Chapter 25
Options and Corporate Securities

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T25.2 Option Terminology

- Call option

  The right to buy an asset at a fixed price during a particular period of time.

- Put option

  The right to sell an asset at a fixed price during a particular period of time. The opposite of a call.

- Striking price

  The fixed price in the option contract at which the holder can buy or sell the underlying asset. (Also the exercise *price or the* strike *price.)*

T25.2 Option Terminology

- Expiration date

  The last day on which an option may be exercised.

- Exercising the option

  The act of buying or selling the underlying asset via the option contract.

- American option

  An option that may be exercised at any time until its expiration date.

- European option

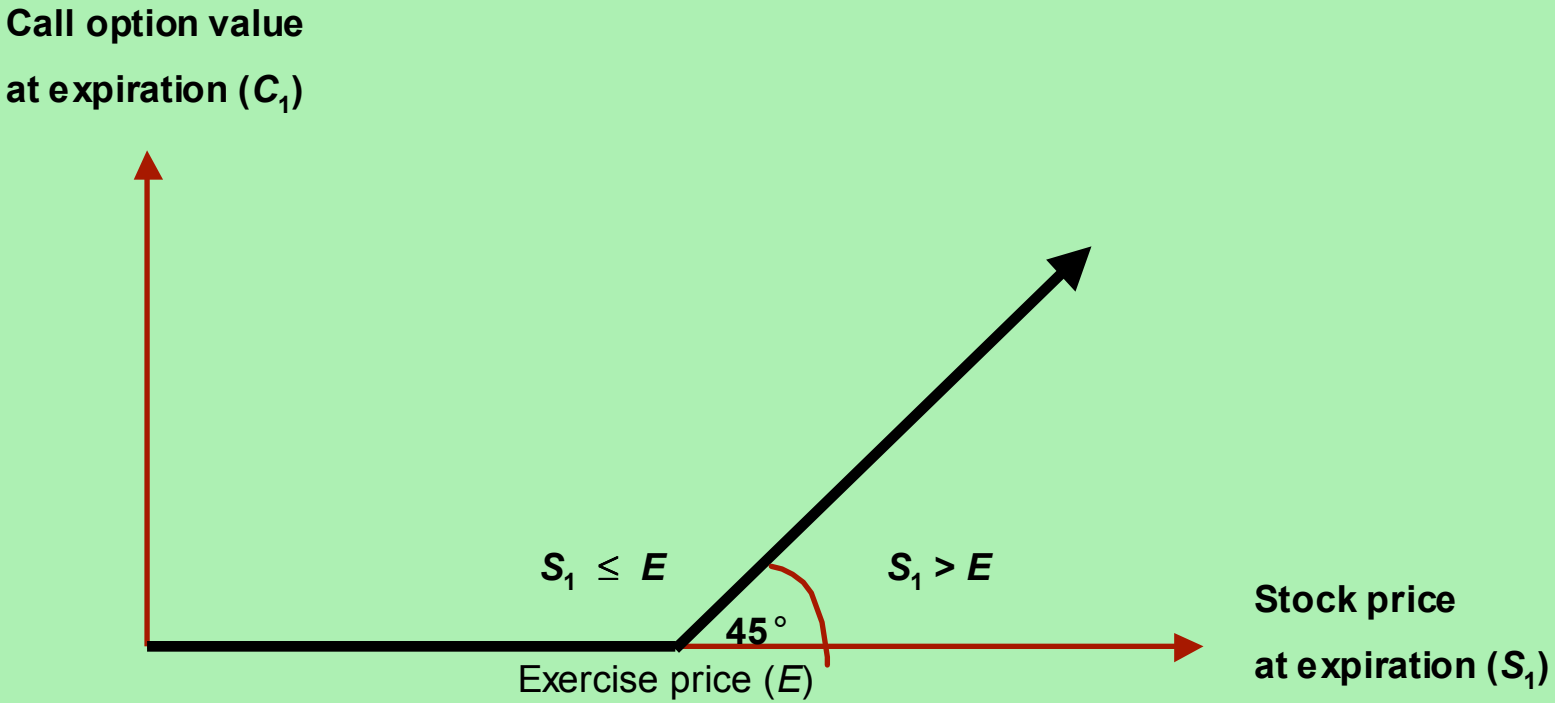
  An option that may only be exercised on the expiration date.

