

SOLUTIONS MANUAL

Seventh Edition

An Introduction to Derivatives and Risk Management



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CHAPTER 2: STRUCTURE OF OPTIONS MARKETS

END-OF-CHAPTER QUESTIONS AND PROBLEMS

1. **(Options)**
 - a. Homeowners insurance is a put option. In the event of a loss, the insurance company pays you a portion of the value of the house. The rest is like a deductible. The premium on the put is the insurance premium.
 - b. The guaranteed tuition arrangement is a call option granted to you by the school. If you enroll now, you can "purchase" the education at a fixed price up through the next four years. The premium on the option is the fact that you have to enroll in this particular school for your freshman year. Of course you do not have to exercise the option by continuing to enroll thereafter.
 - c. This is not an option because no one has the opportunity to forego exercise. It is actually a forward contract. If the lease were cancelable over the period during which the rental rate was fixed, it would be a call option.

2. **(Exercising an Option)** An American option can be exercised at any time up through the expiration date. A European option can be exercised only on the expiration date. An American option is equivalent to a European option with the additional feature that it can be exercised early.

3. **(Option Price Quotations)** The option is on AT&T stock. It expires in January. If it is an exchange-listed option, it expires the Saturday following the third Friday in January. The option is a call with an exercise price of \$65 a share. In other words, the option gives the right to buy AT&T stock at \$65 a share up to the expiration day in January.

4. **(Contract Size)**
 - a. One contract would now cover 110 shares with an exercise price of 60/1.10 or 54.55. This would be rounded to the nearest eighth for 54-1/2.
 - b. Buyers and writers of outstanding contracts are credited with two contracts for every one previously owned or written. The exercise price is changed to 12-1/2. The contract size is still 100.
 - c. One contract would now cover $100(4/3)$ or 133 shares with an exercise price of $85(3/4)$ or 63.75. Note: In the context of options, a 4-for-3 stock split is the same as a 33 percent stock dividend.
 - d. No changes to any contract terms.

5. **(Expiration Dates)**

	Jan cycle	Feb cycle	March cycle
a.	Feb, Mar, Apr, Jul	Feb, Mar, May, Aug	Feb, Mar, Jun, Sep
b.	Jul, Aug, Oct, Jan	Jul, Aug, Nov, Feb	Jul, Aug, Sep, Dec
c.	Dec, Jan, Apr, Jul	Dec, Jan, Feb, May	Dec, Jan, Mar, Jun

6. **(Position and Exercise Limits)** Short puts and long calls are both strategies designed to profit in a bullish market. Thus, they are considered to be "on the same side of the market."

7. **(Option Traders)** The market maker is an independent operator whose objective is to buy options at one price and sell them for a higher price. A broker is in business to generate commissions on each transaction. A broker does not have to try to guess where the market is going or whether he can earn the bid-ask spread.

CBOE rules allow an individual to be both a market maker and a floor broker but not on the same day. The reason is the potential for a conflict of interest. For example, suppose a situation arises in which the trader has to decide whether to execute a personal transaction or a customer transaction. Whichever transaction is

done will bring large profits to the holder of the position. The trader could obviously be tempted to put personal interests ahead of the customer's interests. The practice of trading as both a market maker and a floor broker is called dual trading.

