Options - I: Understanding Options

This lecture introduces the concept of options and their relevance to corporate finance.

What are Options?

- Options are contracts giving the buyer the **right**, but not the **obligation**, to buy or sell an underlying asset (e.g., stock, commodity, currency) at a predetermined price (the **strike price**) on or before a specific date (the **expiration date**).
- Options are **derivative contracts**, meaning their value is derived from the value of another asset (the underlying asset).

Types of Options:

- **Call option:** Gives the buyer the right to **buy** the underlying asset.
- **Put option:** Gives the buyer the right to **sell** the underlying asset.
- **American option:** Can be exercised **anytime** before the expiration date.
- **European option:** Can be exercised **only at the expiration date**.
- **Exchange-Traded Options:** Standardised contracts traded on organised exchanges.
- **Over-The-Counter (OTC) Options:** Tailored contracts traded privately.

Key Terminology:

- **Option seller/writer:** Sells the option contract, obligating them to buy or sell the asset if the buyer exercises it.
- **Option buyer/holder:** Buys the option contract, gaining the right to exercise it.
- **Exercise of option:** Enforcing the right to buy or sell the asset at the strike price.
- **Option premium:** The price paid by the buyer to the seller for the option.

Option Values and Payoffs:

- The value of an option at expiration depends on the asset price (S) and the strike price (X).
- **Call exercise value:** Max(0, S – X)
- **Put exercise value:** Max(0, X – S)

Payoff Diagrams:

- Show the potential profit/loss for the buyer or seller of an option, depending on the asset price at expiration.
- **Long call:** Profit if the asset price is above the strike price.
- **Short call:** Profit if the asset price is below the strike price.
- **Long put:** Profit if the asset price is below the strike price.
- **Short put:** Profit if the asset price is above the strike price.

Options and Corporate Finance:

- **Risk Management:** Companies use options to reduce risk associated with price fluctuations.
- **Real Options:** Embedded options within real investment projects (e.g., option to expand, delay, abandon).
- **Financing:** Companies issue options to raise capital.
- **Leverage:** Shares in a leveraged firm can be viewed as an option on the firm's assets.

Put-Call Parity:

- This fundamental relationship states that the value of a call plus the present value of the strike price equals the value of a put plus the current share price.
- It allows us to calculate the value of one option type if we know the value of the other.

Determinants of Option Premiums:

- **Intrinsic value:** The immediate value of the option if exercised now.
- **Time value:** The potential value of the option due to the uncertainty of future asset prices.

Factors Influencing Option Prices:

- **Current stock price:** Higher stock price = higher call premium, lower put premium.
- **Exercise price:** Lower exercise price = higher call premium, higher put premium.
- **Time to expiration:** Longer time = higher premium for both calls and puts.
- **Volatility of stock price:** Higher volatility = higher premium for both calls and puts.
- **Risk-free interest rate:** Higher interest rate = higher call premium, lower put premium.
- **Expected dividends:** Higher dividends = lower call premium, higher put premium.

American vs European Options:

- American options are generally worth more than European options due to the flexibility of early exercise.

Bounds on Option Values:

- **Call option value:** Cannot be negative, and cannot exceed the current stock price.
- **European call option:** Has a lower bound based on the present value of the strike price.

Arbitrage Opportunities:

- Option prices that deviate from the put-call parity or lower bound formulas present arbitrage opportunities.

Common Option Strategies:

- **Straddle:** Long call and long put with the same strike price (benefits from high volatility).
- **Strangle:** Long call and long put with different strike prices (also benefits from high volatility).

Key Takeaway:

Understanding options and their pricing is crucial for corporate finance professionals. Options provide valuable tools for managing risk, creating innovative financing structures, and enhancing investment strategies.