FINANCIAL DERIVATIVES: FUTURES – THE BIG PICTURE SIMPLY EXPLAINED

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About the Post:

This post aims to explain the fundamental concept of Financial Derivatives: Futures using illustrative examples. It does so without plunging into intricacies and without use of all technical terms- rather with minimal use of technical terms. Focusing on the big picture, it explains the working mechanism of Futures and also explains why Futures Market & the Derivatives Market in general is called a Zero-Sum game.

Let's begin with some definitions. A futures contract is a standardized agreement between a buyer and a seller to exchange an amount and grade of an item at a specific price and future date. The item or underlying asset may be an agricultural commodity, a metal, mineral or energy commodity, a financial instrument or a foreign currency. Because futures contracts are derived from these underlying assets, they belong to a family of financial instruments called Derivatives. Derivatives are financial instruments whose values depend on the value of other underlying financial instruments. The main types of derivatives are futures, forwards, options and swaps.

Generally speaking, to hedge is to take opposing positions in the futures and cash markets. Hedgers include farmers, merchants, millers, utilities and commodities export and import firms, refiners, lenders, hedge fund managers and so on. Meanwhile, to speculate is to take a position in the futures market with no counter-position in the cash market. Speculators may not be affiliated with the underlying cash markets.

Futures markets enable hedgers to shift price risk – asset price volatility – to speculators in return for basis risk – changes in the difference between a futures price and the cash, or current spot price of the underlying asset. Because basis risk is typically less than asset price risk, the financial community views hedging as a form of risk management and speculating as a form of risk taking.

Speculators make the hedge possible because they absorb the inventory's price risk; for example, the ultimate counterparty to the inventory dealer's short position is a speculator.

Consider an example-

'Trader A' and 'Trader D' wish to enter into a Futures contract having opposite views on the Future price of a certain asset. Trader A believes the price of that asset would increase over a month's period whereas Trader D holds a contrary view. Therefore Trader A chooses to enter into an agreement with Trader D, whereby it's agreed that Trader A is entitled to buy the agreed upon asset from Trader D at current market price at the specific future date-i.e. at Futures expiry. If at that specific future date the Market price of that agreed upon asset has indeed increased, Trader A stands to gain since Trader A is entitled to purchase that asset at the older lesser market price at which Trader A entered into a futures contract; whereas Trader D losses as he is obligated to sell the asset at a lower price than it's actual market price. However if after a months period the price of that asset decreases then Trader D stands to gain as Trader A is obligated to purchase the asset from Trader D at a price higher that it's actual market price.

That means if Trader A's judgement of asset price is correct Trader A 'gains' at the cost of Trader D's 'loss'. Similarly, If Trader D's speculation happen to be right Trader D gains at Trader A's cost. If the future price remains unchanged it's a 'no profit no loss' situation for both.

Another way to write this- Say current market price of asset is Rs.5 thousand. A goes long [Buyer]-D goes short[Seller]- 'A' buys from 'D'. A buys at 5k while D sells at 5k. At futures expiry their positions will have to be squared of. At Futures expiry the Futures price and the underlying price of that asset would converge, it is against this price that the open positions of transacting parties would be squared off. If the market price of that asset at futures expiry happens to be 6k. A's position would be squared of-sold at 6k.[Sell price – Buy price = 6k-5k = +1k i.e Trader A has made a profit of 1k.]Since D had initially shorted [Sold] hence for squaring of D's position asset would be purchased at Futures expiry price[Final Price] [Sell price – Buy price = 5k – 6k = -1k i.e. Trader D has made a loss of 1k]. Total of all profits and losses is a Zero.

So, what is a zero-sum game? Zero-sum is a situation in game theory in which one person's gain is equivalent to another's loss, so the net change in wealth or benefit is zero. A zero-sum game may have as few as two players, or millions of participants. For every party who gains on a contract, there is a counter-party who loses.

Consider another example of a Futures contract- [a simple example with just 8 participants- low liquidity]
At the start of the trading session A and D enter into a futures contract -refer to the figure below .A buys from D at price Rs 5. last traded price[LTP]for now. Assume no other transaction told place for this asset's future's contract for the day. LTP is 5 for the day. After a day P and Q enter into a future's contract. P-Buyer, Q-Seller at price Rs 6. Please refer to the diagram & table for the entire transaction sequence. The figure on the following page is self-explanatory.

