DERIVATIVES - BASICS TYPES AND USES

Roughly about seven years ago NSE, one of the leading stock exchanges in India (other includes BSE) inaugurated the trading in Derivatives. Though there were initial hesitation amongst Indian investors with respect to these supposedly new financial instruments, derivatives were soon started acceptance by Indian investors open handedly. Today NSE is among the globe’s top exchanges in F&O activity and Indian stock futures are among the most liquid, high volume instruments in the world.

Chartered Accountants as a professional people are expected to know a lot, if not everything about derivatives. Although it is true that many of Chartered Accountants still opt for core fields of Audit and taxation, it is equally true that we all should have moderate (more than a
basic level) knowledge for derivatives. What they are, their types, their uses. There are many more dimensions in the study of derivatives like pricing of derivatives, “Credit contracts” etc, which are a bit more complex, but this article is aimed at providing a quick insight on the meaning, types and important uses of derivatives world wide.

**DERIVATIVES-WHAT THEY ARE:**

Derivative, speaking very broadly, is a” *price Guarantee*”. It is like you are being guaranteed a fixed price to pay for your byke today which you wish to purchase say, after six months. It may further be assumed that price of the byke today is Rs.45,000/- which after six months can move to Rs.50,000/- or can be available cheap at Rs.42,000/- (due to competition etc) . Even though price gap is not huge, but if one has limited resources, then one is most likely to opt for a definite (fixed) price (simply because it can help one to arrange for the resources in time).

Now (again) broadly speaking, Derivatives do similar things, though in big variety of ways (there can be hundreds of ways) on a very very large scale.

Let’s look here at a quick definition of Derivatives containing all the important features:

“Derivatives are agreements between future buyer and future seller (for a thing called “*underlier*”) which can be or must be sold at a future date.”

Every Derivative specifies a future price at which some item or commodity must be or can be sold. This item is called “*underlier*”. “*Underlier*” can be a physical thing like wheat or oil etc. , or it can be an abstract thing like “price index”. 
The above definition gives us important feature of Derivatives viz; Future Buyer, Future Seller, Future Date, Underlier.

**WHY THE TERM “DERIVATIVE”:**

There is a reason. Derivatives are financial instruments which derive their value from something else. That something else is another instrument or commodity. In other words you can say that value of a Derivative is closely linked with value of other instrument or commodity.

Now, on one side we have non-derivative financial instruments like Shares, Currencies etc. Value of shares of a company depends upon market sentiments, performance of company and many many more factors. Value of currency depends upon interest rates (one may refer Interest rate parity theory), economic performance, demand supply constraints etc. Now these shares, currencies etc are non-derivative financial instruments because their value does not depend upon any instrument or commodity.

On the other side, Derivatives are those financial instruments whose value is closely linked with current market price of underlier (which is called Spot rate of Underlier). A quick example here will make things simpler to understand: Say a juice manufacturing company wants to book an order for 1000kgs of a particular fruit, say Apples (it’s a large manufacturing company) after six months from today’s date. It enters into a contract with farmer John to buy Apples @ Rs. 50/- per Kg after six months from now (by the way, this is an example of Forward contract). After six months, the same commodity (Apples) is being sold at say Rs.60/- per kg. It is evident that the manufacturing company saved a good amount. How much did it saved? or to put it in other words, what’s the worth of this derivative contract? Its Rs.10000/- [i.e (60-50)*1000kg]
This is a very basic example. But it explains as to how the value of derivative is being derived from something else. Hence the term Derivative.

TYPES OF DERIVATIVES:

There are four basic types of Derivatives as shown in the following Diagram:-

1. FORWARD CONTRACTS: These are simplest of all derivatives and hence one can start with forwards at first instance.

A forward contract is simply an agreement to buy or sell a underlier at a price specified at a future a future date.

Now remember one more thing. A person who agrees to sell at a future date in said to take a short position and a person who agrees to buy at a future date is said to take a long position. These two terms are just financial terminologies. Lets look now at the abovementioned example of forwards (a juice manufacturing co. ). We can calculate the gain made by the manfg co (long position, by the way) by using a payoff function.

\[ P=K-S \]

where

\[ P= \text{Payoff} \]
\( K = \) Contract price (read ‘fixed price’)

\( S = \) Spot price of underlier at end of contract.

