CHAPTER 15. OPTIONS MARKETS

Options are traded in:

- Common stocks
- Foreign exchanges
- Agricultural commodities
- Precious metals
- Interest Rates

The Options Contract

Two basic types of Options: Calls and Puts

1. A **Call** is an option to buy an asset
2. A **Put** is an option to sell an asset

Buyer of an Option ⇒ called **Holder**
Seller of an Option ⇒ called **Writer**, or **Grantor**.

Every option has 3 elements:

1. Exercise or Strike Price ⇒ price at which assets can be purchased (call) or sold (put).
2. Premium, cost, price or value of the option
3. Underlying or actual price in the market.

There are 2 types of methods in the application period of options:

- **American Option** ⇒ Option can be applied at any time within the contract period.
- **European Option** ⇒ Option can be applied only at the end of contract period.

Profit/Losses on a Call Option

Example:

- The April 20, 2007 expiration call option for IBM share
- Exercise price, 95$
- Selling on March 2, 2007; for 1.35$ (Premium per share, original investment)
- Until expiration, the purchaser is entitled to buy shares for 95$
• (IF) On March 2, 2007, IBM sells at 90.9$
• Then, it is not profitable for the purchaser to exercise the option.
• Therefore, the call option will be left to expire worthless

• (IF) IBM sells at 96$
• It will be profitable to exercise the option
• Then, this will give its holder the right to pay 95$ for a stock worth 96$.

Then, the value of the option on the expiration date would be:

\[ \text{Value at expiration} = \text{Stock price} - \text{Exercise Price} = 96$ - 95$ = 1$ \]

• Despite the 1$ payout at maturity, the call holder stil realizes a loss of 0.35$ on the investment.

• Profit = Final Value – Original Investment = 1$ - 1.35$ = - 0.35$

• Thus, current selling price should be selling above 96.35$ to clear the profit.

• FINAL: Stock will be bought at maturity at $95 which sells at 96$.

**Profit/Losses on a Put Option**

**Example:**

• The April 20, 2007 expiration put option for IBM share
• Exercise price, 95$
• Selling on March 2, 2007; for 4.90$ (Premium per share, original investment)
• Until expiration, the purchaser is entitled to sell shares for 95$

• (IF) On March 2, 2007, IBM sells at 90.9$
• Then, it is not profitable for the purchaser to exercise the option.
• Therefore, the put option will not be exercised immediately.
• Net proceeds will be 95$ - 90.9$ = 4.10$

• (IF) IBM sells at 88$
• It will be profitable to exercise the put option
• Then, profit:

\[ \text{Value at expiration} = \text{Exercise Price} - \text{Stock price} = 95$ - 88$ = 7$ \]

\[ \text{Profit} = 7$ - 4.90$ = 2.10$ \]
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Holding period rate of return = \( \frac{2.10$}{4.90$} = 42.9\% \)

- FINAL: The seller of the put option sells the stock for 95$ which worths 88$. He/she will be able to purchase stock for 88$ in the market.

Market and Exercise Price Relationships

**In the Money** - exercise of the option would be profitable
- Call: market price > exercise price
- Put: exercise price > market price

**Out of the Money** - exercise of the option would not be profitable
- Call: market price < exercise price
- Put: exercise price < market price

**At the Money** - exercise price and asset price are equal

Speculation in Option Markets: Types of Options Markets

- Stock Options
- Index Options
- Futures Options
- Foreign Currency Options
- Interest Rate Options

Example: Foreign Currency Options

1. **Buyer of a Call Option in Foreign Exchange Markets**

Buying a Call Option for 10,000 USD for 90 days maturity

Strike Price: 1 USD = 1.30 TL (10,000USD will be bought at this rate at maturity)

Premium (cost): 0.03TL / USD

After (or during) 90 days, if 1 USD = 1.35 TL in the market:

