

# An Understanding Of Financial Derivatives

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## < EXECUTIVE SUMMARY >

◆ Derivative products initially emerged as hedging devices against fluctuations in commodity prices. These offer organisations the opportunity to break financial risks into smaller components to best meet specific risk management objectives. A derivative is an instrument where payoffs are derived from a more primitive or fundamental good. A financial derivative is a financial instrument, whose payoffs depend on another financial instrument underlying the transaction. Derivatives offer benefits such as risk management and efficiency in trading etc. to its users. Financial deriva-

tives should be considered for inclusion in any organisation's risk-control arsenal. The most common financial derivative products can be classified as forwards, futures, options and swaps. Derivatives also have a darker side. Without a clearly defined risk management strategy, excessive use of financial derivatives can cause serious losses and can threaten the firm's long-term objectives. Derivatives being an important risk management tool necessitate its users to understand the intended function and the safety precautions before being put to use for the benefit of the society at large.



Derivatives remain a type of financial instruments that few of us understand and fewer still fully appreciate, although many of us have invested indirectly in derivatives by investing in a Mutual Fund whose underlying assets may include derivative products. Even, the financial derivatives have changed the face of finance by creating new ways to understand, measure and manage financial risks.



Derivatives offer organisations the opportunity to break financial risks into smaller components and then to buy and sell those components to best meet specific risk manage-

### Emergence of financial derivative products

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. In the class of equity derivatives the world over, futures and options on stock indices have gained more popularity than on individual stocks, especially among institutional investors, who are major users of index-linked derivatives. Even small investors find these useful due to high correlation of the popular indexes with various portfolios and ease of use. The lower costs associated with index derivatives vis-a-vis derivative products based on individual securities is another reason for their growing use.

Source: [www.nseindia.com](http://www.nseindia.com)

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ment objectives. Using derivatives should be considered as a part of any organisation's risk management strategy to ensure that value enhancing investment opportunities can be pursued.

## INTRODUCTION TO DERIVATIVES

A derivative is an instrument whose payoffs depend on a more primitive or fundamental good. It is a contractual relationship between parties where payoffs are derived from some agreed upon benchmark. These do not have independent existence without underlying product or commodity. Even, derivatives do not have their own value and rather they derive their value from some underlying product or commodity.



A financial derivative is a financial instrument, whose payoffs depend on another financial instrument or we can say a financial derivative is a financial instrument, whose value is linked in some way to the value of another instrument, underlying the transaction. The underlying instrument could be securities, currencies or indices. For example an option on a share of stock depends on the value of the underlying share.

### To quote

“A derivative can be defined as a financial instrument whose value depends on (or derives from) the values of other, more basic underlying variables.”

John C. Hull

“A derivative is simply a financial instrument (or even more simply an agreement between two people) which has a value determined by the price of something else.”

Robert L. McDonald

Section 2 (aa) of the Securities Contracts (Regulation) Act [SC(R)A], 1956 defines derivatives as

“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

Derivatives are securities under the SC(R)A and hence the trading of derivatives is governed by the regulatory framework under the SC(R)A.

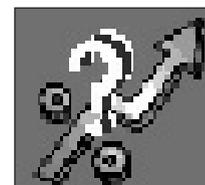
There is no definitive list of derivative products and the types of derivative products that can be developed are limited by human imagination only. However the most common financial derivatives can be classified as forwards, futures, options and swaps.

## APPLICATION OF FINANCIAL DERIVATIVES

Some of the benefits that financial derivatives bring to its users may be enumerated as:

### Risk Management

Risk management is not about the elimination of risk rather it is about the management of risk. Financial derivatives provide a powerful tool for limiting risks that individuals and organizations face in the ordinary conduct of their businesses. Successful risk management with derivatives requires a thorough understanding of the principles that govern the pricing of financial derivatives. Used correctly, derivatives can save costs and increase returns.



