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Chapter 4 Expiration Profit and Loss

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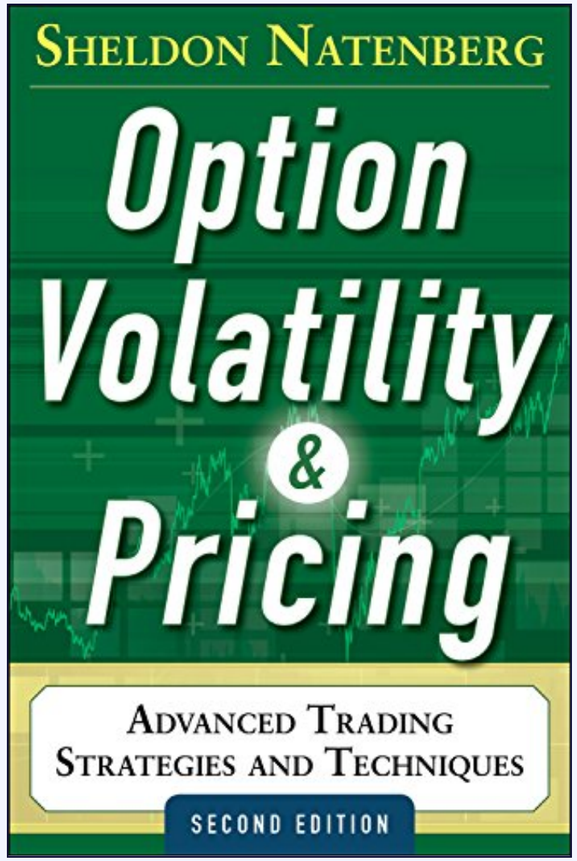
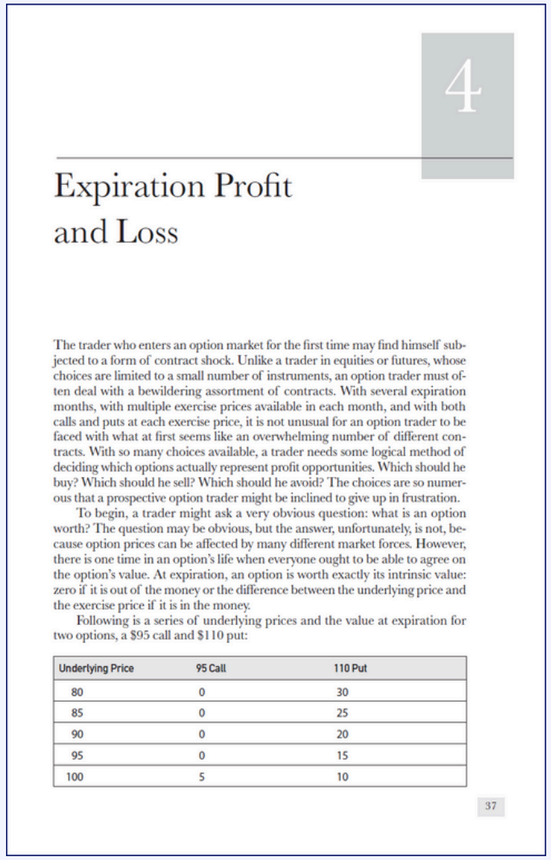
Chapter 4 — Expiration Profit and Loss





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Expiration Profit and Loss

The trader who enters an option market for the first time may find himself subjected to a form of contract shock. Unlike a trader in equities or futures, whose choices are limited to a small number of instruments, an option trader must often deal with a bewildering assortment of contracts. With several expiration months, with multiple exercise prices available in each month, and with both calls and puts at each exercise price, it is not unusual for an option trader to be faced with what at first seems like an overwhelming number of different contracts. With so many choices available, a trader needs some logical method of deciding which options actually represent profit opportunities. Which should he buy? Which should he sell? Which should he avoid? The choices are so numerous that a prospective option trader might be inclined to give up in frustration.

To begin, a trader might ask a very obvious question: what is an option worth? The question may be obvious, but the answer, unfortunately, is not, because option prices can be affected by many different market forces. However, there is one time in an option's life when everyone ought to be able to agree on the option's value. At expiration, an option is worth exactly its intrinsic value: zero if it is out of the money or the difference between the underlying price and the exercise price if it is in the money.

