

CHAPTER 14: ANSWERS TO CONCEPTS IN REVIEW

- 14.1 *Puts* and *calls* are negotiable options issued in bearer form that allow the holder to sell (put) or buy (call) a stipulated amount of a specific security/financial asset, at a specified *strike price*, during a specified time period. They are unique in that puts and calls are created by investors. An individual, for example, who wants to sell to another the right to purchase 100 shares of stock would write a call. The writer (or option maker or seller) receives the price (premium) paid for the call (less any commission). An individual holding the call can sell it in the open market any time before the expiration date, or he can exercise it, at which time the writer would have to sell his stock to the investor holding the call at the agreed-upon exercise price.
- 14.2 Prior to April 26, 1973, all options were *conventional options*. These were sold over-the-counter through a few specialized dealers. Investors who wished to purchase puts or calls used their own brokers and these dealers to find an individual to write the option. That individual would also be the only one with whom the put or call option could be exercised. This led to little secondary trading. Then in April 1973, the Chicago Board Options Exchange (CBOE) came into being with 16 *listed (call) options*. It was quickly followed by the American Stock Exchange, and then several other exchanges, including the NYSE. Eventually, listed puts were added and then, listed options trading began in a variety of debt securities, foreign currencies, and stock indexes. To summarize, conventional options are put and call options sold over-the-counter. Listed options are put and call options, listed and traded on organized security exchanges such as CBOE.

The number of listed options have grown quickly. In 1997, most of the 3000 or so listed stock options are listed on the big four exchange namely NYSE, CBOE, AmEx and the Philadelphia Exchange. All have standardized expiration dates and specified strike prices. The exchanges provide a clearinghouse, active secondary markets, and wide distribution of price information. Their creation has greatly reduced the use of conventional options, while the growth in listed options has been phenomenal.

An *option premium* is simply the price of the option; it is what the purchaser would pay the writer to acquire the put or call. An *investment premium* is the difference between the price of the option and its “true” (theoretical) value. For example, puts and calls generally sell at an investment premium. *Note:* this is a confusing distinction for some students and may require emphasis.

- 14.3 The *main attractions* of puts and calls are:
- The low unit cost: Investors can participate in the price behavior of the underlying security at a fraction of the cost of the security, giving them the benefits of leverage and low downside risk.
 - Can be used profitably when security prices go up or down: Calls can be used in a bull market and puts in a bear market.

Puts and calls have some *disadvantages* as well:

- With puts and calls, as with any option, there is always the risk of losing the entire premium because the option could not be exercised profitably over its limited life.
 - They cannot be margined.
 - They require special knowledge to be utilized successfully.
- 14.4 Stock options are like any other put or call option except that their value is based on a stock. Because puts and calls on a stock “derive” their value from an underlying asset, the stock, they

are a very common form of derivative security. Hence a stock option is an example of derivative security.

Derivative securities are securities which “derive” their value from an underlying asset or security. Some other common examples of derivative securities include rights and warrants, collateralized mortgage obligations (CMOs), convertible bonds, and forward and future contracts.

- 14.5 The strike price of a stock option is the contracted price at which the holder of the option can buy or sell the underlying stock. This is different from the stock's market price which is the prevailing price of the stock at any given time. In fact, the difference between the strike price and market price is the fundamental value of an option. Both puts and calls have strike prices: the strike price on a call is the price at which the owner can purchase the stock, and conversely, the strike price on a put is the price at which the owner can sell the underlying stock.
- 14.6 Expiration dates are important features on options because they specify the life of the option similar to the way that the maturity date on a bond indicates the life of a bond. Consequently, the time to expiration has bearing on the value of the option. Once the expiration date has been passed, the market for that particular option ceases to exist; however, a market for new options with similar contract provisions may arise at that time.
- 14.7 a. A purchaser of a call option on a stock would make money if the stock price rises far enough above the stated strike price to recover the call's premium; this stock price is the break-even point. If the stock continues to rise above this level, the investor makes a profit.
b. A purchaser of a put option makes money when the stock price falls far enough below the strike price to recover the put's premium. Any movement of the stock below this level gives the investor a profit.

An option buyer need not exercise the option to earn his profits. He can sell the options in the secondary market and earn a large profit. This is because he would get a premium for the time value of the option in the secondary option.

- 14.8 The intrinsic value of a call is determined by subtracting the strike price from the market price of the underlying stock. If the strike price exceeds the market price of the stock, the call has zero intrinsic value. However, if the market price exceeds the strike price, the amount by which it exceeds the strike price is the call option's intrinsic value.

The intrinsic value of a put reverses the comparison between the market and strike prices. If the strike price exceeds the market price of the stock, unlike a call, the put has intrinsic value. Thus, the intrinsic value is the difference between the strike price and the market price, and the intrinsic value is zero for a put whose strike price is below the market stock price.

Out-of-the-money options have no intrinsic value. Their value is made up of an investment premium or time premium.