### Trading Efficiency

Derivatives allow for the free trading of individual risk components, thereby improving market efficiency. Traders can use a position in one or more financial derivatives as a substitute for a position in the underlying instruments. In many instances traders find financial derivatives to be a more attractive instrument than the underlying security. Reason being, the greater amount of liquidity in the market offered by the financial derivatives and lower transaction costs associated with trading a financial derivative as compared to the costs of trading the underlying instrument.



### Speculation

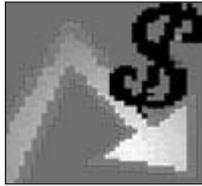
Serving as a speculative tool is not the only use, and probably not the most important use, of financial deriv-

atives. Financial derivatives are considered to be risky. However, these instruments act as a powerful instrument for knowledgeable traders to expose themselves to properly calculated and well understood risks in pursuit of a reward i.e. profit.

## FORWARD CONTRACTS

These are the simplest form of derivative contracts.

A forward contract is an agreement between parties to buy/sell a specified quantity of an asset at a certain future date for a certain price. One of the parties to a forward contract assumes a long position and agrees to buy the underlying asset at a certain future date for a certain price. The other party to the contract assumes a short position and agrees to sell the asset on the same date for the same price. The specified price is referred to as the delivery price. The contract terms like delivery price and quantity are mutually agreed upon by the parties to the contract. No margins are generally payable by any of the parties to the other.

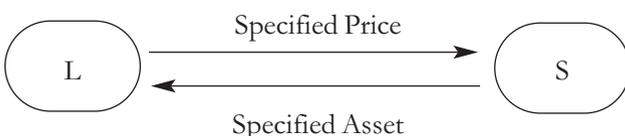


### Features

Salient features of forward contracts may be enumerated as:

- Each contract is custom designed, and hence is unique in terms of contract size, maturity date and the asset type and quality,
- On the expiration date, the contract is normally settled by the delivery of the asset,
- Forward contracts being bilateral contracts are exposed to counter party risk, and
- If the party wishes to cancel the contract or change any of its terms, it has necessarily to go to the same counter party.

**Illustration:** On 1<sup>st</sup> April, Mr. 'L' enters into a forward contract with Mr. 'S' and agrees to purchase 1000 shares of 'X Ltd.' for a pre-determined price of Rs. 10 three months forward. Here on the fixed future date, Mr. 'L' will get the 1000 shares and will pay the price i.e. Rs. 10,000 and Mr. 'S' will deliver the shares and will receive the money.



The contract is settled at maturity date. The holder of the short position delivers the asset to the holder of the long position in return for a cash amount equivalent to the delivery price. Forwards contracts are traded over the counter and are not dealt with on an exchange. These have certain flexibility and are self-regulatory. Forwards markets afford privacy that is not there in the exchange trading. Lack of liquidity and counter party default risks are the main drawbacks of a forward contract.

## FUTURES CONTRACTS

A futures contract is one by which one party agrees to buy from / sell to the other party at a specified future time, a specified asset at a price agreed at the time of the contract and payable on maturity date. The agreed price is known as the strike price. The underlying asset can be a commodity, currency, debt or equity security etc. Unlike forward contracts, futures are usually performed by the payment of difference between the strike price and the market price on the fixed future date, and not by the physical delivery and the payment in full on that date.



### Features

Futures contracts can be characterised by:

- An organised exchange,
- Standardised contract terms viz. the underlying asset, the time of maturity and the manner of maturity etc.,
- Associated clearinghouse to ensure smooth functioning of the market,
- Margin requirements and daily settlement to act as further safeguard, and
- Existence of a regulatory authority.

Futures contracts being traded on organised exchanges impart liquidity to a transaction. The clearinghouse, being the counter party to both sides of a transaction, provides a mechanism that guarantees the honouring of the contract and ensuring very low level of default.