Following is a series of underlying prices and the value at expiration for two options, a $95 call and $110 put:

Underlying Price	95 Call	110 Put
80	0	30
85	0	25
90	0	20
95	0	15
100	5	10

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- **Parity Graphs**

Understanding terminal values

At expiration, an option will be worth:
*$0 if it is *out-of-the-money*,*
*or its **intrinsic value** if it is *in-the-money**

From the book (in-the-money shaded)

Underlying Price	95 Call	110 Put
80	0	30
85	0	25
90	0	20
95	0	15
100	5	10
105	10	5
110	15	0
115	20	0
120	25	0
125	30	0

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At expiration-

Call Option Values are the greater of (0, S - K) where S = spot value & K = strike price

- *If IN THE MONEY- the Call Option Value moves 1-for-1 with the underlying asset (slope = +1.0)*
  - *A short Call Option position would have an inverse payoff, moving -$1 for every +$1 in the underlying (slope = -1.0)*
- *If OUT OF THE MONEY- whether long or short, the option has no value (slope = 0.0)*

Figure 4-1 Long call.

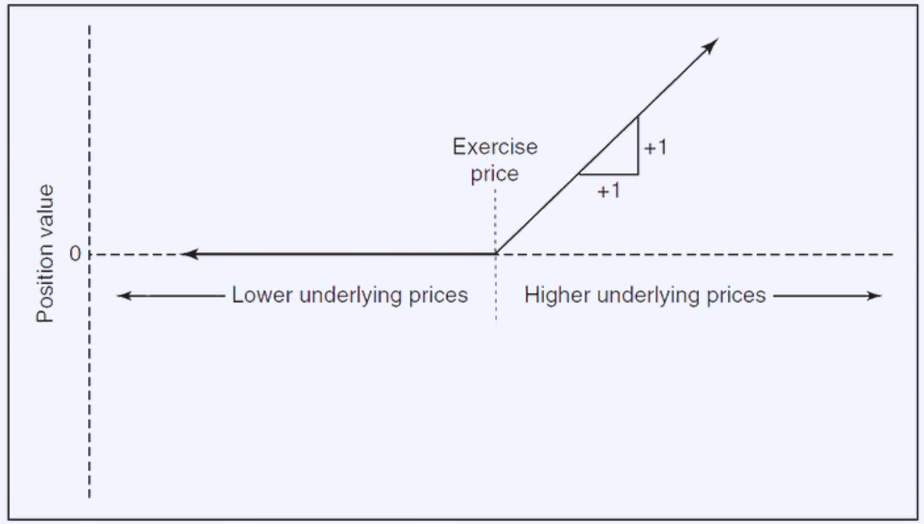
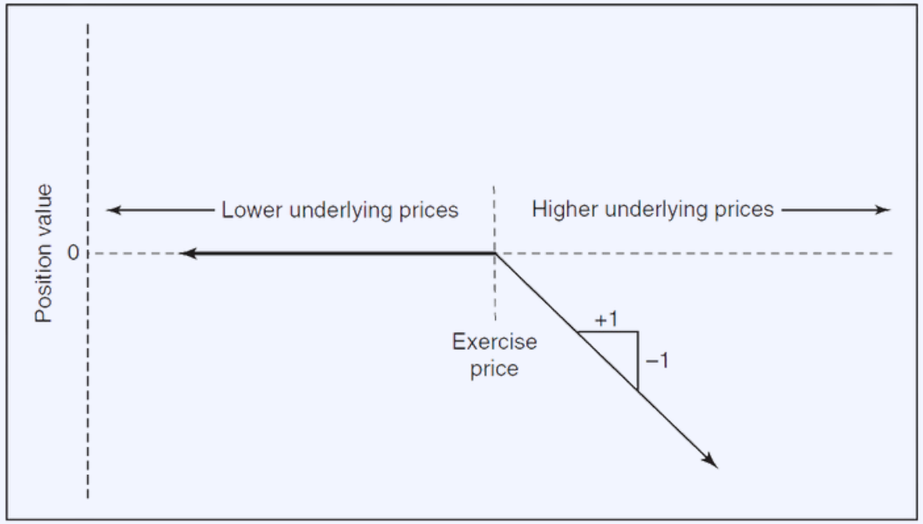


Figure 4-2 Short call.



