CHAPTER 6: OPTIONS MARKETS

6.1 Exchange-Traded Options

Futures Options

In a futures option (or option on futures), the underlying asset is a futures contract. The futures contract normally matures shortly after the expiration of the option. When the holder of a call option exercises, he or she acquires from the writer a long position in the underlying futures contract plus a cash amount equal to the excess of the futures price over the strike price. When the holder of a put option exercises, he or she acquires a short position in the underlying futures contract plus a cash amount equal to the excess of the strike price over the futures price. In both cases, the futures contracts have zero value and can be closed out immediately.

6.2 OTC Options

The main advantage of an over-the-counter option is that it can be tailored by a financial institution to meet the needs of a corporate client. The strike period and maturity do not have to correspond to those of exchange-traded options. Also, nonstandard features can be incorporated into the design of the option. Two examples of options involving nonstandard features are Bermudan and Asian options. A Bermudan option is exercisable only on certain specified days during its life. In an Asian option, the payoff is defined in terms of the average value of the underlying asset during a certain time period rather than in terms of its final value.

6.3 Specification of Stock Options

In the rest of this chapter we focus on exchange-traded options. A stock option contract is an American-style option contract to buy or sell 100 shares of the stock. Details of the contract are specified by the exchange.

Expiration dates

One of the items used to describe a stock option is the month in which the expiration date occurs. Longer-dated stock options known as long-term equity anticipation securities or LEAPS also trade on exchanges. These have January expiration dates up to two years into the future.

Strike Prices

The exchange chooses the strike prices at which options can be written. For stock options, strike prices are normally spaced $2/5, $5, or $10 apart. When a new expiration date is introduced, the two strike prices closest to the current stock price are usually selected by the exchange. If one of these is very close to the existing stock price, the third strike price closest to the current stock price may also be selected. If the stock price moves outside the range defined by the highest and lowest strike price, trading is usually introduced in an option with a new strike price.

Terminology

All options of the same type (calls or puts) are referred to as an option class. An option series consists of all the options of a given class with the same expiration date and strike price. Options are referred to as in the money, at the money, or out of the money. An in-the-money option is one that would lead to a positive cash flow to the holder if it were exercised immediately. Similarly, an at-the-money option would lead to zero cash flow if it were exercised immediately, and an out-of-the-money option would lead to a negative cash flow if it were exercised immediately.

The intrinsic value of an option is defined as the maximum of zero and the value it would have if it were exercised immediately. For a call option, the intrinsic value is therefore $\max(S - X, 0)$. For a put option, it is $\max(X - S, 0)$. The total value of an option can be thought of as the sum of its intrinsic value and its time value.

Flex Options

Some exchanges now offer flex options. These are options where the traders on the floor of the exchange agree to nonstandard terms. These nonstandard terms might involve a strike price or an expiration date that is different from those usually offered by the exchange. Flex options are an attempt by the exchanges to regain business from the OTC markets.

Dividends and Stock Splits

The early OTC options were dividend protected. If a company declared a cash dividend, the strike price for options on the company’s stock was reduced on the ex-dividend day by the amount of the dividend. Now, both exchange-traded and OTC options are not generally adjusted for cash dividends. As we will see in Chapter 11, this has significant implications for the way in which options are valued.

Exchange-traded options are adjusted for stock splits. In general, an $n$-for-$m$ stock split should cause the stock price to go down to $m/n$ of its previous value. The terms of option contract are adjusted to reflect expected changes in a stock price arising from a stock split. After an $n$-for-$m$ stock split, the exercise price is reduced to $m/n$ of its previous value and the number of shares covered by one contract is increased to $m/n$ of its previous value. If the stock price reduces in the way expected, the position of both the writer and the purchaser of a contract remain unchanged.

Stock options are adjusted for stock dividends. A stock dividend involves a company issuing more shares to its existing shareholders. Like a stock split, a stock dividend has no effect on either the asset or the earning power of a company. The stock price can be expected to go down as a result of a stock dividend. All else being equal, it should cause the stock price to decline. The terms of an options are adjusted to reflect the expected price decline arising from a stock dividend in the same way as they are for that arising from a stock split.
Adjustments are also made for right issues. A right issue gives existing shareholders the right to buy more shares at a specified price. The basic procedure is to calculate the theoretical price of the rights and then to reduce the strike price by this amount.

