

# FUTURES & OPTIONS

A Complete Study Guide for Beginners &  
Intermediates

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# Chapter 1: Introduction to Financial Derivatives

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The financial markets are vast and complex, offering a multitude of instruments for investment and risk management. Among these, **derivatives** hold a significant position due to their ability to hedge risk and provide leverage. This chapter lays the foundation for understanding the complex world of Futures and Options.

## Definition: Derivative

A derivative is a financial contract that derives its value from an underlying asset. The underlying asset can be stocks, indices, commodities (like gold or oil), currencies, or even interest rates. The derivative itself has no intrinsic value; its value fluctuates based on the movements of the underlying asset.

## The History and Evolution

While modern derivatives markets are highly sophisticated, the concept is ancient. The earliest recorded derivatives date back to the 2nd millennium BC in Mesopotamia, where clay tokens were used to track delivery commitments for agricultural goods. In the 17th century, the Dojima Rice Exchange in Japan established the first organized futures market for rice. Today, derivatives are traded on global electronic exchanges, handling trillions of dollars in volume daily.

## Why are Derivatives Important?

Derivatives serve three primary functions in the financial ecosystem:

- Hedging:** This is essentially an insurance policy. A farmer might sell wheat futures to lock in a price before harvest, protecting against a price drop.
- Speculation:** Traders use derivatives to bet on the future price direction of an asset to generate profit. Because derivatives offer leverage, small price movements can result in significant gains (or losses).

3. **Arbitrage:** This involves taking advantage of price differences for the same asset in different markets (e.g., spot market vs. futures market) to make a risk-free profit.

Derivatives are broadly classified into four types: *Forwards*, *Futures*, *Options*, and *Swaps*. This book focuses exclusively on the two most popular exchange-traded instruments: Futures and Options.

# Chapter 2: Futures Contracts – Fundamentals

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A **Futures Contract** is a standardized legal agreement to buy or sell something at a predetermined price at a specified time in the future. Unlike "Forwards," which are custom contracts traded Over-the-Counter (OTC), futures are traded on organized exchanges.

## Key Terminology

### Spot Price vs. Futures Price

- **Spot Price:**

The current market price at which an asset can be bought or sold for immediate delivery.

- **Futures Price:**

The price at which the futures contract trades, representing the expected value of the asset at expiry.

Understanding the anatomy of a futures trade is crucial:

- **Expiry Date:** The date on which the contract ceases to exist. On this day, the contract is settled.
- **Lot Size:** Futures are traded in bundles called lots. For example, if the lot size of a stock is 500, buying 1 futures contract means you are controlling 500 shares.
- **Margin:** Unlike stocks where you pay the full price, futures require only a small percentage of the contract value, known as the margin (usually 10-20%). This creates *leverage*.

## Participants in the Futures Ecosystem

Participant	Objective	Risk Profile
<b>Hedgers</b>	Protect against price risk	Risk Averse
<b>Speculators</b>	Profit from price movements	High Risk Tolerance
<b>Arbitrageurs</b>	Profit from market inefficiencies	Very Low Risk

 **NOTE**

Futures contracts are a "Zero Sum Game." For every profit made by a buyer (Long), there is an equivalent loss incurred by the seller (Short), and vice versa. Wealth is merely transferred, not created.

# Chapter 3: Understanding Futures Markets

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The mechanics of the futures market rely heavily on the integrity of the exchange and the clearing house. When two parties enter a trade, they do not face each other directly; they face the **Clearing House**.

## The Role of the Clearing House

The Clearing House acts as the buyer to every seller and the seller to every buyer. This eliminates counterparty risk. If a trader defaults, the Clearing House ensures the other party still gets paid. This is managed through a sophisticated system of margins and daily settlements.

## Mark-to-Market (MTM) Settlement

In futures trading, profits and losses are calculated and settled daily. This process is called "Marking to Market."

*Example:* You buy a Gold Futures contract at \$1,800. At the end of the day, the settlement price is \$1,810. You have made a profit of \$10. The exchange credits \$10 to your account and debits \$10 from the seller's account immediately. The next day, your new base price is \$1,810.

## Open Interest (OI) vs. Volume

While volume tracks the number of contracts traded during a day, **Open Interest** tracks the number of contracts that are active or outstanding (not yet settled).

- **Rising OI + Rising Price:** Indicates a strong Bull market (Long buildup).
- **Rising OI + Falling Price:** Indicates a strong Bear market (Short buildup).
- **Falling OI + Rising Price:** Indicates Short Covering (Bears are exiting).
- **Falling OI + Falling Price:** Indicates Long Unwinding (Bulls are exiting).