At expiration-

Put Option Values are the greater of (0, K - S) where S = spot value & K = strike price

- *If IN THE MONEY- the Put Option Value moves 1-for-1 with the underlying asset (slope = -1.0)*
  - *An IN THE MONEY short Put Option would have an inverse payoff, moving +$1 for every +$1 in the underlying (slope = +1.0)*
- *If OUT OF THE MONEY- whether long or short, the option has no value (slope = 0.0)*

Figure 4-3 Long put.

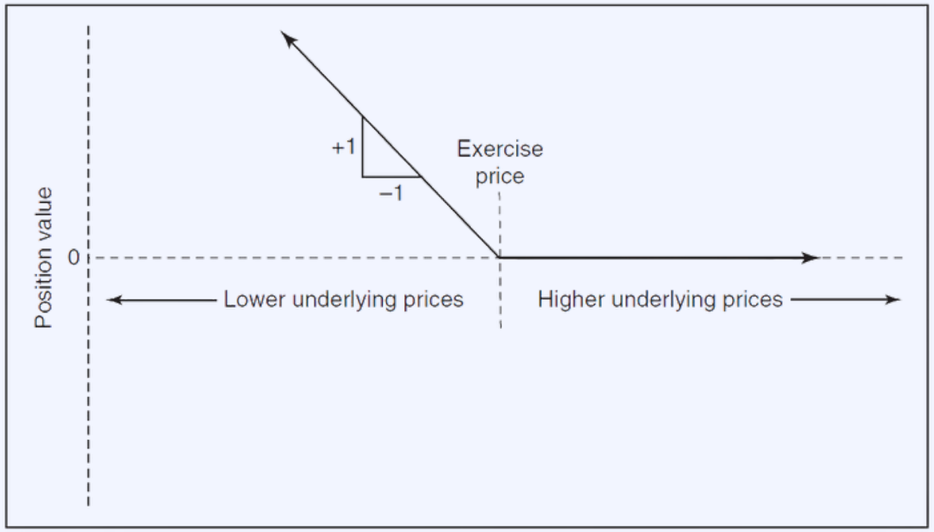
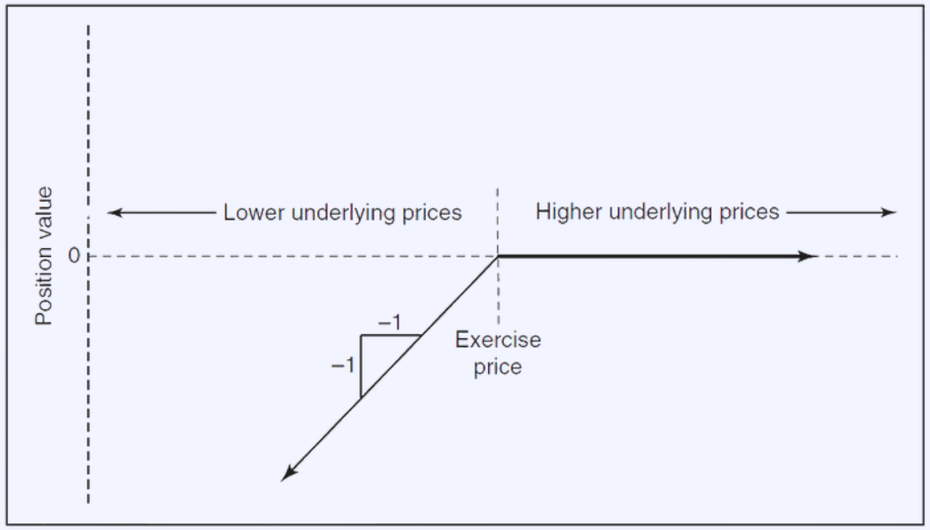


Figure 4-4 Short put.



Chapter 4 — Expiration Profit and Loss

Key Points

Buyers of options have limited risk with practically uncapped payoff potential
Sellers of options have the opposite- limited payoff (premium received) but practically uncapped risk

Balancing out the apparent contradictory payoff profiles lies the probability distribution (future chapters)

When graphing expiration profit and loss profiles…
Slope = change in position value / change in underlying price
Any option combination can be plotted by adding up the components of the strategy

Position	Slope
Long or short any out-of-the-money option	0
Long an in-the-money call	+1
Short an in-the-money call	–1
Long an in-the-money put	–1
Short an in-the-money put	+1

Practice

While I encourage to go through some of the combinations of spreads in the book- the examples I give you will be more useful in assessing payoff profiles of actual option spreads.

