

Analytical Applications of Options Trading

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Abstract: An option is a contract that gives the holder the right, but not the obligation, to buy or sell an underlying asset at a predetermined price for a specified period of time. Options are the most versatile and unique financial instruments as they are available on a large variety of underlying assets like common stock, currencies, debt instruments, interest rates and so on. Options on stock indices and futures contracts, wherein the underlying asset is a futures contract, are also traded on organized options exchanges. The paper notes that the main disadvantage of over-the-counter market is that the option writer (seller) may default. It means that the buyer is subject to credit risk. In order to overcome this problem, market participants adopt a number of measures such as calling for some collateral from the counterparties. Although the market participants are free to trade in options using their own requirements, standard terms and conditions for OTC options and guidelines for trading practices are governed by International Currency Options Market (ICOM) or International Swap Dealers Association Incorporation (ISDA).

Keywords: *Options, call options, put options*

1. Introduction

In forward and futures contracts, the buyer and the seller or the long and the short have certain rights as well as obligations. The buyer has the right and the obligation to take delivery of the underlying asset at the specified price on the expiry date, whereas the seller has the right and the obligation to deliver the underlying asset.

Say on the 15th of June, a firm enters into a three-month forward contract to sell £100 000 at a price of \$1.44570 quoted by a bank. The delivery date is set to be the 17th of

September. On the 15th of September, the firm finds out that the spot rate is \$1.45570. Can the firm ask the counterparty to forget about the forward contract and sell the pound in the spot market? The answer is 'no' and such an action would constitute a legal default because the forward contract has not only given the right to the firm to sell the pound at a rate of £1.44570 but also imposed an obligation on it to do so. Now take the same example from another aspect. On the 15th of June, the firm takes the view that after three months, the pound would appreciate and its rate will increase more than the forward rate quoted by the bank viz. \$1.44570. Thus the firm is not willing to accomplish the deal. Can the firm structure such a deal wherein it could derive additional benefits if the value of the pound increases and avoid losses if it depreciates? The solution to this problem lies in options.

Options are the most versatile and unique financial instruments that find their competitor nowhere. An option is a contract that gives the holder the right, but not the obligation, to buy or sell an underlying asset at a predetermined price for a specified period of time (Gupta 2006, p. 350). American options give the option-holder the right to buy or sell the underlying asset at any time before or on the expiration date of the option. European options, on the other hand, give the option-holder the right to buy or sell the underlying asset on the expiration date only (Saunders & Cornett 2007, p. 306). European options are therefore cheaper than American options (Smullen & Hand 2005, p. 295). Most options being traded on exchanges in the USA and abroad are American options.¹

Apte (2007) states that options are available on a large variety of underlying assets like common stock, currencies, debt instruments, interest rates and so on. Options on stock indices and futures contracts, in which the underlying asset is a futures contract, are also traded on organized options exchanges. The largest options exchange is the Chicago Board Options Exchange (CBOE). Some other exchanges that trade in options include European Options Exchange (EOE), London International Financial Futures and Options Exchange (LIFFE), American Stock Exchange (AMEX), New York Stock Exchange (NYSE), Philadelphia Stock Exchange (PB), Chicago Mercantile Exchange (CME) and Pacific Stock Exchange (PSE). In addition to these

¹ It should be noted that the terms American and European do not refer to the location of the option or the exchange. Some options to be traded on North American exchanges are European (Hull 2007, p. 6).

exchanges, various financial institutions, corporate treasurers and fund managers trade in options in over-the-counter market as well. Hull (2007) points out that the main disadvantage of over-the-counter market is that the option writer (seller) may default. It means that the buyer is subject to credit risk. In order to overcome this problem, market participants adopt a number of measures such as calling for some collateral from the counterparties. Although the market participants are free to trade in options using their own requirements, standard terms and conditions for OTC options and guidelines for trading practices are governed by International Currency Options Market (ICOM) or International Swap Dealers Association Incorporation (ISDA).

The discourse that follows is divided up into five broad sections altogether. Section 2 and Section 3 canvass the nature as well as trading mechanism of call options and put options respectively. Section 4 goes over foreign currency options. Section 5 deals with the mechanics of interest-rate options. Finally, Section 6 recapitulates the discussion and draws inferences therefrom.

2. Call Options

A call option gives its holder the right but not the obligation to buy an underlying security at a predetermined price called the exercise or strike price on or before a specified date (Saunders & Cornett 2007, p. 306). In this case, the buyer of the call option pays the writer (seller) an upfront fee which is known as call premium. This premium is an immediate cash outflow for the buyer of the call option. However, the buyer potentially stands to make a profit if the price of underlying security is greater than the exercise price when the option expires.

Suppose that an investor buys an European call option to purchase 10 000 shares of a certain company at a strike price of £20. The current stock price is £18, the expiration date of the option is six months hence, and the price of an option to purchase one share is £2. It means that the upfront fee is £20 000. Since the option is European the investor can exercise it only on the expiration date. If the share price on this date is less than £20 the investor will categorically choose not to exercise the option. In this situation, he will have to lose the whole initial investment viz. £20 000, but if the

share price is above £20 on the expiration date the option would certainly be exercised. For instance, the share price is £25. If the investor exercises the option he will buy 10 000 shares for £20 per share. If these shares are sold without further ado the investor will make a profit of £5 per share, or £50 000, ignoring the transaction costs. If the initial cost of the option is taken into account the net profit to the investor will be £30 000.