- 14.9 The following are the four most important variables which affect the price behavior of listed options (in descending order of importance):

(1) *The price behavior of the underlying common stock*: The greater the difference between the market price of the stock and the strike price on the option, the greater the value of the put or call. This determines the *fundamental value* of an option. For example, the higher the stock price relative to the strike price, the higher the value of the call option.

(2) *The time remaining to expiration*: The longer the time remaining to expiration, the higher the value of the option, because the option price will contain a component or the *time premium*. The time premium reflects the belief that the fundamental value will increase in the time remaining to expiration.

(3) *The price volatility of the underlying common stock*: The more *volatile* the price of the underlying stock, the more it enhances the *speculative appeal* of the options and hence the more valuable the option.

(4) *The level of interest rates*: The value of an option will generally *increase* with the level of market interest rates. The higher the market interest rate, the higher the option and hence the more valuable.

When an option has a *positive* fundamental value (the stock price is higher than the strike price in the case of calls and the opposite for puts), the option is said to be *in-the-money*. When an option has zero fundamental value, the option is *out-of-the-money*. Fundamental value makes up the major portion of the value of an in-the-money option. Also, these options have small time premiums, as typically they are closer to expiration. But out-of-the-money options have no intrinsic value; hence, their price is made up *entirely* of the time premium.

14.10 Using common stocks as a basis of discussion, stock options are used primarily in one of three ways:

a. *Speculation*: This strategy is the simplest; it is just like buying common stock (the buy low—sell high approach). If an investor feels a stock will appreciate, he or she buys a call rather than the stock. If the investor feels the stock price will fall, he or she buys a put rather than short selling the stock. This strategy says buy options, instead of stocks, as the options are likely to generate a higher return.

b. *Hedging*: This strategy involves combining two securities into a single investment position for the purpose of reducing risk. Hedging always involves two transactions, an initial common stock position and a subsequent/simultaneous option purchase. The two transactions can take place at the same time; this *limits the loss* in the position. In contrast, the option purchase can occur some time after the original stock position is taken; this usually is done to *protect a profit*.

c. *Writing and Spreading*: These strategies are really best left to the experienced investors. Writing options, either on stocks the investor owns (covered options) or on stocks the investor does not own (naked options) can be profitable. The writer receives at most the option premium and can suffer high losses, but careful analysis and stock selection can make this a profitable strategy. Spreading options simply involves combining two or more options into a single transaction. For example, buying a call and simultaneously selling a call (with different strike prices or expiration dates on the *same* underlying stock) is a spread. Many different spreads exist, each with a different investment goal. Straddles are similar to spreads. They involve the simultaneous purchase (or sale) of a put *and* a call at the same strike price for the same expiration date. All these strategies can be very risky for inexperienced investors.

14.11 The maximum profit that an investor can make from writing calls is the call premium. However, a call writer's loss is potentially unlimited. This risk can be partially offset by writing covered calls.

An investor who writes a covered call effectively writes a naked call, but already owns the stock on which the option is written. The investor's objective is to write a slightly out-of-the-money call option, pocket the premium, and hope the price of the underlying stock will move up or down, but not above the call's strike price.

If the stock price rises dramatically, the investor doesn't get to enjoy the full benefit of the stock price rise. In this case, the investor's gain on the stock is offset by losses on the option. Thus, writing a covered call involves losing upward price potential while providing only limited downward risk. Only an investor who is sure that the stock price will not fluctuate much should consider writing a covered call.

- 14.12 Synthetic securities are securities which are created by investors using a combination of many simple, plain-vanilla securities. Synthetic securities allow investors to design customized securities, which suit their investment profile and needs.

Let us try to design a convertible security for Intel. This security must have two characteristics in order to be a convertible (a) Regular income stream and a low downside risk (b) Ability to convert into equity if the stock price increases. To make this security, place 10% of your money in a call option on Intel and 90% in a money market mutual fund. If Intel's stock price decreases, then we lose the call premium but our loss is limited to 10% of the portfolio. On the other hand, if Intel's stock price soars, then the call option would be very valuable; thus providing the equity kicker. In this way, a combination of a call option on Intel and a MMMF can be used to make a synthetic convertible security of Intel.

- 14.13 First, let's look at the *similarities* between stock index options and stock options:

- (1) The contracts are standardized with respect to strike prices and expiration dates.
- (2) They are listed on exchanges and therefore enjoy active secondary trading.
- (3) They are valued in a similar fashion.
- (4) They can be used in basically the same kinds of trading strategies.
- (5) The quotation system for both is virtually identical.

Differences between these securities include the following:

- (1) Most obviously, the underlying securities are considerably different; stock index options are written on the market as a whole rather than individual equities.
- (2) While stock options trading is based on 100 shares of the underlying common stock, stock index options are traded as 100 times the value of the market index. However, there is no market of stocks backing the index option so settlement is defined in cash, while equity options are settled using the underlying stock.
- (3) Index options are issued with monthly rather than quarterly expiration dates, and expiration dates go out only 3 months rather than 9 months (as is the practice with equity options).
- (4) When hedging with index options, you can protect an entire portfolio rather than only one stock.