## **Concept: Convergence**

As the expiration date approaches, the futures price and the spot price must converge. On the day of expiry,  $\text{Futures Price} = \text{Spot Price}$ . If they do not match, arbitrageurs will step in to profit from the difference until the prices align.

# Chapter 4: Futures Trading Strategies

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Traders use futures not just to gamble on direction, but to execute precise financial strategies. This chapter explores the primary methods used by professionals.

## 1. The Long Hedge

Used by consumers of a commodity who want to lock in a purchase price.

*Scenario:* An airline expects fuel prices to rise. They buy Crude Oil futures today. If oil prices rise, the profit from the futures contract offsets the higher cost of buying actual jet fuel.

## 2. The Short Hedge

Used by producers who want to lock in a selling price.

*Scenario:* A corn farmer fears prices will drop by harvest time. He sells Corn Futures today. If the price drops, the profit from the short futures position offsets the loss he takes when selling his actual corn in the local market.

## 3. Spread Trading

Spread trading involves buying one contract and selling another to profit from the change in the price difference (spread) between them. This is generally lower risk than a naked directional trade.

- **Calendar Spread:** Buying a near-month contract and selling a far-month contract of the same asset.
- **Inter-commodity Spread:** Buying Gold futures and selling Silver futures.

## Practical Example: Speculation

Trader A believes Company X (trading at \$100) will rise. He buys 1 Futures Lot (Size: 1000). Total contract value = \$100,000. Margin requirement (20%) = \$20,000.

**Outcome 1:** Price rises to \$110. Profit =  $(\$110 - \$100) * 1000 = \$10,000$ .

Return on Investment =  $(\$10,000 / \$20,000) = 50\%$ .

**Outcome 2:** Price falls to \$90. Loss =  $(\$90 - \$100) * 1000 = -\$10,000$ .

Loss on Investment = 50%.

 **NOTE**

**Warning:** The leverage shown above cuts both ways. A 10% move in the asset price resulted in a 50% impact on the trader's capital.

# Chapter 5: Options Contracts – Fundamentals

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Options are more complex than futures because they introduce the concept of "rights" versus "obligations." An option gives the buyer the **right, but not the obligation**, to buy or sell an asset.

## Types of Options

### Call Option (CE)

Gives the buyer the right to

#### **BUY**

an asset at a specific price (Strike Price) within a specific time. You buy a Call if you think the market will go UP.

### Put Option (PE)

Gives the buyer the right to

#### **SELL**

an asset at a specific price within a specific time. You buy a Put if you think the market will go DOWN.

## Buyer vs. Seller (Writer)

The buyer pays a fee, known as the **Premium**, to purchase the option. The seller (writer) collects this premium but takes on the obligation to fulfill the contract if the buyer decides to exercise their right.

## Moneyness of Options

Understanding where the stock price is relative to the strike price is vital:

- **In-The-Money (ITM):** The option has intrinsic value. For a Call, Spot Price  $>$  Strike Price.
- **At-The-Money (ATM):** Spot Price  $\approx$  Strike Price.
- **Out-Of-The-Money (OTM):** The option has no intrinsic value. For a Call, Spot Price  $<$  Strike Price.

# Chapter 6: Options Pricing

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Why does an option cost what it costs? The price of an option (Premium) is composed of two parts:

$$\text{Option Premium} = \text{Intrinsic Value} + \text{Time Value}$$

## Intrinsic Value vs. Time Value

**Intrinsic Value** is the real, tangible value if the option were exercised immediately. Only ITM options have intrinsic value. OTM options have zero intrinsic value.

**Time Value** represents the probability that the option will increase in value before expiry. As expiration approaches, time value decays to zero. This phenomenon is known as "Time Decay."

## The Black-Scholes Model

Fisher Black, Myron Scholes, and Robert Merton developed a mathematical model to calculate the fair price of an option. While the math is complex, the inputs are straightforward:

1. Spot Price of the underlying asset
2. Strike Price of the option
3. Time to Expiration
4. Volatility (Implied Volatility)
5. Risk-free Interest Rate

**Implied Volatility (IV)** is perhaps the most critical factor. It measures the market's expectation of future price range. High IV means expensive options; Low IV means cheap options.

# Chapter 7: The Greeks

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To manage an options portfolio professionally, one must understand "The Greeks." These are sensitivity measures that tell you how the option price will change given a change in market variables.

## 1. Delta ( $\Delta$ )

Measures the change in option price for a \$1 change in the underlying stock price.