Now contract price remaining fixed, let's further assume that spot price of Apples (commodity) are Rs. 30, 40, 50, 60, 70 in different possible situations. This helps us to plot the table as below:

<table>
<thead>
<tr>
<th>S</th>
<th>K</th>
<th>Plong=K-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>60</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>40</td>
<td>50</td>
<td>-10</td>
</tr>
<tr>
<td>30</td>
<td>50</td>
<td>-20</td>
</tr>
</tbody>
</table>

We can plot the above values on a graph paper to get a figure which will look like one below:-
### A Payoff Table

<table>
<thead>
<tr>
<th>PAYOFF</th>
<th>SPOT PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
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<td>30</td>
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<td>60</td>
<td>50</td>
</tr>
<tr>
<td>70</td>
<td>60</td>
</tr>
</tbody>
</table>

A payoff table is a handy device to understand any derivative. On X Axis, plot “Spot Price” and on Y axis plot the “Payoff.” By joining all the points we get a straight line. A payoff diagram explains the payoff function. AKB is the Long position and GKH is the short position. It may be appreciated that payoff for the short position can be drawn on similar lines and in that case will intersect the previous line at point”K”.

### 2. Hedging with Futures:

[Diagram of AKB and GKH positions]
Future Contracts are no different from Forward contracts as they serve the same purpose. The main difference between a future and a forward is that Futures are standardized contracts whereas forwards are tailor-made. One more important difference is the method of operation of Futures is different.

There are hundreds of types of future contracts regularly traded on exchanges around the globe. Their underliers fall in two groups. a) Commodity underliers, which are physical goods that can be (but need not be) physically delivered) and (b) Financial underliers, which are securities such as government bond, currency, etc. There are many exchanges around the world where futures are traded. e.g.: New York Mercantile Stock Exchange (NYMEX), Chicago Board of Trade (CBOT), Hong Kong Futures Exchange (HKFE).

Some contracts are traded exclusively on one exchange, some others are not.

Unlike Forwards, in case of Futures, there is a daily settlement. At the end of every trading day, all the pending futures are Marked to Market by the exchange. It means that all outstanding futures are valued at their current value at the closing of each day. This determines the payoff for the buyer and the seller. Further, there is also a margin deposit to be paid by each party in the contract. This (margin deposit) is same as asking for the collateral security for the sake of performance of the contract.

This daily marking to market is also useful to reduce the credit risk. Credit risk is the risk that the opposite party will not honor its obligations. In future, because, each party settles up daily, realizing any profit or loss on that day itself, it mitigates the credit risk.

3. HEDGING WITH SWAPS:

“Swaps” implies an ‘exchange’. Swap contract is an agreement to exchange two streams of cash flows over a period of time.
We know that when we take a loan, we have to pay an interest (i.e. cost of debt). Now interest rate may be fixed or it can be floating (i.e. fluctuating as per the agreed terms).

The use of a Swap is that it allows a company to borrow Capital at fixed rate (or say, floating rate) and later on exchange its interest payments at floating rate (or for that matter, fixed rate), if it desires so. This is called interest rate swap. For example, say a Company has raised a loan for a million

1. Floating rate is determined with reference to a market determined rate, say e.g. LIBOR (London Inter Bank Offer Rate)

US$ at floating rate as at the time of borrowing, the interest rates were low and expected to be more or less at same level for entire tenure of loan. But if after some time interest rates are showing greater volatility, and company finds itself at a risky position. Now it wants to convert its floating rate loan to fixed rate loan. What should the company do? It can switch to a fixed rate by converting existing loan, but that option may be costly as it involves transactions costs. Another possible alternative is that company enters into a swap arrangement to convert its floating rate loan into fixed. Thus company can hedge its interest rate risk effectively.