8. **(Order Book Official)** Consider a limit order to buy an option at no more than 3. If there is no offer to sell for 3 or less, the OBO takes the limit order, adds it to the other limit orders, and makes the highest bids known to the traders. If any market maker or broker is willing to lower the ask price to 3 or below, the OBO executes the order. Because the price may not fall to 3, the limit order may never be filled.
9. **(Other Option Trading Systems)** In the market maker system, an individual trader who is not a broker is required to be a market maker. That is, the trader must be willing to quote a bid and an ask price on certain options. In the specialist system, there is an individual called the specialist who is charged with making a market in certain options. In addition, there are registered option traders who trade on their own but are not required to make a market. The market maker system puts the role of the specialist and registered option trader into one person, the market maker. Exchanges using the specialist system claim that it has the advantage of specialized expertise in keeping the market fair and orderly. Proponents of the market maker system argue that because the specialist is a monopolist, the cost to the public is much higher than under the market maker system, which encourages market makers to compete with each other for the public's business.
10. **(Mechanics of Trading)** Since each contract covers 100 shares, your 20 calls cover 2,000 shares. Thus, your premium is \$4,500. You pay your premium to your broker. Your broker's firm must clear its option trades through a clearing firm, which is a member of the Options Clearing Corporation (OCC). Your broker's firm sends the money to the clearing firm, which deposits it with the OCC. The clearing firm does not actually have to deposit your money with the OCC. It is allowed to consolidate its accounts and using a predetermined formula, it deposits the required amount with the clearinghouse.
11. **(Index Options)** If a call stock option is exercised, the writer delivers the stock to the buyer and receives the exercise price. If a put is exercised, the buyer delivers the stock to the writer and receives the exercise price. If a call index option is exercised, the writer pays the buyer the difference between the stock price and the exercise price. For a put, the writer pays the buyer the difference between the exercise price and the stock price. The major advantage of exercising an index option rather than a stock option is not having to handle the stock. This results in significantly lower transaction costs.
12. **(Option Price Quotations)** Besides the fact that stock and option prices are already dated by the time they appear in newspapers, these prices are not synchronized. The prices shown are only the prices of the last trade. The last trade of the stock may not have taken place at the same time as the last trade of the option. In addition, the stock and option markets do not even close at the same time. Moreover, the prices appearing in the newspapers do not indicate whether the last trade was at a bid price or an ask price. Also, printed newspapers provide prices for only the most active options (though more information can usually be obtained from the newspapers' web sites). Web sites of the exchanges provide much more current information and in some cases include information not provided by the newspapers, such as the bid and ask prices.
13. **(Mechanics of Trading)** An option position can be terminated by simply executing an offsetting order in the market. For example, suppose in January you bought a Microsoft March 90 call for $5 \frac{3}{8}$. In the middle of February it is selling for $6 \frac{1}{4}$ and you would like to take your profit. You simply sell a Microsoft March 90 call, which offsets your long position. An option can also be closed by exercising it. You would simply notify your broker that you want to buy the stock at the exercise price (if a call) or sell it at the exercise price (if a put). The third way an option position can be terminated is by expiring out-of-the-money. If it is not advantageous to exercise it by the expiration, the option simply expires and your position is terminated. In the over-the-counter market, you can certainly exercise the option or have it expire out-of-the-money. While you can effectively offset a position by opening up a new but opposite contract, the procedure is technically somewhat different than in the exchange-listed options market. In the latter market,

the contracts cancel each other and no further obligation is incurred. In the over-the-counter market, both contracts remain in force and consequently each is subject to default on the part of the writer.

14. **(Other Types of Options)** Among the option-like instruments are warrants, convertibles and callable bonds. A warrant is an option offered by the firm on its own stock. A convertible is a bond or preferred stock that can be converted into common stock at a fixed rate at the holder's discretion. Callable bonds are bonds that can be retired early at a specific price at the discretion of the issuing firm. In addition firms issue options similar to warrants to executives and employees. Finally, we should note that stock itself is like a call option held by the stockholders and written by the bondholders.
15. **(Real Options)** Real options are options that corporations hold when they invest in certain projects and includes options to expand projects, contract projects, temporarily shut them down, terminate them, or sell them to other companies. These options do not trade in open markets like exchange-listed and over-the-counter options, but they possess the characteristics of ordinary options such as having an exercise price and an expiration.
16. **(Transaction Costs in Option Trading)** Floor trading and clearing fees run from \$0.50 to \$1.00. These represent the costs of paperwork involved in processing the trade as well as the exchange's overhead. Commissions, which reflect the cost of the labor involved in arranging the trade, vary and depend on the type of broker (discount or full service). The bid-ask spread is the cost of providing liquidity to the market. The public and floor brokers representing the public incur all of these costs while market makers incur floor trading and clearing fees and may incur the bid-ask spread if they have to deal with other market makers instead of the public.

