Lecture 5: Properties of Stock Options

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Types of Options

American options can be exercised anytime prior to the expiration date

European options can only be executed on the expiration date.

Which are more valuable, American or European options?

Most exchange-traded options are American, but the value of European options is easier to determine.

Employee stock options are used to aid in recruitment and retention of employees.

Making them exchange tradeable (as Google has done) makes them more valuable.

What is an Option Worth?

Suppose you own an unexpired call option to buy a stock for $100.

What is your option worth if the stock is selling for $110? At least $10.

It is better to own cash and an option to buy at the current price than to own the shares!

What if the stock is selling for $90? The value of an option cannot be less than 0, since you can choose not to execute it.

Long vs. Short

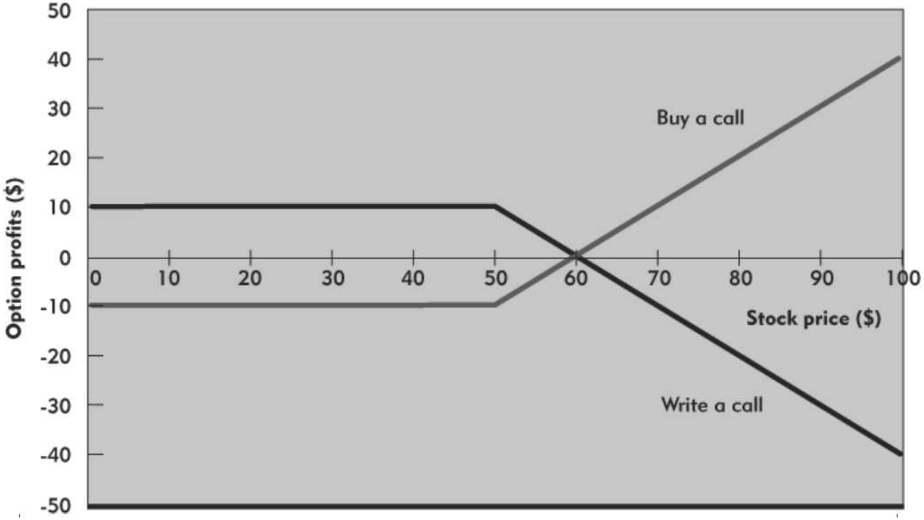
The long position in a security is held by the buyer of the security, be it a stock share, a put, or a call.

The short position in a security is held by the seller of the security, be it a stock share, a put, or a call.

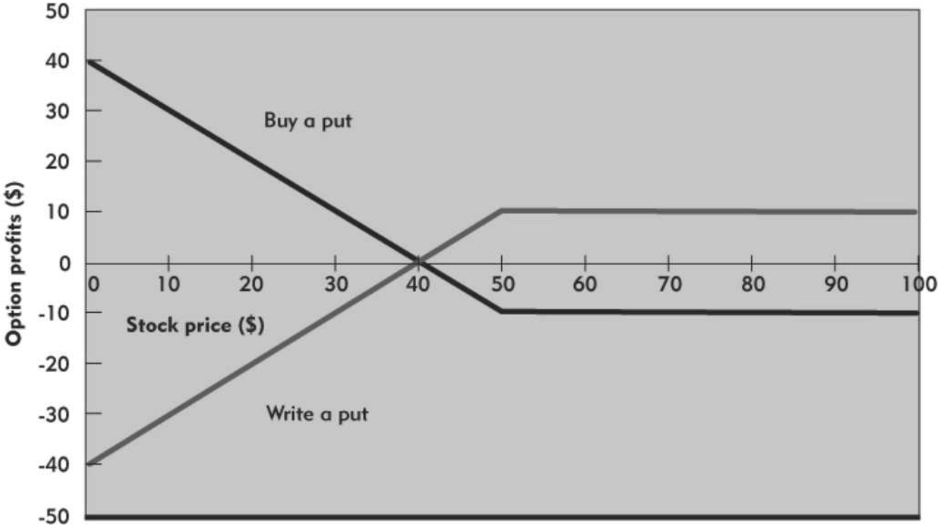
The seller of an option makes a profit by having sales prices exceed losses.

