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Lecture Notes: Directional Trading Strategies

1 Directional Trading Strategies

With options you can profit from correctly predicting market direction, changes in the perception of risk, and from the passage of time. Options also allow you to arbitrage price discrepancies easily and completely. Here we emphasize directional trading strategies.

1.1 The Strategy Matrix

Recall that the value of the option is composed of the intrinsic value and the time value. Changes in intrinsic value are associated with movement in the underlying market while changes in the time value are associated with changes in volatility and the passage of time. Therefore, when options are traded, a viewpoint must be taken on the movement of both the underlying asset and volatility¹. (We do not need to take a view on time because it is always passing.) By taking a view, we mean choosing a specific trading strategy which benefits from particular market and volatility movements.

Suppose, for example, that the asset underlying the option is a Crude Oil futures contract. The following strategy matrix summarizes some of the main points made in previous lectures:

Viewpoint on the underlying market (crude oil is the underlying market in this case)				
	Buyer	Seller	Neutral	
Viewpoint on volatility	Buyer	<i>Buy call option</i>	<i>Buy put option</i>	
	Seller	<i>Sell put option</i>	<i>Sell call option</i>	
	Neutral	<i>Long futures</i>	<i>Short futures</i>	

¹Note that option positions can benefit from a change in both the implied volatility of the options market and from the actual volatility of the underlying market. Here we assume that a viewpoint on volatility means an identical viewpoint on both the implied and actual volatility levels.

- *Bullish Strategies:* ways to benefit from an increase in the underlying market. Concerning market direction, there are three ways to assume an equivalent buying position in Crude Oil: (i) buy a Crude Oil futures contract, (ii) buy a call option on Crude Oil futures, or (iii) sell a put option on Crude Oil futures.
- *Bearish Strategies:* ways to benefit from a decrease in the underlying market. On the selling side, there are also three ways to assume a short position: (i) sell a Crude Oil futures contract, (ii) buy a put option on Crude Oil futures, or (iii) sell a call option on Crude Oil futures.

The choice of which trade to use depends on one's viewpoint on volatility. Recall that when you buy an option, you buy the two components of its value: intrinsic value and time value. Volatility is the crucial element in time value; if volatility increases, the time value will increase as well, all other things remaining equal.

Buying an option implies buying volatility; when you sell an option, you sell volatility. When the implied volatility increases, you make money due to the increase in the time value of the option. This has been referred to as the “vega”, or “kappa” effect. If the actual volatility of the market increases that means the exposure of the option will react positively both to increases and decreases in the price of the underlying asset. This is known as the “gamma” effect.

Finally, consider a position in Crude Oil futures. Volatility does not impact the prices of these contracts. The price of Crude Oil futures is determined by supply and demand and is bound by the futures pricing relationship discussed in previous lectures. Hence, the Crude Oil futures is not determined by volatility and so its exposure to volatility is neutral. In this case you only make money if the Crude Oil market moves up or down, in other words by *directional moves* in the underlying Crude Oil market.

1.1.1 Comparison of the Bullish Strategies

(See Figure 1.) From the directional standpoint, the most aggressive position is to buy the Crude Oil futures. A less aggressive position is to buy a call option with the limited loss potential. If one expects the Crude Oil market to move up minimally, then the best strategy is to sell a put option. Which trade you choose will depend on how far you think the Crude Oil market will go, when it is going to move, and your viewpoint on volatility.

If you believe volatility will increase, the general rule is to buy options.²

²Unfortunately when you buy options you are subject to time decay. Unless volatility increases immediately, time decay can quickly waste the option value.

If you believe that volatility will fall, then you should sell options. Regardless of how we define volatility, option sellers want the risk of the market to fall to earn their profits.

The consideration of loss potential, and whether it is limited or unlimited, is also important to option traders. Selling options can be lucrative but requires the ability to quickly apply “damage control” if the market moves against your position. Buyers of options are assured of only a limited loss if things go wrong. Thus buying options is a better strategy for those with a limited taste for risk.