Sometimes an investor exercises an option but makes a loss overall. Say that the stock price is £21 on the expiration date. Since it is above the strike price the investor would exercise the option making a profit of £10 000 but losing £10 000 as well when the initial cost of the option is taken into consideration. It is interesting to argue that the investor should not exercise the option in this situation, but it would result in a loss of £20 000 which is, however, worse than the first loss of £10 000. So, it can be inferred that call options should always be exercised on the expiration date if the stock price is above the strike price (Hull 2007, p. 182).

3. Put Options

A put option gives its holder the right but not the obligation to sell an underlying security at a predetermined price on or before a specified date. In return, the buyer of the put option pays the writer an upfront fee which is known as put premium. If the price of underlying security is less than the exercise price on the expiration date the buyer will purchase the underlying security (e.g. a stock) from the stock market at current price and sell it then and there at strike price by exercising the put option. On the other hand, if the price of the underlying security is greater than the exercise price when the option expires the buyer of the put option will never exercise it, and the option will expire without being exercised (Saunders & Cornett 2007, p. 308).

Suppose that an investor buys an European put option to sell 10 000 shares of certain company at a strike price of £20. The current share price is £18, the expiration date of the option is three months hence, and the price of an option to sell one share is £2. The initial investment is £20 000. Since the option is European it can only be exercised on the expiration date if the share price is below £20. On the expiration

date, the share price is £17. The investor buys 10 000 shares for £17 per share, and according to the terms of the put option sells the same shares for £20 making a profit of £3 per share, or £30 000, if the transaction costs are ignored. If the initial cost of the option viz. £20 000 is taken into account the investor's net profit would be £10 000. There is, of course, no guarantee that the investor could make a profit because if the stock price is above £20 on the expiration date put option will expire, and he will have to lose £20 000 eventually.

Options can also be used for speculative purposes. The price of an option contract or the premium depends upon the intrinsic value and the time value of the option. This premium keeps on changing as the price of the underlying asset changes. Ceaseless fluctuations in the premium provide speculators with an opportunity to make a profit from options trading. A speculator might buy an option at a low premium and sell it later on at a higher premium in order to enjoy short-term gains.

It has been clear from the preceding discussion, as Hull (2005) states, that there are two sides of every option contract. One investor is on one side who takes a long position whereas the other investor is on the other who takes a short position. Therefore option positions can be elucidated in the following manner:

- A long position in a call option
- A long position in a put option
- A short position in a call option
- A short position in a put option

4. Foreign Currency Options

A foreign currency option is a contract giving the right either to buy or to sell a specified currency at a fixed exchange rate within a given period. The price agreed is called the exercise price or strike price (Smullen & Hand 2005, p. 102; Gupta 2006, p. 440). Foreign currency options have assumed a vital importance in the financial markets all around the globe. They are primarily traded at the over-the-counter market. Hull (2007) states that European and American options are traded on the

Philadelphia Stock Exchange in the United States, but the exchange-traded market is much smaller than the over-the-counter market.²

Foreign currency options are a good alternative to forward contracts for a corporation wishing to hedge against a foreign exchange exposure. For example, a certain amount of pound sterling is to be received by an American company at a certain time in the future. The company can hedge against foreign exchange exposure by buying put options that mature at that time. Similarly, a certain amount of pound sterling is to be paid by an American company at a certain time in the future. The company can hedge against foreign exchange risk by buying call options that mature at that time (Hull 2005, p. 298).³

5. Interest-Rate Options

It is an option enabling traders and speculators to hedge against future changes in interest rates (Smullen & Hand 2005, p. 215). A call option on interest rate gives the holder the right to borrow funds for a specified duration at a specified interest rate without an obligation to do so, whereas a put option on interest rate gives the holder the right to invest funds for a specified duration at a specified return without an obligation to do so. In both cases, the buyer of the option pays the seller an upfront premium (Apte 2007, p. 454).⁴

6. Conclusion

Options are the most versatile and unique financial instruments that find their competitor nowhere. American options give the option-holder the right to buy or sell the underlying asset at any time before or on the expiration date of the option. European options, on the other hand, give the option-holder the right to buy or sell the underlying asset on the expiration date only. Most options being traded on exchanges in the USA and abroad are American options. The paper defined that a call option gives its holder the right but not the obligation to buy an underlying security at a

² See also Click & Coval 2004, pp 300-307; Strong 2006, pp 374-376; Gupta 2006, pp 439 ff.

³ For further details of hedging with currency options, see Apte 2007, pp 390 ff.

⁴ For a thorough analysis of interest-rate options, see Hull 2005, pp 390-407; Strong 2006, pp 330 ff.

predetermined price called the exercise or strike price on or before a specified date, whereas a put option gives its holder the right but not the obligation to sell an underlying security at a predetermined price on or before a specified date.

The paper also discussed that options are used for speculative purposes into the bargain. The price of an option contract or the premium depends upon the intrinsic value and the time value of the option. This premium keeps on changing as the price of the underlying asset changes. Ceaseless fluctuations in the premium provide speculators with an opportunity to make a profit from options trading. A speculator might buy an option at a low premium and sell it later on at a higher premium in order to enjoy short-term gains.

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