*Example:* If a Call option has a Delta of 0.5, and the stock moves up by \$1, the option premium will increase by \$0.50.

## 2. Gamma ( $\Gamma$ )

Measures the rate of change of Delta. It tells you how stable your Delta is. Gamma is highest for ATM options.

## 3. Theta ( $\Theta$ ) – The Silent Killer

Measures the time decay. It tells you how much value the option loses every single day as it approaches expiry.

*Note:* Theta is negative for option buyers (you lose money as time passes) and positive for option sellers (you gain money as time passes).

## 4. Vega ( $v$ )

Measures sensitivity to Volatility. If IV increases by 1%, Vega tells you how much the option price will increase.

## 5. Rho ( $\rho$ )

Measures sensitivity to interest rates. It is generally less significant for short-term trading.

 **NOTE**

**Trader Tip:** Professional traders often "Sell Theta" (sell options) to profit from time decay, while "Buying Gamma" (buy options) requires explosive market moves to overcome that decay.

# Chapter 8: Options Trading Strategies

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Combining Calls and Puts allows traders to engineer payoff profiles for any market condition.

## Bullish Strategies

**Bull Call Spread:** Buy a lower strike Call and Sell a higher strike Call. This limits profit but also reduces the cost of the trade.

## Bearish Strategies

**Bear Put Spread:** Buy a higher strike Put and Sell a lower strike Put. Used when expecting a moderate decline.

## Neutral Strategies (Non-Directional)

These strategies profit if the market stays sideways or within a range.

- **Short Straddle:** Sell a Call and a Put at the *same* strike (ATM). You profit from high time decay if the market doesn't move.
- **Short Strangle:** Sell an OTM Call and an OTM Put. Wider range for profit than a straddle, but lower premiums collected.
- **Iron Condor:** A four-leg strategy. Sell an OTM Call, Buy a further OTM Call (protection). Sell an OTM Put, Buy a further OTM Put (protection). This is a defined-risk, high-probability income strategy.

## Protective Strategies

**Covered Call:** You own the stock and sell OTM Call options against it. This generates rental income on your stock holdings but caps your upside.

**Protective Put:** You own the stock and buy a Put option. This acts as insurance against a market crash.

# Chapter 9: Risk Management in Derivatives

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Derivatives are "weapons of mass destruction" if used improperly, but precision surgical tools if managed well. Risk management is not optional; it is survival.

## The 2% Rule

Never risk more than 2% of your total trading capital on a single trade. If you have \$100,000, your maximum loss on one trade should not exceed \$2,000.

## Position Sizing

Do not determine position size based on how much money you want to make. Determine it based on where your Stop Loss is.

*Formula:*  $\text{Position Size} = (\text{Total Risk Capital}) / (\text{Entry Price} - \text{Stop Loss Price})$ .

## Stop Loss

A mental stop loss is not a stop loss. It must be in the system. For option buyers, stops can be tricky due to volatility; many professional traders use stops based on the underlying asset's chart rather than the option premium itself.

### **Concept: Risk/Reward Ratio (RRR)**

Before entering a trade, ensure the potential reward is at least 1.5x or 2x the potential risk. If you risk \$100 to make \$50, you will eventually go bankrupt even with a decent win rate.

# Chapter 10: Regulatory Framework & Market Participants

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Derivatives markets are heavily regulated to prevent fraud, manipulation, and systemic risk.

## Regulators

- **USA:** The Securities and Exchange Commission (SEC) regulates options on stocks, while the Commodity Futures Trading Commission (CFTC) regulates futures markets.
- **India:** The Securities and Exchange Board of India (SEBI) is the apex regulator.

## Exchanges

Exchanges provide the infrastructure for trading. Major global exchanges include:

- **CME Group (Chicago Mercantile Exchange):** The world's largest derivatives exchange.
- **NSE (National Stock Exchange of India):** One of the world's largest by volume in contracts traded.
- **CBOE (Chicago Board Options Exchange):** Known for creating the VIX (Volatility Index).

## Settlement Types

**Cash Settlement:** No physical goods are exchanged. The difference in price is settled in cash. Most index futures (like S&P 500 or Nifty 50) are cash-settled.

**Physical Settlement:** The actual asset must be delivered. This is common in commodities (e.g., delivering barrels of oil) and increasingly in single-stock derivatives in some jurisdictions.

 **NOTE**

**Final Note for Students:** Mastery of Futures and Options takes years. Start with paper trading, understand the Greeks thoroughly, and never underestimate the power of leverage.