1.1.2 Comparison of the Bearish Strategies

(See Figure 2.) On the downside, the most aggressive position is to sell the Crude Oil futures. If the market goes down you make an immediate profit; this is your best short term trade. But if you are concerned that the market might rise, you may not wish to have the unlimited loss potential associated with a short futures contract.

If you buy a put option, you benefit when the market goes down. You also achieve a great deal of leverage with a relatively small amount of capital invested. The worst drawback when buying an option is waiting while the time value steadily depletes and the market fails to move. It is like driving a car up a hill and you are hoping you make it to the top before it runs out of petrol.

If you sell a call you receive a premium, and if the market is stable, you profit. The most option sellers can make is the premium paid to them, while their risk potential is unlimited. Therefore, with options one must decide if one wishes to buy an option with limited loss, or sell an option with limited gain.

1.2 Vertical Spreads

Fortunately, that is not the end of the story. With options one can use a wide variety of additional strategies by buying and selling options in combination. The strategist, by using both calls and puts of different strike prices can create new “instruments” with an infinite number of possible combinations.

One of the most popular kind of combination trades which provides a directional viewpoint is the *vertical spread*. In these trades, you buy a call and sell a call, or you buy a put and sell a put. Both options will be on the same underlying position and with the same maturity. The twist is that one buys and sells options with different strike prices.

1.2.1 Bull Spreads

The rule to create a *bull spread* is to buy the lower strike price option and sell the higher strike price option.

First, consider a bull spread created using call options. The strategy is illustrated in Figure 3 (the solid line shows the total payoff from the bull spread). Since a call price decreases as the strike price increases, the value of the option sold is always less than the value of the option bought. A bull spread, when created from calls, requires an initial investment. Suppose that X_1 is the strike price of the call option bought, X_2 is the strike price of the call option sold, and S_T is the stock price on the expiration date of the options. The following table shows the total payoff that will be realized from a bull spread in different circumstances. (The profit is calculated by subtracting the initial investment from the payoff.)

Payoff from a Bull Spread Using Calls			
Stock Price Range	Payoff from Long Call Option	Payoff from Short Call Option	Total Payoff
$S_T \geq X_2$	$S_T - X_1$	$X_2 - S_T$	$X_2 - X_1$
$X_1 < S_T < X_2$	$S_T - X_1$	0	$S_T - X_1$
$S_T \leq X_1$	0	0	0

A bull spread strategy limits the trader's upside as well as downside risk. The strategy can be described by saying that the trader has a call option with a strike price equal to X_1 and has chosen to give up some upside potential by selling a call option with strike price X_2 ($X_2 > X_1$). In return for giving up the upside potential, the trader gets the price of the option with strike price X_2 . Three types of bull spreads can be distinguished:

1. Both calls are initially out of the money.
2. One call is initially in the money; the other call is initially out of the money.
3. Both calls are initially in the money.

The most aggressive bull spreads are those of type 1. They cost very little to set up and have a small probability of giving a relatively high payoff ($X_2 - X_1$). As we move from type 1 to type 2 to type 3, the spreads become more conservative.

- Why would one want to buy a bull spread? Two reasons may exist: time decay neutrality and volatility immunization. If you buy a call option outright (also known as a “naked call”) your exposure to time decay is extensive. If an option is sold, then time decay works in your favor. Therefore, if you are both buying and selling options, your exposure to volatility and time decay is reduced and can be neutral.

Next, consider a bull spread created using put options. This is created by buying the lower strike price put and selling the higher strike price put. The strategy is illustrated in Figure 4 (the solid line shows the total payoff from the bull spread). Since the put premium increases as the strike price increases, the value of the option sold is always greater than the value of the option bought. Unlike the bull spread created from calls, bull spreads created from puts involve a positive cash flow to the trader up front and a payoff that is either negative or zero. The following table shows the total payoff that will be realized from a bull spread in different circumstances. (The profit is calculated by adding the initial cash inflow to the payoff.)