Interest rate swaps, as discussed above, are one use of swaps. There is another important use of swaps, i.e., Currency Swaps. Till now, we have considered swaps in which all things (principal, fixed interest, floating interest) are denominated in the same currency. Now, it may be possible that one has raised loan in one currency (say in US$) but really wishes to pay in terms of another currency (say Rs.). One important thing to note is that in the earlier case of Interest rate swaps; only the interest amount is to be exchanged as principal amount was not changing. But in case like one cited just above (i.e. cross currency loan), the principal amount changes, because of exchange rate of currency changes. Here one can use the currency swaps to hedge his position.
HEDGING WITH OPTION:

After discussing about Forwards, Futures and Swaps, another basic type of derivative is Options. Options give a right, but not the obligation to buy or sell something at a future date. Thus one may (or may not) use the option agreement. For easy understanding, one may think of a coupon. If you have got a coupon to purchase 1Kg of Rice at Rs.15/- (say), which are selling at around Rs.17/- per Kg, the coupon is worth utilizing. But if you find that in the market, same 1kg wheat can be purchased for Rs. 13/-, then you can simply buy it from the market itself at current spot price and throw away the coupon. This is because one is not under any obligation to use it.

An Option is also a price guarantee like any other derivative, but it may or may not result in a future sale. There are two parties to an option, Option buyer (or long party or holder) and Option seller (or Long party) Option buyer, since he gets a right only and not an obligation, is required to compensate to seller for his privilege, by paying him a premium.

Options can be of two types, call option and Put Option. Call Option gives a right to its holder to buy the underlier at contract (i.e. fixed) price and Put option gives the holder the right to sell at a fixed price. Further, the price at which the holder may buy or sell (as the case may be), is known as strike price.

Consider a simple example. You buy a European call option on stock of XYZ ltd with a strike price of Rs. 100/- expiring after 6 months (i.e. you got a right to buy stock at Rs. 100). Now if in six months the said stock is trading @ Rs. 120/-, you can purchase the stock at Rs. 100/- for what others must pay Rs. 120/- . So you are at a gain of Rs. 20/- !!

As for when can the holder exercise the option, there are again two types, viz, American Option and European Option. A European Option can be exercised only at the end of the tenure (6 months in above example), but an American Option can be exercised at any time.
during the validity of the option period. American Options are thus considered to be more valuable.

**USE OF DERIVATIVES:**

Individuals and Corporate are risk averse. They do not like risk and uncertainties in their financial planning. Financial uncertainties expose them to unexpected losses and thereby reduce the value of their investments. But the fact is that the uncertainties do exist. We do not know what the future will bring for us. Derivatives are a powerful tool to quantify certainty and thereby enable us to manage the risks better. Many examples follow. Look at the recently declared results of TCS (Tata Consultancy Services), which is India’s largest software firm. In recently announced quarterly results for the first quarter of financial year 2008, it is shown that largely because of the forex hedging gains (and due to lower tax provisioning also), it could protect its margin decline. It may be noted that Rupee has appreciated in terms of dollars by around 6.5% in a very short span of few months, hitting the margins of all major exporters in India. The company has thus shown its effective forex risk hedging. A proper use of derivative can help company to manage the unexpected losses.

Now a word of caution. The derivatives are the financial instruments which need to be used with caution. For the things may wrong with derivatives too. And when this happens, it generally costs a company much huge losses than it can absorb. Many such dark chapters are also included in the history of derivatives. Prominent among them would be names of Metallgesellschaft(MGAG), Barings bank and Long Term Capital Management. All these instances have shown that the reason for things going wrong is the misuse of derivatives.
Today, the derivatives market is flourishing all over the world. It has also opened various opportunities for a Chartered Accountant throughout the world. Chartered Accountants with their analytical skills and knowledge are already proving a great help to corporate around the world in many fields including derivatives.
Dear sir I had ever heard derivatives in such simple manner earlier. Thanks a lot. But I have one query that what happens if in the example of options prices goes down please help me
out for the same

RUCHIKA JAIN
i never ustoed 'derivatives this much easily. Thanx a ton sir !!!

KRM DILIP NAGARAJAN
very useeful. thank you ;)

RAHUL SAHU
Thank you sir

MUKUL KR. SINGH
Amazing!!!!

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