Transactions in the OTC market do not generally incur commissions and floor trading and clearing fees. They do incur costs of paperwork and, in particular, the legal expenses of laying out the rights of each party. Since transactions in the OTC market are generally executed through dealers, they incur the dealer's bid-ask spread.
17. **(Over-the-Counter Options Markets)** Exchange-traded options are regulated by the Securities and Exchange Commission. There is essentially no regulation of OTC option transactions. Firms that trade in the OTC market, however, are typically regulated by the National Association of Securities Dealers or, if they are banks, by banking regulators.

APPENDIX 2A QUESTIONS AND PROBLEMS

1.
 - a. $10[0.2(\$5,000) + \$700] = \$17,000$.
 - b. $10[0.2(\$5,000) - (\$5,500 - \$5,000) + \$300] = \$8,000$. This amount exceeds the minimum of $\$300 + 0.1(\$5,000) = \$800$.
 - c. $10[0.2(\$5,000) - (\$5,000 - \$4,500) + \$300] = \$8,000$. This amount exceeds the minimum of $\$300 + 0.1(\$4,500) = \$750$.
 - d. $10[0.2(\$5,000) + \$700] = \$17,000$
 - e. The stock price exceeds the exercise price so only $1,000(\$45)(0.5)$ or \$22,500 can be borrowed. The call premium, however, can be applied so the investor must come up with only $\$27,500 - \$7,000 = \$20,500$.
 - f. $20(\$500) = \$10,000$. One-hundred percent margin must be posted on all option purchase transactions.

APPENDIX 2B QUESTIONS AND PROBLEMS

1.
 - a. $\$450 - \$600 = -\$150$. The \$150 loss applies against other taxable income and reduces taxes by $\$150(0.28) = \42 .
 - b. $\$650 - \$600 = \$50$. The tax is $\$50(0.28) = \14 .
 - c. The stock is treated as having been purchased for $\$25 + \$6 = \$31$. The taxable gain is $\$3,500 - \$3,100 = \$400$. The tax is $\$400(0.28) = \112 .
 - d. The call would be exercised. You deliver the stock and receive \$25 for it. The sale price of the stock for tax purposes is $\$25 + \$6 = \$31$. You purchased the stock at \$30. The tax is $(\$3,100 - \$3,000)(0.28) = \$28$.
 - e. The taxable gain is $\$600 - \$350 = \$250$. The tax is $\$250(0.28) = \70 .
2.
 - a. Your loss is $100(\$15 - \$12) = \$300$. This is netted against other gains for a tax saving of $\$300(0.31) = \93 . The after-tax profit is $-\$300 + \$93 = -\$207$.
 - b. You exercise the call and receive $100(\$441.35 - \$425) = \$1,635$. Your profit is $\$1,635 - \$1,500 = \$135$. The tax is $\$135(0.244) = \32.94 . The after-tax profit is $\$135 - \$32.94 = \$102.06$.
 - c. The call expires worthless. Your loss is \$1,500. This is netted against other gains for tax savings of $\$1,500(0.31) = \465 . The after-tax profit is $-\$1,500 + \$465 = -\$1,035$.
 - d. Taxes are paid at the end of the year on all trading profits whether the positions are closed out or not. Thus, in a. and b., if the end of the year came before you sold or exercised the call, you would owe taxes on any profits or be able to deduct any losses accumulated up to that time.
3.
 - a. This would be a wash sale. You replaced the stock with a call option within the 61-day period. The loss on the stock is not deductible for tax purposes.
 - b. This would be a wash sale because you acquired the call within a 61-day period surrounding the sale of the stock. It does not matter that you acquired the call before you sold the stock.
 - c. This is not a wash sale. The wash sale rule pertains only to cases where the stock is sold at a loss. The rule prohibits deducting the loss. In this case, the stock was sold at a gain so the wash sale rule has no effect.