T25.3 A Sample *Globe and Mail, Report on Business* Option Quote (Figure 25.1)

Stock	Series		Close Bid	Ask	Last	Total Vol Vol	Op Int Op Int
Air Canada			**$19.35**			**156**	**8514**
Jul-00	$16.00		3.35	3.60	3.95	7	592
	$19.00	p	0.60	0.85	0.55	20	150
	$20.00		0.60	0.85	0.90	20	230
	$21.00		0.30	0.55	0.50	40	104

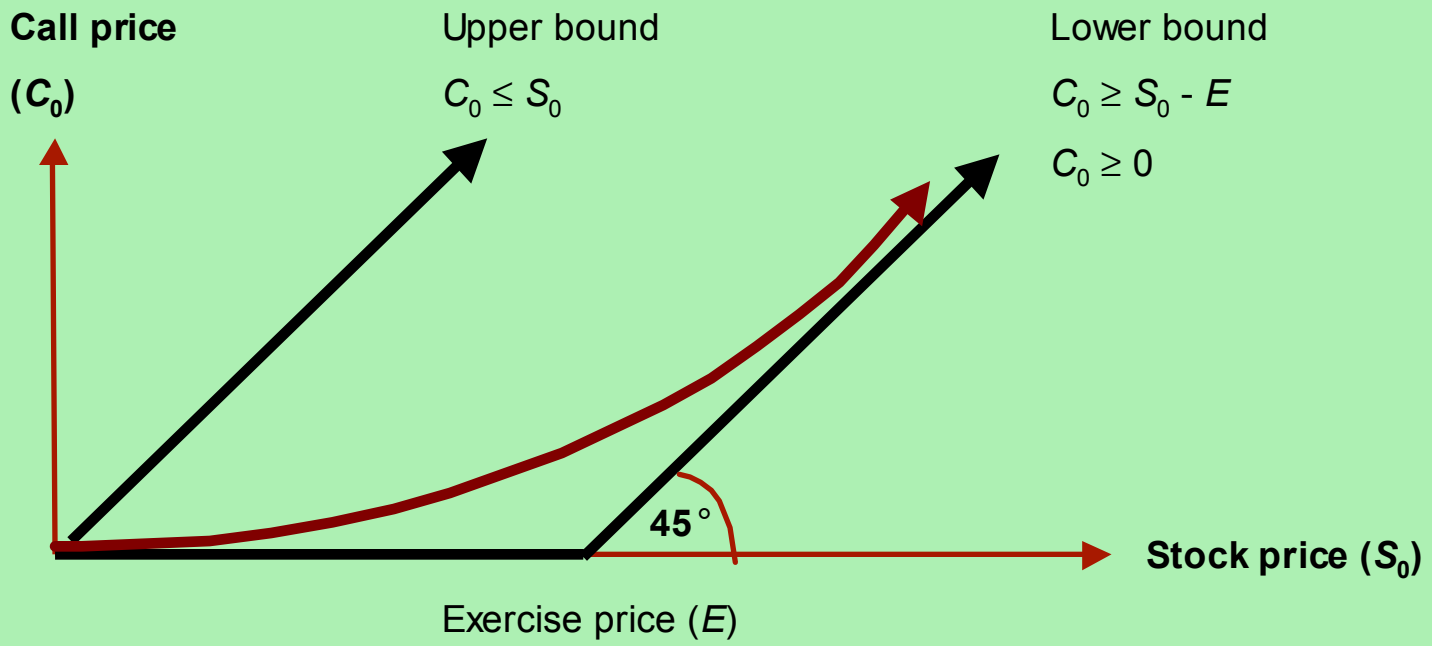
Source: The Globe and Mail, Report on Business, July 6, 2000, p. B27. Used with permission

T25.4 Value of a Call Option at Expiration (Figure 25.2)



As shown, the value of a call at expiration is equal to zero if the stock price is less than or equal to the exercise price. The value of the call is equal to the stock price minus the exercise price (S_1 - E) if the stock price exceeds the exercise price.

T25.5 Value of a Call Option Before Expiration (Figure 25.3)



As shown, the upper bound on a call's value is given by the value of the stock ($C_0 \leq S_0$). The lower bound is either $S_0 - E$ or zero, whichever is larger.