My MINOR Adjustment

In the text, Natenberg introduces the underlying contract as something you can go long or short (in combination with the options themselves) and which has a SLOPE (or… a "Delta") of +1.00 (long) or -1.00 (short).

In practice: the underlying contract = the hedge (MMs hedge every spread at time of trade)
To assess the payoff profile of a hedged option or option structure, use a fractional underlying contract in your payoff profile.

For example… if you BUY a 20 Delta Call, your hedge is selling .20 units of the underlying at the time of trade.

Let's walk through a similar example using a hypothetical (and relevant) option from the SPX

Expiration PNL Graph Example

Draw the Expiration PNL Graph (Parity Graph) for the following:

+1 SPX 6020 Call for $56.00
*Hedged on a 28 Delta vs 5733 SPX**

**For simplicity we will use SPX as the underlying (hedge) instrument here instead of ES Futures*

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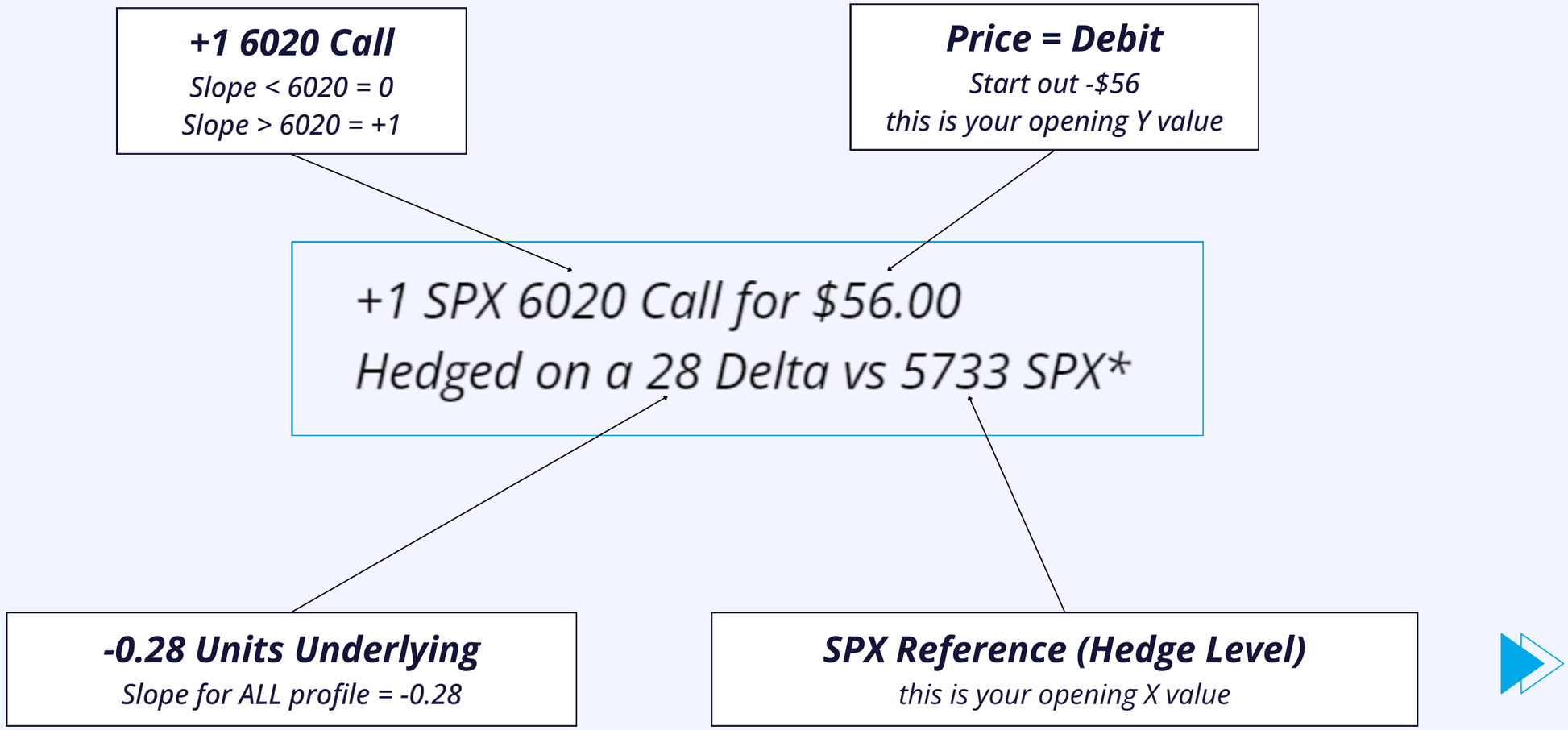

