

LECTURE 2

(Chapters 6 & 7– Basic and Advanced Option Strategies)

OPTIONS

Few headlines:

AIG Loses - \$100 Billion - Massive Government Bailout (Sep 08)

Goldman Sachs / Paulson & Co Hedge Fund

USE OPTIONS FOR INSURANCE / PROTECTING / HEDGING – RESPONSIBLE RISK MANAGER

BASIC NOTATIONS AND TERMINOLOGY:

S_0 = Stock price today, S_T = Stock price at expiration

X = Exercise Price (Future price)

T = time to expiration (sometimes use n)

C = Call option price or premium paid/received for the call option

P = Put option price or premium paid/received for the put option

Payoff & Profits

$S - X$ = Call Option Payoff (if negative the payoff is \$0) – [Profit = Payoff – Call Premium]

$X - S$ = Put Option Payoff (if negative the payoff is \$0) – [Profit = Payoff – Put Option]

DCRB OPTION DATA MAY 14

Exercise Price	CALLS			PUTS		
	May	June	July	May	June	July
120	8.75	15.40	12.90	2.75	9.25	13.65
125	5.75	13.50	18.60	4.60	11.50	16.60
130	3.60	11.35	16.40	7.35	14.25	19.65

Risk Free Rates	0.0447	0.0446	0.0453	0.0447	0.0446	0.0453
Current Stock Price	125.94					

INTRODUCTION TO DERIVATIVES

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The table above is showing an example of how various stock options for DCRB are trading. Assuming that today is May 14th and you are looking to buy or sell options. The table shows the exercise price (or the future price that you want to look at today), the Month that the option to exercise expires (third Friday of that month) and the premium that you need to pay if you buying the option or the money you received if you sell an option. For example, the stock is currently trading at \$125.94 and you have a strong view that the underline stock will go up by July (3 months from now) higher than \$150 you are willing to pay \$16.40 per share now to lock in the future price at \$130. If in deed the stock goes to \$150 in July, then you will exercise the option to basically buy the stock at \$130 and sell it to the market at \$150 making \$20 gross gain (called Payoff) before costs (premiums). At \$150, the profit will be \$3.60 per share ($\$150 - \$130 - \16.40)

CALL OPTIONS

The right to purchase an asset for a specific price (exercise price or strike price) on or before some specified expiration

i.e. June Call OPTION for DCRB stock with exercise price of \$130 entitles its owner to **PURCHASE** DCRB stock for \$130 at any time up to and including the expiration S=Day in June (third Friday). The purchase price option is called **PREMIUM** (like insurance) - the seller that owns the stock receives the premium

EXAMPLE

Call June option DCRB \$130 with Premium for \$11.35

Until the third Friday of June, the holder of the option may buy the stock (100 shares per option) for \$130. Today DCRB sells for \$125.94 – Not a good time to exercise – If DCRB is selling at \$132 on the third Friday in June – The option will be exercised (even though you will lose money – but not as much as not exercising)

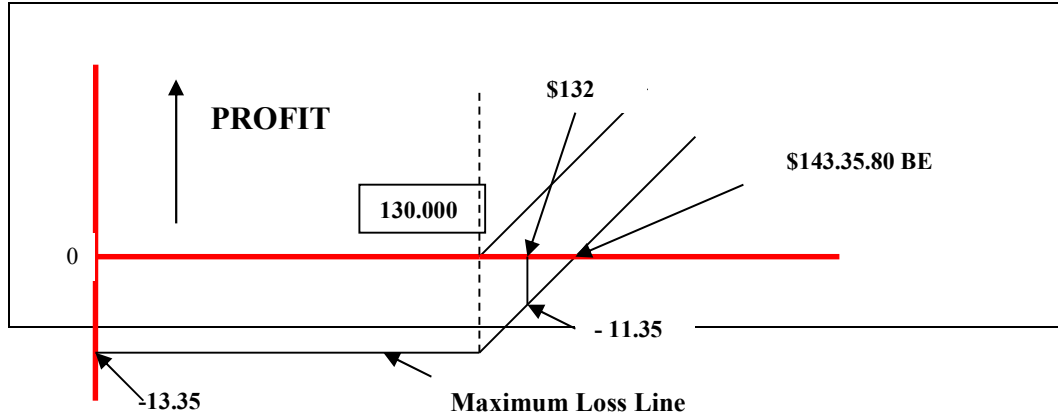
$132 - \text{Buy } 130 = \2 Payoff

$\text{Profit} = \text{Final Value} - \text{Original Investment} = 2 - 13.35 = - 11.35$

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CALL OPTION:



PUT OPTIONS

Gives the holder the right to SELL an Asset for a specific exercise or stock price on or before a specific date (exercise date)

i.e. June \$130 - Sell DCRB at \$130 even if the stock price less than \$130 – The owner of the PUT option does not need to own the shares to exercise the option

Example

PUT OPTION w/ exercise price \$130 sell today for \$14.25. Entitles the owner of the option to sell DCRB shares at any time, until the third Friday of June, to sell the stock at \$130

If the current price of stock is \$125.94 – an immediate exercise will lose money even though you “in-the-money” (less than \$130) due to high premium you paid– wait until the expiration date June – If at expiration day in June, the price of the DCRB stock is \$110, then you exercise the option – buying the stock at \$110 and sell it at \$130