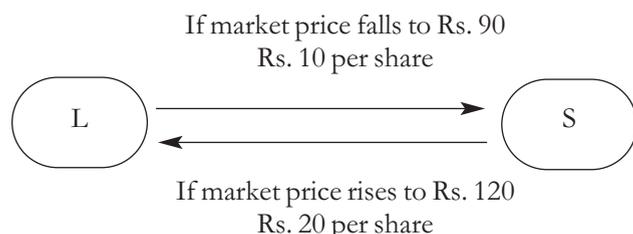
### Types of Futures

Few types of financial futures are:

- Currency futures
- Interest futures
- Stock index futures

**Illustration:** On 1<sup>st</sup> September, Mr. 'L' enters into a futures contract to purchase 100 equity shares of 'X Ltd.' at an agreed price of Rs. 100 in December. If on the

maturity date (as determined by the rules of the exchange for the month of December) the price of the equity stock rises to Rs. 120 Mr. 'L' will receive Rs. 20 per share and otherwise if the price of the share falls to Rs. 90 Mr. 'L' will pay Rs. 10 per share.



As compared to a forward contract the futures are normally settled only by the difference between the strike price and the market price as on maturity date.

## OPTION CONTRACTS

The literal meaning of the word 'option' is 'choice' or we can say 'an alternative for choice'. In derivatives market also, the idea remains the same. An option contract gives the buyer of the option a right (but not the obligation) to buy / sell the underlying asset at a specified price on or before a specified future date. As compared to forwards and futures, the option holder is not under an obligation to exercise the right. Another distinguishing feature is that, while it does not cost anything to enter into a forward contract or a futures contract, an investor must pay to the option writer to purchase an option contract. The amount paid by the buyer of the option to the seller of the option is referred to as the premium. For this reward i.e. the option premium, the option seller is under an obligation to sell / buy the underlying asset at the specified price whenever the buyer of the option chooses to exercise the right. Option contracts having simple standard features are usually called plain vanilla contracts. Contracts having non-standard features are also available that have been created by financial engineers. These are called exotic derivative contracts. These are generally not traded on exchanges and are structured between parties on their own. The relevance of exotic options can be understood from these lines:

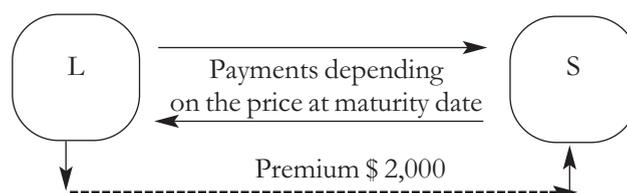
"Exotic products come about for a number of reasons. Sometimes they meet a genuine hedging need in the market; sometimes there are tax, accounting, legal, or regulatory reasons why corporate treasurers find exotic



products attractive; sometimes the products are designed to reflect a corporate treasurer's view on potential future movements in particular market variables; occasionally an exotic product is designed by an investment bank to appear more attractive than it is to an unwary corporate treasurer."

John C. Hull

**Illustration:** Mr. 'L' pays \$ 2,000 to buy a 'December 103' call option on a \$ 100,000 US Treasury bond at an exercise price of \$ 103. If the price rises above \$ 103, Mr. 'L' will gain from the difference and if the price falls below \$ 103, the maximum amount which Mr. 'L' may lose is the amount of premium paid.



### American Option and European Option

It is essential to be aware of the distinction between an American Option and a European Option. An American option can be exercised at any time upto the expiration date, a European option can be exercised only on the expiration date itself. Most of the option contracts traded on exchanges are of the type of American option.



### Call Option and Put Option

Basically there are two types of options viz. Call Option and Put Option. A call option gives the buyer of the option the right (but not the obligation) to buy the underlying asset on or before a certain future date for a specified price whereas a put option gives the buyer of the option the right (but not the obligation) to sell the underlying asset on or before a certain future date for a specified price. As stated earlier, the option writer is under an obligation to sell / buy the underlying asset at the specified price whenever the buyer of the option chooses to exercise the right. The specified price is known as the strike price or the exercise price and the specified date is known as the exercise date, maturity date or the expiration date.