**Position Limits and Exercise Limits**

The exchange specifies a **position limit** for each stock upon which options are traded. This defines the maximum number of option contracts that an investor can hold on one side of the market. For this purpose, long calls and short puts (as well as short calls and long puts) are considered to be on the same side of the market. The **exercise limit** equals the position limit. It defines the maximum number of contracts that can be exercised by any individual in any period of five consecutive business days.

**6.5 Trading**

**Market Makers**

Most options exchanges use a market maker system to facilitate trading. A market maker for a certain option is a person who will quote both a bid and an ask price on the option whenever he or she is asked to do so. The bid is the price at which the market maker is prepared to buy and the ask is the price at which the market maker is prepared to sell. The ask is, of course, higher than the bid, and the amount by which the ask exceeds the bid is referred to as the bid-ask spread. The exchange sets upper limits for the bid-ask spread. The existence of the market maker ensures that buy and sell orders can always be executed at some price without delays. Market makers therefore add liquidity to the market.

**Floor Broker**

Floor brokers execute trade for the general public. The floor broker trades either with another floor broker or with the market maker. A floor broker may be on commission or may be paid a salary by the brokerage house for which he or she executes trades.

**Order Book Official**

Many orders that are relayed to floor brokers are limit orders. This means that they can be executed only at the specific price or a more favorable price. Often, when a limit order reaches a floor broker, it cannot be executed immediately. In most exchanges, the floor broker will then pass the order to a person known as an **order book official**. This person enters the order into a computer along with other public limit orders. This ensures that as soon as the limit price is reached, the order is executed.

**Offsetting Orders**

An investor who has purchased an option can close out his or her position by issuing an offsetting order to sell the same option. Similarly, an investor who has written an option can close out his or her position by issuing an offsetting order to buy the same option. If, when an option contract is traded, neither investor is offsetting an existing position, the open interest increases by one contract. If one investor is offsetting an existing position and the other is not, the open interest stays the same. If both investors are offsetting existing positions, the open interest goes down by one contract.

**6.7 Margins**

When shares are purchased, an investor can either pay cash or use a margin account. The initial margin required is usually 50% of the value of the shares, and the maintenance margin is usually 25% of the value of the shares.

When call and put options are purchased, the option price must be paid in full. Investors are not allowed to buy options on margin. This is because options already contain substantial leverage. When an investor writes options, he or she is required to maintain funds in a margin account.

**Writing Naked Options**

Consider first the situation where a stock option is naked. This means that the option position is not combined with an offsetting position in the underlying stock. The initial margin is the greater of the result of the following two calculations:

1. A total of 100% of the proceeds of the sale plus 20% of the underlying share price less the amount if any by which the option is out of the money.
2. A total of 100% of the proceeds of the sale plus 10% of the underlying share price.

A calculation similar to the initial margin calculation (but with the current market price replacing the proceeds of the sale) is repeated every day.

**Writing Covered Calls**

Writing covered calls involves writing call options when the shares that might have to be delivered are already owned. If covered call options are out of the money, no margin is required. If the options are in the money, no margin is required for the options. However, for the purposes of calculating the investor’s equity position, the share price is reduced by the extent (if any) to which the option is in the money. This may limit the amount that the investor can withdraw from the margin account if the share price increases.

**6.8 The Options Clearing Corporation**
The Options Clearing Corporation (OCC) performs much the same sort of function for options markets as the clearinghouse does for futures markets. It guarantees that the option writer will fulfill his or her obligations under the terms of the option contract and keeps a record of all long and short positions.

6.11 Warrants and Convertibles

Warrants are issued by a company or a financial institution. The number of contracts outstanding is determined by the size of the original issue and changes only when options are exercised or expire. Call warrants are frequently issued by companies on their own stock. If the warrants are exercised, the company issues new treasury stock to the warrant holders in return for the strike price specified in the contract.

Put and call warrants are also sometimes issued by a financial institution to satisfy a demand in the market. The underlying asset is typically an index, a currency, or a commodity.

Convertible bonds are debt instruments with embedded options issued by corporations. The holder has the right to exchange a convertible bond for equity in the issuing company at certain times in the future according to a certain exchange ratio. Very often, the convertible is callable. This means that it can be repurchased by the issuer at a certain price at certain times in the future. Once the bonds have been called, the holder can always choose to convert prior to repurchase. Thus the effect of a call provision is often to give the issuer the right to force conversion of the bonds into equity at an earlier time than the holder would otherwise choose. If, as a rough approximation, interest rates are assumed constant and call provisions are ignored, a convertible can be regarded as a regular debt instrument plus call warrants.