The nomiclature can get confusing. . .

Call Option Profits



Put Option Profits



Uses of Options

Hedgers can use options to reduce risk.
They can reduce the risk that a stock they own will decline by buying put options on it.
Speculators can use options to gamble that prices will change.
They can buy a put option on a stock if they think it will go down.
Arbitragers can use options to gain risk-less profits if securities are inconsistently priced.

Options Provide Action!

Options provide more impact per dollar than holding the underlying securities.

Suppose IBM has a current spot price of \$90 per share.

Further, call options with a strike price of \$90 and three month expiration are available for \$5 per share

To invest in 100 shares of IBM for three months, I could:

- Buy $\$90 \times 100 = \$9,000$ of shares, or
- Buy $\$5 \times 100 = \$500$ of options.

Three Months Later

	Buy 100 IBM Shares ($90/share; $9000 Investment):		Buy One Call Option Contract ($5/option; $500 Investment):	
	Dollar Profit:	Percentage Return:	Dollar Profit:	Percentage Return:
Case I: $100	$1,000	11.11%	$500	100%
Case II: $90	$0	0%	-$500	-100%
Case III: $80	-$1,000	-11.11%	-$500	-100%

Options are risky investiments which hold out the possiblity of high returns.
The worst that can happen when you own options is that you lose everything, as they cannot get negative.

Portfolios with Options

The raw materials of investments we have include borrowing/depositing money, buying/selling options, and buying/selling stocks.

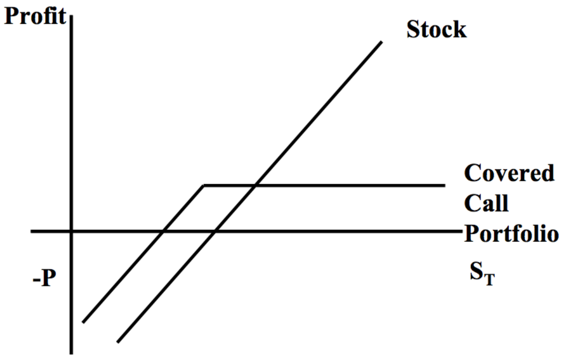
Combinations of options and stocks can be used in clever ways to engineer portfolios exploiting certain opportunities and eliminating particular risks.

By combining put and call options, we can place bets which payoff under a variety of different market conditions.

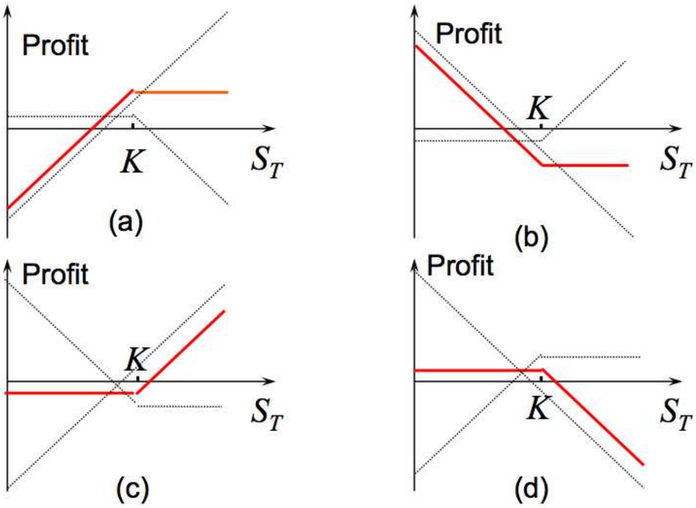
The Covered Call

I own Google stock, current spot price \$500 per share.

If I write (sell) a call option at \$600, I get some guaranteed income, but lose some potential profits (if it goes above the strike price).



Single Option, Single Stock



(a) long stock, short call (b) short stock, long call
(c) long stock, long put (d) short stock, short put
Adding an option protects me if I am long or short on a stock.