- It will be profitable to exercise this call option
We buy 10,000USD at 1.30 TL/USD in the contract and sell them at 1.35TL/USD in the market.
- Unit gross Gain = 1.35 – 1.30 = 0.05TL/USD
- Total gross gain = 10,000 x 0.05 TL/USD = 500 TL
- Total net gain: 500 TL – (0.03TL/USD x 10,000) = 200 TL

Profit = S – (Strike price + premium) = 1.35 – (1.30 + 0.03) = 0.02 / USD

S = 1.33TL / USD (Break Even Exchange Rate)

2. Writer of a Call Option in Foreign Exchange Markets

If the Buyer of a call applies the option, let’s say at S = 1.35TL/USD,
Then, the profit/loss condition of the writer of a call will be:
Loss = Premium – (Spot - Strike) = 0.03 – (1.35 – 1.30) = -0.02TL/USD

So, the writer will buy $s at 1.35TL/USD and sell to the buyer at 1.30TL/USD, so the writer will realize a net loss of 0.02TL/USD.

S = 1.33TL / USD (Break Even Exchange Rate)
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If the buyer of a call does not exercise the call option, let’s say at $S = 1.25\text{TL}/\text{USD}$, then the buyer will pay $0.03\text{TL}/\text{USD}$ to the writer of whom it will be the maximum profit limited by the premium to be paid.

$S = 1.33\text{TL} / \text{USD}$ (Break Even Exchange Rate)

3. Buyer of a Put Option in Foreign Exchange Markets

Strike Price: 1 USD = 1.30 TL

Premium (cost): 0.03TL / USD

a. Spot Rate = 1.25 TL/USD

\[
\text{Profit} = \text{Strike Price} - (\text{Spot rate} + \text{Premium}) = 1.30 - (1.25+0.03) = 0.02\text{TL}/\text{USD}
\]

- IF dollar sells at 1.25TL in the market, we will sell the put at 1.30, so the net gain will be 0.02TL/USD and the put option is said to be ITM.

b. If, Spot Rate = 1.27 TL/USD, then BEP.

c. If Spot Rate = 1.35 TL/USD
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Profit = Strike Price – (Spot rate + Premium) = 1.30 – (1.35+0.03) = -0.08TL/USD

- If dollar sells at 1.35TL in the market, then, we will not exercise the put, if we do, our loss will be 0.08TL/USD by doing so. Thus, the put is in OTM position.
- So, we don’t exercise it and we only pay 0.03TL/USD to the writer.

4. Writer of a Put Option in Foreign Exchange Markets

Strike Price: 1 USD = 1.30 TL

Premium (cost): 0.03TL / USD

a. Spot Rate = 1.25 TL/USD

Profit/Loss = Premium – (Strike Price - Spot Rate) = 0.03 – (1.30-1.25) = -0.02TL/USD

It means that the writer will buy $s at 1.30TL and sell back to the buyer of a put at 1.25TL/USD by realizing a net loss of 0.02TL/USD.

b. Spot Rate = 1.27 TL/USD, BEP.

c. Spot Rate = 1.35 TL/USD
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Profit/Loss = Premium – (Strike Price - Spot Rate) = 0.03 – (1.30-1.35) = 0.08TL/USD

If the buyer of the put exercise the option, the writer will gain 0.08TL/USD; otherwise, 0.03TL/USD will be the profit of the writer.

Example: Options in the Stock Markets

1. Buyer of a Call Option in Stock Market

Buying a Call Option for 100 shares of IBM stock for 90 days maturity

Strike Price: 85USD per share (100 shares will be bought at this rate at maturity)

Premium (cost): 1.30 USD per share

After (or during) 90 days, if a share of IBM stock is 88 USD:

- It will be profitable to exercise this call option
- We buy 100 shares at 85 USD in the contract and sell them at 88 USD in the market.