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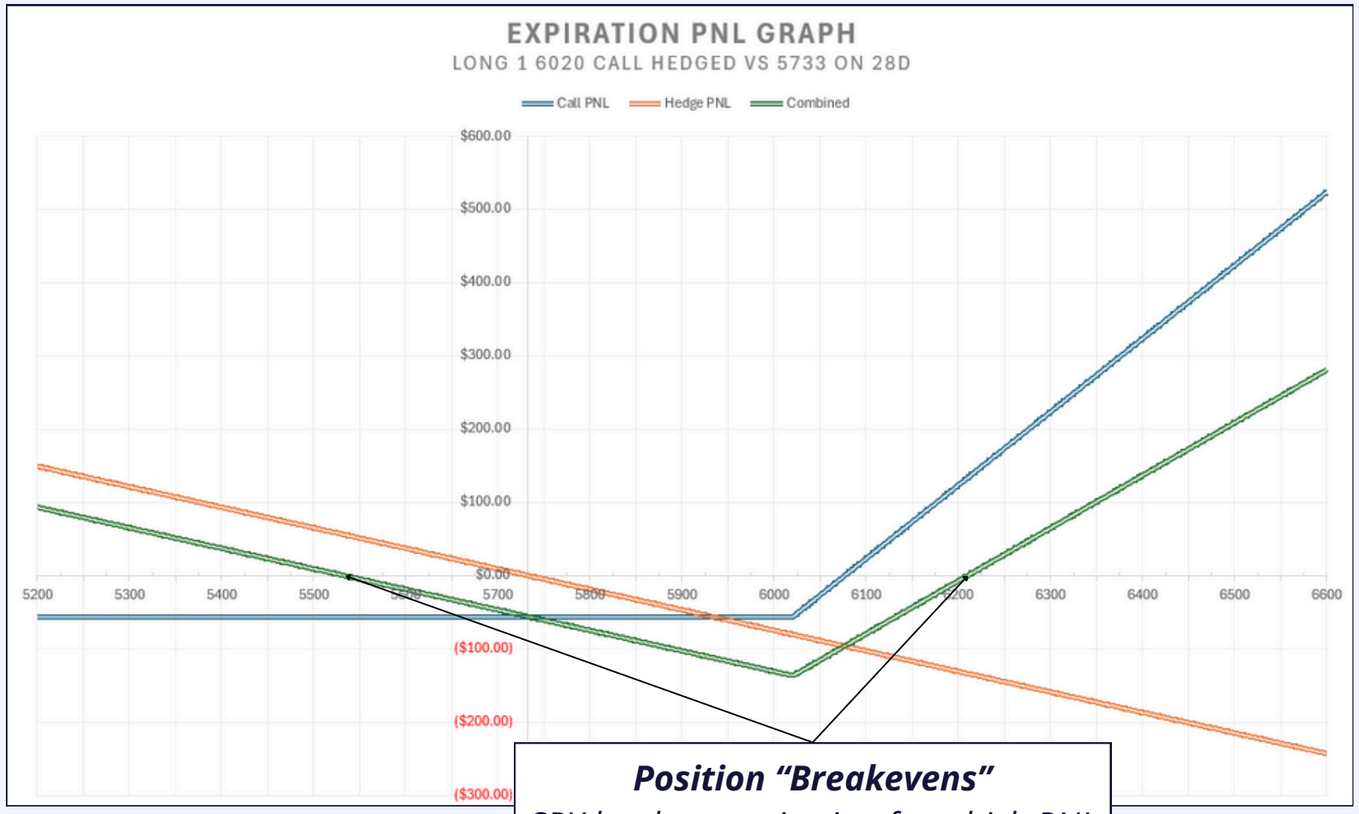

Position "Breakevens"
SPX levels at expiration for which PNL becomes ***positive***

Downside Breakeven:

This is where the PNL on the delta hedge (short 0.28 units of the underlying) overtakes the loss on the Call (-$56 in premium paid).

-0.28X = -56.00 -> X = 56 / 0.28 -> X = 200.00
BE1 = 5733 - 200 = ***5533***

Upside Breakeven:

The upside breakeven must account for the premium spent, as well as all money lost on the hedge (short 0.28 units SPX).