T25.6 Five Factors That Determine Option Values (Table 25.1)

Factor	Calls	Puts
Current value of the underlying asset	(+)	(–)
Exercise price on the option	(–)	(+)
Time to expiration on the option	(+)	(+)
Risk-free rate	(+)	(–)
Variance of return on underlying asset	(+)	(+)

T25.7 Terminology: Convertible Bonds

- Conversion premium

  The difference between the conversion price and the current stock price, divided by the current stock price.

- Conversion price

  The dollar amount of a bond's par value that is exchangeable for one share of stock.

- Conversion ratio

  The number of shares per bond received for conversion into stock.

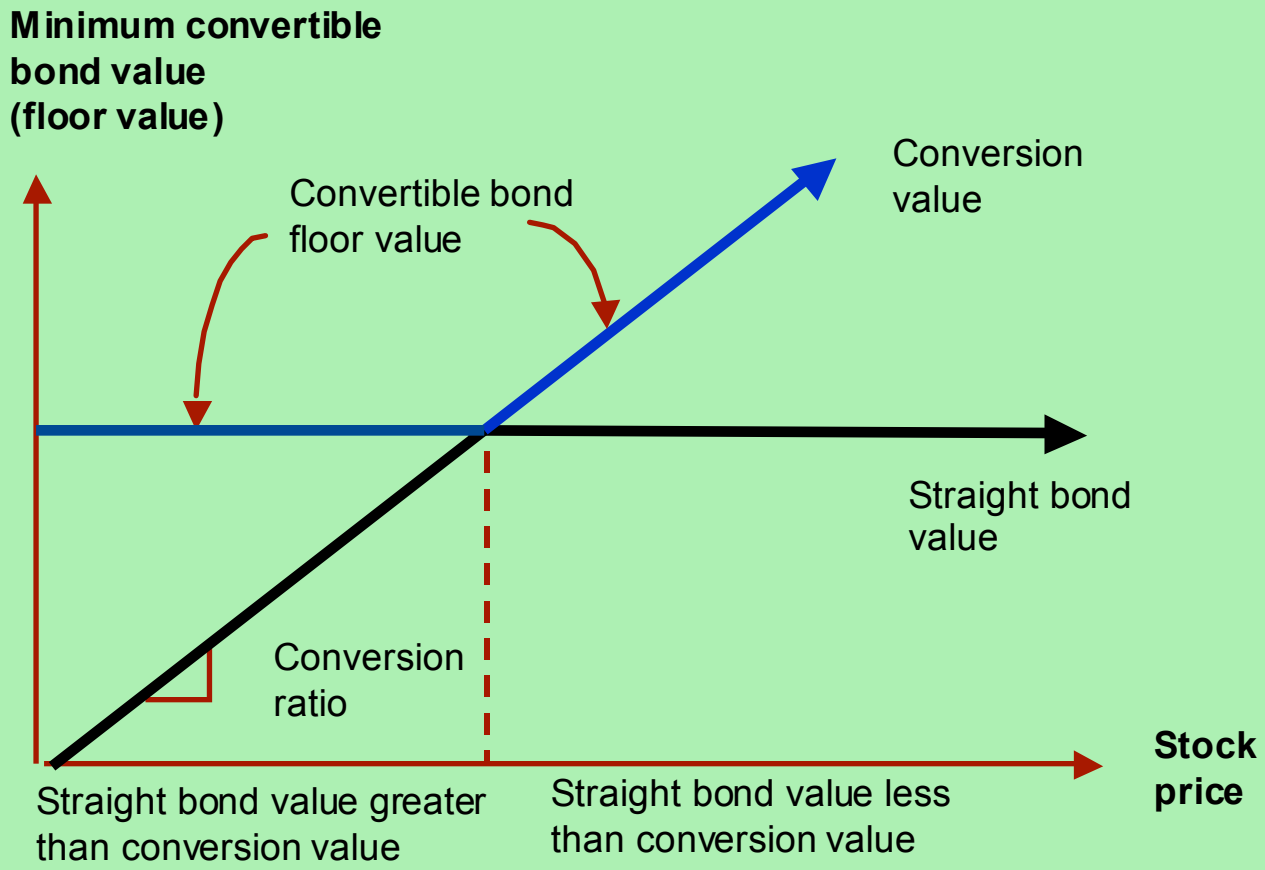
- Conversion value

  The value a convertible bond would have if it were to be immediately converted into common stock.