Payoff from a Bull Spread Using Puts			
Stock Price Range	Payoff from Long Put Option	Payoff from Short Put Option	Total Payoff
$S_T \geq X_2$	0	0	0
$X_1 < S_T < X_2$	0	$-(X_2 - S_T)$	$-(X_2 - S_T)$
$S_T \leq X_1$	$X_1 - S_T$	$-(X_2 - S_T)$	$-(X_2 - X_1)$

- Note that bull spreads share the same directional and volatility biases as a long position in the underlying market. However, the bull spread’s advantage is the limited loss feature which the long position in the underlying market does not share.

Using the example of the previous section, assume that it is your viewpoint that Crude Oil futures price will increase, but you do not know exactly when. You also feel that volatility may decrease and you do not wish to be hurt if this occurs. Furthermore, you require a strategy with limited loss potential in case you are wrong. Finally, you want a strategy which will not be eroded by time decay. *If you establish a bull spread you achieve all these objectives.*

1.2.2 Bear Spreads

- A trader who enters into a bull spread is hoping that the price underlying market will increase. By contrast, a trader who enters into a *bear spread* is hoping that the price underlying market will decline. Bear spreads are almost identical to bull spreads, except that the rule with bear spreads is that you buy the higher strike price option and sell the lower strike price option.

Consider a bear spread created by using call options. The payoff from this strategy is depicted by the solid line in Figure 5. Note that the strike price (X_2) of the call purchased is greater than the strike price (X_1) of the call sold: $X_2 > X_1$. Thus, a bear spread created from calls involves an initial cash inflow because the premium of the call sold is greater than the premium of the call purchased. The following table shows the total payoff that will be realized from a bear spread in different circumstances. (The profit is calculated by adding the initial cash inflow to the payoff.)

Payoff from a Bear Spread Using Calls			
Stock Price Range	Payoff from Long Call Option	Payoff from Short Call Option	Total Payoff
$S_T \geq X_2$	$S_T - X_2$	$X_1 - S_T$	$-(X_2 - X_1)$
$X_1 < S_T < X_2$	0	$X_1 - S_T$	$-(S_T - X_1)$
$S_T \leq X_1$	0	0	0

Like bull spreads, bear spreads limit both the upside profit potential and the downside risk. Bear spreads can be created using puts instead of calls. The trader buys the higher strike price put and sells the lower strike price put. The payoff from this strategy is depicted by the solid line in Figure 6, and shown in the following table.

Payoff from a Bear Spread Using Puts			
Stock Price Range	Payoff from Long Put Option	Payoff from Short Put Option	Total Payoff
$S_T \geq X_2$	0	0	0
$X_1 < S_T < X_2$	$X_2 - S_T$	0	$X_2 - S_T$
$S_T \leq X_1$	$X_2 - S_T$	$-(X_1 - S_T)$	$X_2 - X_1$

Bear spreads created with puts require an initial investment. In essence, the trader has bought a put with a certain strike price and chosen to give up some of the profit potential by selling a put with a lower strike price. In return for the profit given up, the trader gets the price of the option sold.

- If your viewpoint is that the underlying market will decrease, and you wish to be neutral to volatility and time decay, then a bear spread is an ideal strategy to use.

1.3 Directional Trading Strategies Placement in the Strategy Matrix

With the completion of our discussion on vertical spreads, we can add another two strategies in the “Strategy Matrix” presented in the previous section.

Viewpoint on the underlying market (crude oil is the underlying market in this case)				
	Buyer	Seller	Neutral	
Viewpoint on volatility	Buyer	<i>Buy call option</i>	<i>Buy put option</i>	
	Seller	<i>Sell put option</i>	<i>Sell call option</i>	
	Neutral	<i>Long futures</i> ▶ <i>Bull spread</i>	<i>Short futures</i> ▶ <i>Bear spread</i>	

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6