### Moneyness of an Option

Options can also be characterised in terms of their

money. Using notations, the moneyness of an option for the buyer of the option can be summarised as:



	Call Option	Put Option
In-the-money	$M > E$	$M < E$
At-the-money	$M = E$	$M = E$
Out-of-the-money	$M < E$	$M > E$

Where M is the prevalent market price for the option contract, and E is the exercise price of the option contract. For a seller / writer of the option the  $>$ ,  $<$  signs will reverse. In words, the moneyness of the option for the buyer of the option can be stated as:

- An in-the-money option is one that would lead to a positive cash flow to the buyer of the option if the buyer of the option exercises the option at the current market price.
- An at-the-money option is one that would lead to a zero cash flow to the buyer of the option if the buyer of the option exercises the option at the current market price.
- An out-of-the-money option is one that would lead to a negative cash flow to the buyer of the option if the buyer of the option exercises the option at the current market price.

**Cap, Floor and Collar**

Limits can be set on the strike price for an option contract. If an upper limit on the strike price is set, it is called a ‘cap’. If a lower limit on the strike price is fixed, it is called a ‘floor’. If a combination of both i.e. ‘cap’ and ‘floor’ is used i.e. a range is fixed for the strike price, it is called a ‘collar’. If the market price as on maturity date is higher than the cap price, then the cap price will be the strike price, otherwise the market price will be the strike price. Similarly, if the market price as on maturity date is lower than the floor price, then the floor price will be the strike price otherwise the market price will be the strike price. In other words we can conclude that in case of a collar, the strike price can’t be higher than the cap price and lower than the floor price.

Similar to a futures contract, the exercise of the option, normally, results in a contract to pay the difference between the strike price and the market price on the date of exercise of the option. As mentioned earlier, the buyer of the option has to pay a premium for purchasing the option. Hence on the maturity date the maximum

loss that the buyer may suffer is the amount of the premium paid and the gain depends on the difference between the strike price and the market price as on maturity date. On the other hand, the gain to the seller of the option is limited to the amount of the premium received but the risk of loss is unlimited, depending upon the strike price and the market price as on maturity date.

**SWAPS**



A swap can be defined as a barter or exchange. A swap is a contract whereby parties agree to exchange obligations that each of them have under their respective underlying contracts or we can say a swap is an agreement between two or more parties to exchange sequences of cash flows over a period in the future. The parties that agree to the swap are known as counter parties.



**Types of Swaps**

There are two basic kinds of swaps:

- Interest rate swaps
- Currency swaps

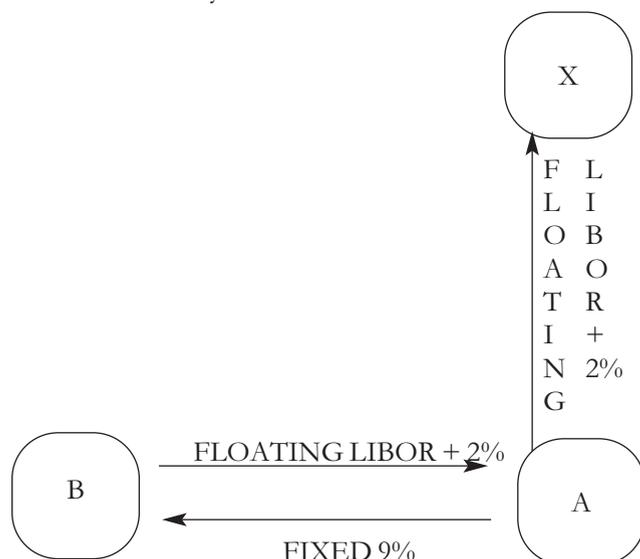
Today, interest rate swaps account for the majority of banks’ swap activity and the fixed-for-floating rate swap is the most common interest rate swap. In such a swap, one party agrees to make fixed-rate interest payments in return for floating-rate interest payments from the counterparty, with the interest rate payment calculations based on a hypothetical amount of principal called the notional amount. Notional amount typically does not change hands and it is simply used to calculate payments. Currency swaps involve exchange of currencies at specified exchange rates and to make a series of interest payments for the currency that is received at specified intervals.