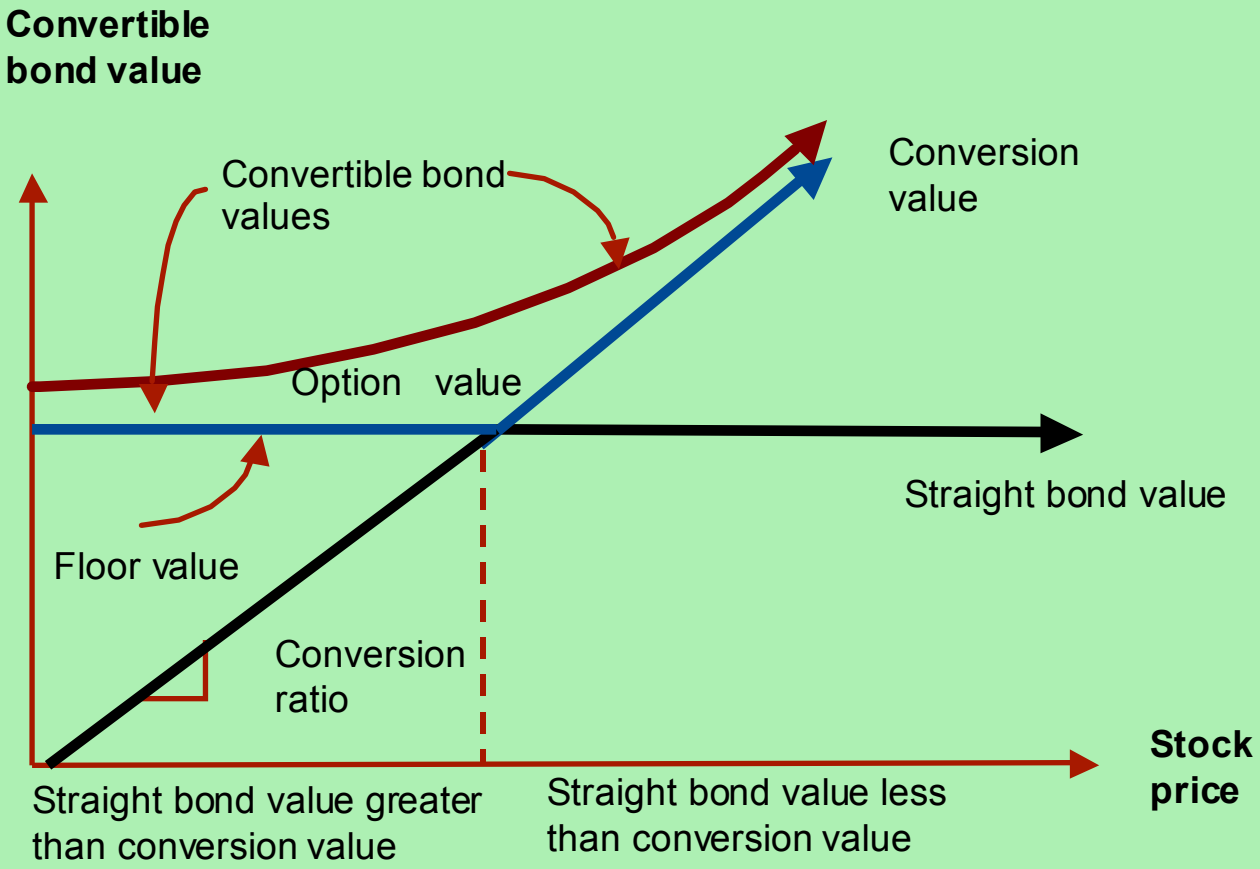
- Straight bond value

  The value a convertible bond would have if it could not be converted into common stock.

T25.8 Minimum Value of a Convertible Bond (Figure 25.4)



T25.9 Value of a Convertible Bond (Figure 25.5)



T25.10 The Case For and Against Convertibles (Table 25.3)

	If Firm Does Poorly	If Firm Prospers
	Low stock price and no conversion	**High stock price and conversion**
Convertible bonds issued instead of straight bonds	Cheap financing because coupon rate is lower (good outcome)	Expensive financing because bonds are converted, which dilutes existing equity (bad outcome)
Convertible bonds issued instead of common stock	Expensive financing because firm could have issued common stock at high prices (bad outcome)	Cheap financing because firm issues stock at high prices when bonds are converted (good outcome)

T25.11 Other Options

- Call provision on a bond

  A call provision provides the issuer the right, but not the obligation to repurchase the bond at a specified price.