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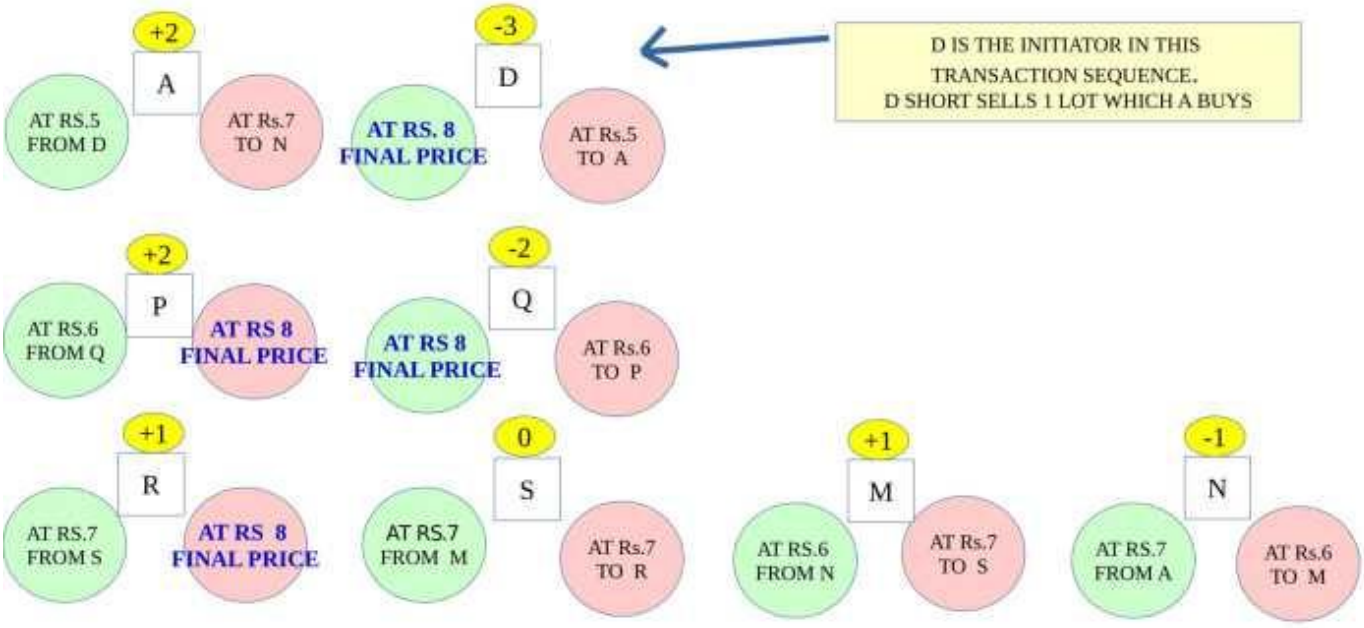
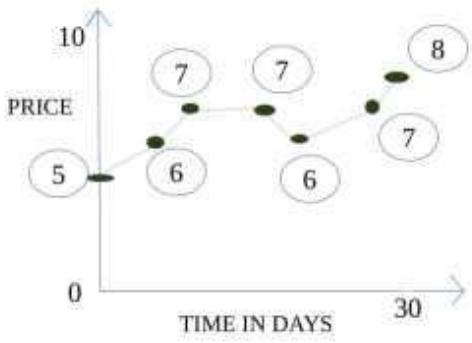
FINANCIAL DERIVATIVES: FUTURES- EXAMPLE TO SHOW WORKING MECHANISM

TRANSACTION NO <Sequence>	TRANSACTING PARTIES	PRICE	QUANTITY<kept constant for simplicity>
1	A-BUYER D-SELLER	5	1 LOT
2	P-BUYER Q-SELLER	6	1 LOT
3	R-BUYER S-SELLER	7	1 LOT
4	S-BUYER M-SELLER	7	1 LOT
5	M-BUYER N-SELLER	6	1 LOT
6	N-BUYER A-SELLER	7	1 LOT



TOTAL OF ALL PROFITS AND LOSSES = (+2) + (-3) + (+2) +(-2) + (+1) +(0) + (+1) +(-1) = 0
TOTAL OF ALL PROFITS OF ALL GAINERS= (+2) + (+2) + (+1) +(+1) = (+6)
TOTAL OF ALL LOSSES OF ALL LOSERS= (-3) +(-2) +(-1) = (-6)



A SIMPLE FUTURES CONTRACT OF A MONTHS DURATION WITH ONLY 8 PARTICIPANTS. 6 TRANSACTIONS EXECUTED BY PARTICIPANTS + 4 TRANSACTIONS EXECUTED AT EXPIRY OF CONTRACT AS PART OF SETTLEMENT MECHANISM FOR- D,P,Q AND R

GREEN ELLIPSE INDICATES **BUY**

RED ELLIPSE INDICATES **SELL**

+/- INDICATES PROFIT OR LOSS.+VE VALUE FOR PROFIT & -VE VALUE FOR LOSS

EX: PRICE CHART FOR 'XYZ COMPANY' FUTURES CONTRACT OF ABOVE EXAMPLE

The final price-settlement price at futures expiry at the end of the month happens to be Rs. 8. Hence all open positions would be squared off against that. A,S,M and N have already squared off their positions prior to expiry hence only positions of D,P,Q and R would be squared off.

After understanding the above example it shouldn't be difficult to see that the game remains a zero-sum game even if thousands of participants participate and number of transactions increase. It shouldn't also be difficult to see that the game still remains a zero-sum game if the traded quantities per participant are made variable. So also it is easier to see that forwards contracts and options too are zero-sum games – excluding transaction costs/taxes, else they are negative-sum games.

Intra-day trading- excluding delivery trades [i.e.- trades with actual delivery of the security] is another example of a zero-sum game of a single day duration. The sum of multiple zero-sum games still remains a zero-sum game. Futures market also allows intraday trades. So it's like multiple smaller zero-sum games embedded in a larger purely zero-sum game.

That is the reason why the Futures Market & the Derivatives Market in general is called a Zero-Sum game. There are other aspects to this zero-sum game which shall be discussed in coming posts.