**Illustration:** Mr. ‘A’ has borrowed from Mr. ‘X’ at LIBOR (London Interbank Offered Rate) + 2%. Mr. ‘A’ to cover the transaction from unanticipated fluctuations in the interest rate, agrees to pay a fixed rate of 9% to Mr. ‘B’ and in return Mr. ‘B’ agrees to pay a floating rate i.e. LIBOR + 2% to Mr. ‘A’. Although the actual payments between Mr. ‘A’ and Mr. ‘B’ will take place only on a net basis. The net result of the transaction for each of the parties will be as follows:

- Mr. ‘X’ will receive the amount at LIBOR + 2%.
- Mr. ‘A’s liability is fixed at 9%.
- Mr. ‘B’s liability depends on the fluctuating rate i.e. LIBOR.

Let us take two cases:

- 1) LIBOR = 10%  
In this case Mr. 'A' will pay to Mr. 'X' at the rate of 12%. Mr. 'B' will pay to Mr. 'A' at the rate of 3%. Hence the net liability of Mr. 'A' is 9% only.
- 2) LIBOR = 5%  
In this case Mr. 'A' will pay to Mr. 'X' at the rate of 7% and Mr. 'A' will pay to Mr. 'B' at the rate of 2%. Hence the net liability of Mr. 'A' remains the same at 9%.



Swaps are not traded on organized exchanges and have an informal market among the dealers. As distinguished from futures and options, swaps market affords privacy that may not be there in exchange trading. The inherent limitations of a swaps market may be summarized as follows; first, a party has to find a counter party willing to take the opposite side of the transaction, second, a swap agreement, being between two counter parties cannot be altered or terminated early without the agreement of both the parties, third, parties to the swap must be certain of the creditworthiness of the counter party as the risk of counter party default is always there.

## CONCLUSION

Financial derivatives should be considered for inclusion in any organisation's risk-control arsenal. Using derivatives allows risk to be broken into pieces that can be managed independently. The viability of financial derivatives rests on the principle of comparative advantage i.e. the relative cost of holding specific risks. Whenever comparative advantage exists, trade can benefit all parties involved. From a market-oriented per-

spective financial derivatives offer free trading of individual risk components.

As there is always an other side of the coin, derivatives also have a darker side. Organisations like Procter & Gamble, Long Term Capital Management, Barings Bank, etc. experienced huge losses from derivatives trading in the early 1990's. Barings Bank lost around



\$1 billion just because one trader whose job was to carry out low risk arbitrage switched from being an arbitrageur to a speculator. The hedge fund named Long Term Capital Management lost about \$4 billion in 1998. The treasury department of Procter & Gamble lost about \$90 million trading highly exotic interest rate derivatives contracts. These losses warn the users against excessive use of financial derivatives. Without a clearly defined risk management strategy, excessive use of financial derivatives can be risky. They can cause serious losses and can threaten the firm's long-term objectives. Hence it is important that users of derivatives fully understand the complexity of financial derivative contracts and accompanying risks. Derivatives being an important risk management tool necessitate its users to understand the intended function and the safety precautions before being put to use. The use of derivatives should be integrated into an organisation's overall risk-management strategy and should be in harmony with its objectives. Hence the users of derivatives can use these instruments for their benefit and for the benefit of the society at large.

## REFERENCES

- Options, Futures, and Other Derivatives – John C. Hull
- Derivatives Markets – Robert L. McDonald
- Futures, Options, & Swaps – Robert W. Kolb
- [www.nseindia.com](http://www.nseindia.com)

Note: The Council of the Institute of Chartered accountants of India has recently issued a "Guidance Note on Accounting for Equity Index and Equity Stock Futures and Options" which is available at pages 245 to 266 of the September 2003 issue of "The Chartered Accountant". It is also available on the website of the Institute at <http://www.icaai.org/announ/GNonAcingforFuturesandOptions.doc>. For accounting related aspects readers may kindly refer the Guidance Note. ■