- Put bonds

  The owner of a put bond has the right to force the issuer to repurchase the bond for a fixed price for a fixed period of time.

- Green Shoe provision

  The right of the underwriter to purchase additional shares from the issuer at the offer price in an IPO.

- Insurance

  Insurance obligates the insurer (option writer) to purchase the underlying asset at a specified price for a specified period (the term of the policy).

T25.12 Chapter 25 Quick Quiz

1. What is the difference between a call option and a put option?

   Call: the right to buy an asset at a fixed price during a particular period of time.

   Put: the right to sell an asset at a fixed price during a particular period of time.

2. *All else equal*, which is more valuable to the holder, an American option or a European option? Why?

   An American option gives the holder the right to exercise at any time during the option's term; a European restricts the right to exercise to the expiration date. The former must be more valuable to a rational option holder.

3. What is the "floor value" of a convertible bond?

   The floor value of a convertible bond is the higher of the conversion value or the straight bond value.

T25.13 Solution to Problem 25.2

Consider the following options quote.

Option & NY Close	Strike Price	Expiration	Calls Vol.	Calls Last	Puts Vol.	Puts Last
RWJR						
74	70	Mar	230	3 1/2	160	1 1/8
74	70	Apr	170	6	127	1 7/8
74	70	Jul	139	8 5/8	43	3 3/8
74	70	Oct	60	9 7/8	11	3 1/8

T25.13 Solution to Problem 25.2 (concluded)

a. Are the call options in the money? What is the intrinsic value of an RWJR Corp. call option?

The strike price is 70 and the value of the underlying stock is 74. The call options, therefore, are in the money. Intrinsic value = $4

b. Are the put options in the money? What is the intrinsic value of an RWJR Corp. put option?

The strike price is 70 and the value of the underlying stock is 74. The put options, therefore, are not in the money. Intrinsic value = $0

c. Two of the options are clearly mispriced. Which ones? At a minimum, what should the mispriced options sell for? Explain how you could profit from the mispricing in each case.

The March 70 call price is $3.50, yet its intrinsic value is $74 - 70 = $4. One could buy the call and immediately exercise it, netting $.50 per share before transactions costs.

The October 70 put is priced lower than the July 70 put, although the former gives the holder an extra three months. One could sell July puts and use the money to buy October puts, netting $.25 per share and an extra three months in the bargain.

T25.14 Solution to Problem 25.4

- The price of Cartman stock will be either $75 or $95 at the end of the year. Call options are available with one year to expiration. T-bills currently yield 4 percent.

  a. Suppose the current price of Cartman stock is $90. What is the value of the call option if the exercise price is $70?

  b. Suppose the exercise price is $90 in part (a). What would the value of the call option be?

T25.14 Solution to Problem 25.4 (continued)

a. What is the value of the call option if the exercise price is 70?

The present value of the exercise price = \$70/(1.04) = \$67.31

S_0 = PV exercise price + C_0

\$90 = \$67.31 + C_0

C_0 = \$22.69

b. Suppose the exercise price is \$90 in part (a). What would the value of the call option be?

\$90 = _____ + _____

C_0 = _____

T25.14 Solution to Problem 25.4 (conclusion)

a. What is the value of the call option if the exercise price is 70?

The present value of the exercise price = \$70/(1.04) = \$67.31

S_0 = PV exercise price + C_0

\$90 = \$67.31 + C_0

C_0 = \$22.69

b. Suppose the exercise price is \$90 in part (a). What would the value of the call option be?

\$90 = \$90/1.04 +(4)C_0

C_0 = \$4.47

T25.15 Solution to Problem 25.6

- A one-year call option contract on Cheesy Poofs common stock sells for $1,800. In one year, the stock will be worth $30 or $50 per share. The exercise price on the call option is $35. What is the current value of the stock if the risk-free rate is 5 percent?

T25.15 Solution to Problem 25.6 (continued)

- C_0 = \$1,800/(100 shares per contract) = \$18 per share
- S_0 = _____ $\times$ \$18 + __ /(1.05) = \$_____ = _____

T25.15 Solution to Problem 25.6 (conclusion)

- C_0 = \$1,800/(100 shares per contract) = \$18 per share

- S_0 = \$20/(50-35) $\times$ 18 + 30/(1.05) = \$24 + 28.57 = \$52.57