Profit = Stock Price – (Strike price + premium) = 88 – (85 + 1.30) = 1.7 USD
2. **Writer of a Call Option in Stock Market**

If the Buyer of a call applies the option, when, let’s say that, Stock price is 88 USD,

Then, the profit/loss condition of the writer of a call will be:

\[
\text{Loss} = \text{Premium} - (\text{Stock price} - \text{Strike price}) = 1.30 - (88 - 85) = -1.7 \text{ USD}
\]

So, the writer will buy shares at 88 USD and sell to the buyer at 85 USD, so the writer will realize a net loss of 1.7 USD per share.

**S = 86.3 USD (Break Even Stock Price)**

If the buyer of a call does not exercise the call option, let’s say at 83 USD, and then the buyer will pay 1.3 USD per share to the writer of whom it will be the maximum profit limited by the premium to be paid.

3. **Buyer of a Put Option in Stock Market**

Strike Price: 85 USD per share

Premium (cost): 1.3 USD per share

a. Stock Price = 83 USD

\[
\text{Profit} = \text{Strike Price} - (\text{Stock price} + \text{Premium}) = 85 - (83 + 1.3) = 0.7 \text{ USD}
\]

- IF current stock price is 83 USD in the market, we will sell the put at 85 USD, so the net gain will be 0.7 USD per share and the put option is said to be ITM.

b. If, Stock price = 83.7 USD, then BEP.

c. If Stock price = 88 USD

\[
\text{Profit} = \text{Strike Price} - (\text{Stock price} + \text{Premium}) = 85 - (88 + 1.3) = -4.3 \text{ USD}
\]
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- IF stock price is 88 USD in the market, then, we will not exercise the put, if we do, our loss will be -4.3 USD per share by doing so. Thus, the put is in OTM position.
- So, we don’t exercise it and we only pay 1.3 USD to the writer.

4. Writer of a Put Option in Stock Market

Strike Price: 85 USD per share

Premium (cost): 1.3 USD per share

a. Stock Price = 83 USD per share

Profit/Loss = Premium – (Strike Price – Stock Price) = 1.3 – (85-83) = -0.7 USD

It means that the writer will buy stocks at 85 USD and sell back to the buyer of a put at 83 USD by realizing a net loss of 0.7 USD.

b. Stock Price = 83.7 USD per share, BEP.

c. Stock price = 88 USD per share

Profit/Loss = Premium – (Strike Price – Stock price) = 1.3 – (85-88) = 4.3 USD

If the buyer of the put exercise the option, the writer will gain 4.3 USD; otherwise, 1.3 USD per share will be the profit of the writer.

OPTION STRATEGIES

1. Protective Put

This strategy is the situation where an asset is combined with a put option that guarantees minimum proceeds equal to the put’s exercise price. Investing in the stock alone may seem risky; thus, in addition to investing in the stock alone, purchasing a put option on the stock can also be considered. So, comparing stock price with exercise price, we decide whether to exercise or not exercise the option.

Example:
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Strike Price = 90$
Stock Price = 87$ (at option expiration)

If strike price > stock price, then you exercise the option, otherwise, you don’t exercise it and end up with a share of stock higher than 90$.

2. Covered Calls

This position is the purchase of a share of stock with the simultaneous sale (writing) of a call on that stock.

Example:

- Assume a pension fund holds 1,000 shares of GXX stock, with a current price of 130$ per share.
- Suppose the portfolio manager intends to sell all 1,000 shares if price hits 140$ and a call expiring in 90 days with an exercise price of 140$ currently sells at 5$.
- By writing 10 GXX call contracts (100 shares each) the fund can pick up 5,000$ in extra income.
- The fund would lose if price is above 140$, but given that it would have sold its shares at 140$.

3. Straddle

This strategy is a combination of a call and a put, each with the same exercise price and expiration date.

This strategy is useful for investors who believe a stock will move a lot in price but are uncertain about the direction of the move.

4. Spread

This is the combination of two or more call (or two or more put) options on the same stock with differing exercise prices or times to maturity.

Some are bought while some are sold, or written.

Thus, a money spread involves the purchase of one option and the simultaneous sale of another with a different exercise price.

And, a time spread refers to the sale and purchase of options with differing expiration dates.