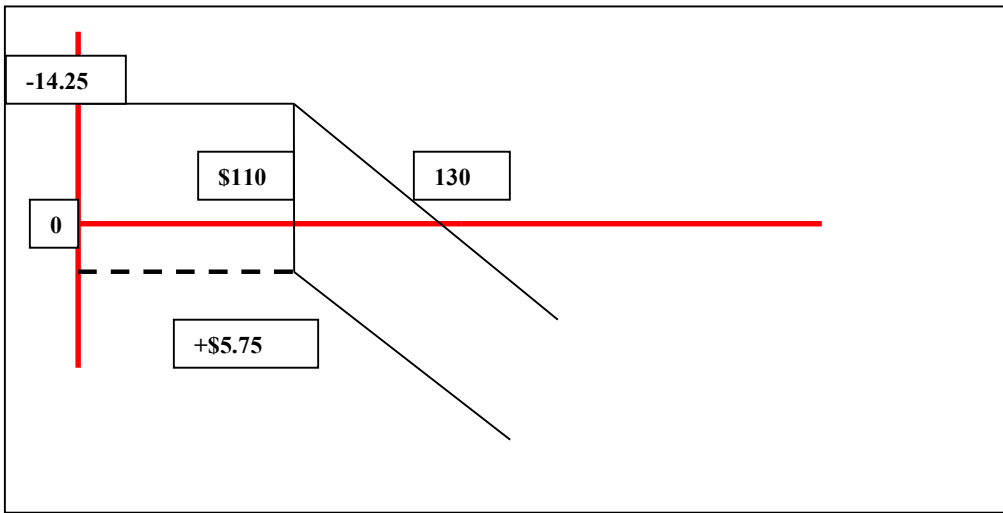
$$\text{Payoff} = \$130 - 110 = \$20$$

$$\text{Profit} = \text{Payoff} - \text{Premium} = \$20 - \$14.25 = \$5.75 \text{ -----net profit of HPR of } 5.75/14.25 = 40.35\%$$

Other Terms: In-the money / Out-of the money (Before Premium) / on the money

American Option (on or before) / European Option (on expiration day)

PUT OPTION



4 STRATEGIES

	Buy a CALL	Write a CALL	Buy a PUT	Write a PUT
Expected Stock	UP	Stabilize / Sideways	DOWN	U or stable
Max Loss	Premium	Opportunity Cost	Premium	Exercise Price – Stock - Premium
		Must own the stock		

BASIC AND MOST COMMON OPTION STRATEGIES

PROTECTIVE PUT – Chapter 6 page 225

STRATEGY (the most common hedging strategy):

1. Buy/Hold the stock
2. Buy a Put Option on the stock

Example:

From the example above the DCRB June’s strike price is \$130 and the stock is selling for \$110 at expiration day – the value of your stock that you own in your portfolio is \$110. The right to sell the stock at \$130

The stock is worth \$110 – You sell it at the option price at \$130 then your payoff is

$$X - S_t = \$130 - \$110 = \$20$$

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if the price of the stock is $S=140$ = you get \$140 from owning the stock

if $S = 150$ then $S > 130$ = the option at 130 is worthless, but you own the stock anyway – you buy the put option for pure protection if the stock drops below \$130 though you need to pay \$14.25 for that option.

Payoff to protective PUT strategy

	$St \leq X$	$St > X$
Stock	St	St
Put Option	$X - St$	0
Total	X	St

Despite the common perception that Derivative means Risk – these can be used effectively for risk management – Brane Vs Roth – responsibility to hedge Grain held in storage – failed to hedge – lawsuit was one because manager failed to use to secure the risk by hedging.

COVERED CALLS (Chapter 6, page 220)

Is the purchase of Share of Stock with simultaneous sale of a Call on the stock? The option is “covered” because the potential obligation to deliver the stock is covered by the stock held in the portfolio.

NOTE: Writing an option without affecting the stock is called “naked option writing”

	$St \leq X$	$St > X$
Payoff of Stock	St	St
Payoff of Call Option	- 0	$-(St - X)$
Total	St	X

Example:

Assume you hold 1,000 shares of DCRB stock at \$125.94 per share. You intent to sell the stock if it hits \$130 per share – so you write a call for 90 days receiving \$13.35 premium at the $X=\$130$.

Write 10 DCRB (1,000 shares) you get \$13,350. If the stock goes to \$140.00 – the stock will be exercised getting \$140 for selling the stock offsetting the loss of \$10 keeping the

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premium \$13.35 – the only risk is if the stock will increase beyond \$130 and you lost the opportunity to sell it higher than \$140, but you were going to sell it at \$130 anyway if you enter to a Limit Order....

OVERVIEW ADVANCED OPTION STRATEGIES (Discussed later in detail)

STRADDLE (Chapter 7, page 260)

A long straddle is established by BUYING A CALL and A PUT on a stock each with the same X price and same Expiration Date. The view is Volatility – If the investor is expecting that the stock will swing significantly up or significantly down based on news (FDA drug, Court Decision, etc). – Volatility Bet

The worst case scenario for straddle is no movement in the stock – max loss is the premium on both PUT and CALLS

	$St \leq X$	$St > X$
Payoff of CALL	0	$St - X$
Payoff of PUT	$(X - St)$	+0
Total	$X - St$	$St - X$

COLLARS (Chapter 7, page 247)

A collar is an option strategy that brackets the value of the portfolio between two bounds