The similarities between foreign currency options and stock options are identical to the similarities between stock index options and stock options (which is listed above).

Foreign currency options differ from stock options in the following ways:

- (1) In this case, the underlying securities are specific foreign currencies and the value of the option is determined by the *exchange rate* between the local and the foreign currency on the date of expiration.
- (2) While stock options trade on 100 shares of the underlying stock, currency options trade on the basis of a *certain amount of the foreign currency per contract*. This unit of contract varies depending on the specific foreign currency. For example, the size of a contract in British pounds is 31,250 pounds while that of Swiss francs is 62,500 francs.

- 14.14 Stock index options can be used to hedge or speculate. An investor can protect a portfolio of common stocks against a poor market by buying puts on one of the stock market indexes. That way, the investor's portfolio is hedged: if the market goes up, only the cost of puts is lost, but if the market goes down, the investor earns money on the puts to offset losses in the portfolio of stocks.

An investor can also speculate on the market by buying index options. A call option on an index requires relatively little capital and losses are limited, providing an attractive leverage opportunity to speculators.

Index options and foreign currency options can be used in the same way, to speculate or hedge. Foreign currency options can be used to protect foreign investments by insuring that adverse currency exchange movements do not erode value. Foreign currency options also can be used to speculate on exchange rates, earning returns from movements in the foreign exchange rate.

- 14.15 If an investor holds a well-balanced portfolio of common stocks, he may want to hedge his position with a stock index option under two conditions: in the first, if he expects a market decline; and second, if he wants to shift his tax obligation from one year to the next but is unsure of the future course of the market.

If a market drop is expected and it would be too expensive to sell the entire portfolio, the investor can buy a stock index put. In this way, if the market does fall, then he'll make a profit on the put which will offset all (or most) of the loss in value of his portfolio.

- 14.16 By eliminating most monetary borders in western Europe, the euro creates one of the world's largest trading blocs. The unified economic environment will foster stability growth and investment. Intra-European and global trade should increase. It should be easier to access the more efficient European capital markets.

- 14.17 LEAPS, or *long-term equity anticipation securities*, are long-term options with expiration dates that could extend out as far as two years. Caps, or *capped options*, are index options with a cap, or ceiling, on the amount of profit an option holder can make. They have *cap prices* in addition to strike prices. Cap prices are set 30 points above the strike price for calls and 30 points below the strike price for puts.

LEAPS give an investor more time to be right about his or her bets on the direction of a stock or stock index than regular listed options with their shorter maturities. Similarly, LEAPS give investors with large portfolios the ability to protect their portfolios over a longer period of time. But there is a price for this longer-term protection: LEAPS have a higher time premium and are therefore more expensive.

- 14.18 *Warrants* are options that allow their holders the right to purchase a specified number of shares of common stock (usually one) at a specified *exercise price* over a specified period of time. Warrants usually have expiration dates that extend two or more years into the future. The securities only exist in the corporate sector and are usually issued as "sweeteners" in a bond issue. Warrants are speculative investment vehicles; they are attractive because they offer a way to participate in the capital gains of the common stock with a much lower dollar investment. Very often, they also have less downside risk than the underlying common stock.

Warrants are attractive alternatives to common stock investments because they provide basically the same capital gains opportunities, but require a smaller capital investment. They usually have low unit cost, so they can be used to lower invested capital and downside risk. As a result, the

leverage imbedded in warrants can magnify dollar (and percentage) returns if the price of the underlying stock goes up.

With warrants, an investor has a fairly high leverage position because the value of a warrant moves up (approximately) dollar for dollar with the value of the common stock. So, even though one pays a low price for the warrant and a much higher price on the stock, the dollar capital gain from owning the warrant (approximately) equals the dollar capital gain from holding common stock. An aggressive individual could put the same amount in warrants as he or she would pay for a share of common stock and receive many times the dollar return in capital gains (if the price of the stock goes up). A conservative investor, in contrast, could invest in one warrant and get (approximately) the same dollar capital gain available from a much larger investment in a single share of common stock, thereby sharply reducing his/her exposure to loss (e.g., there's no way a \$5 warrant can fall \$10 in price, even if the underlying \$50 stock does drop to \$40).

14.19 Several factors are important in determining the investment appeal of warrants:

(1) *Expected price behavior of underlying stock*: The common stock must be carefully selected and must hold the promise for the type of price potential desired.

(2) *Market price of common stock*: Should be above the exercise price for the warrant to have value.

(3) *The expiration date*: Should be well into the future in order to give the investor plenty of time (the more time we have to work with, the better our chances of generating the types of price behavior we forecasted).

(4) *Warrant premium*: The smaller the better (since this is a “sunk cost”).

(5) *Price of the warrant*: This is a key feature; a high warrant price increases downside risk and reduces the leverage appeal of a warrant. As the warrant price increases, it begins to behave more like the underlying stock, with similar risk and return characteristics. Thus, the warrant's *leverage appeal* and its ability to generate magnified returns *decreases* as the price of the underlying common stock *increases*.