We know the Call pays 0 until it's IN-THE-MONEY (6020) so our starting point must be the PNL at 6020:

-56.00 + -0.28(6020-5733) = $136.36*

Once in the money, the Call returns 1:1 on the underlying- but we must still account for the hedge PNL slope at -0.28. The combined position's slope with SPX > 6020 is then +0.72, which reflects the net $ returned per dollar for all settlements above 6020. Thus… the breakeven:

136.36 / 0.72 = 189.39

BE2 = 6020 + 189.39 = ***6209.39***

Practice:

Try your hand at the examples in your Module beneath the video.

Discuss in Discord or wait for your answers to be revealed at the end of the week 👍

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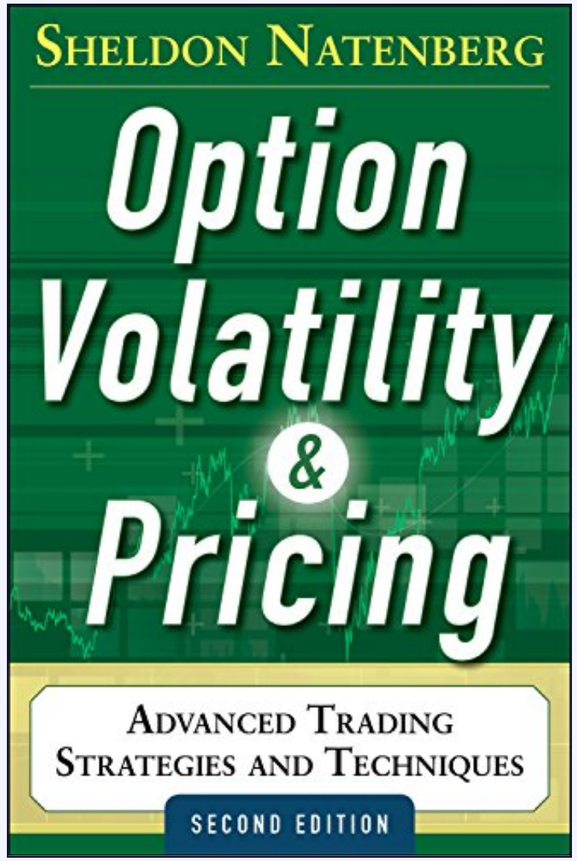
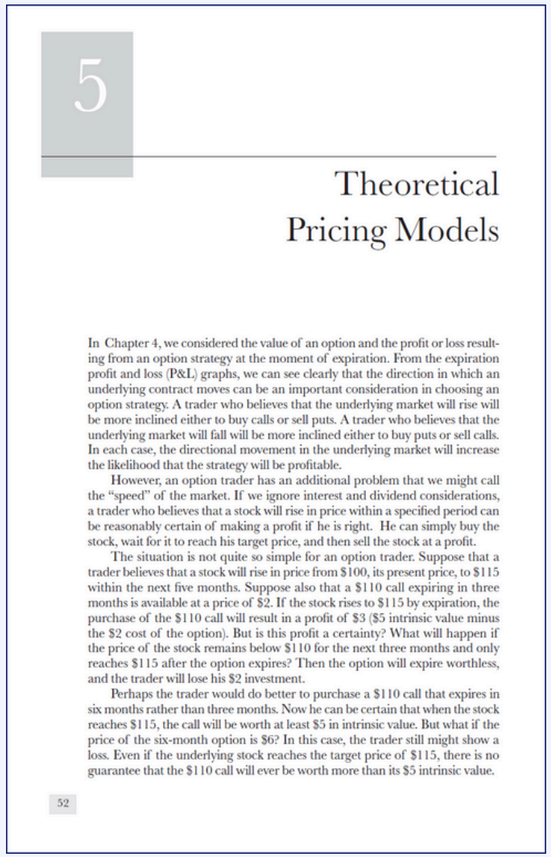
Next up...





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Theoretical Pricing Models

In Chapter 4, we considered the value of an option and the profit or loss resulting from an option strategy at the moment of expiration. From the expiration profit and loss (P&L) graphs, we can see clearly that the direction in which an underlying contract moves can be an important consideration in choosing an option strategy. A trader who believes that the underlying market will rise will be more inclined either to buy calls or sell puts. A trader who believes that the underlying market will fall will be more inclined either to buy puts or sell calls. In each case, the directional movement in the underlying market will increase the likelihood that the strategy will be profitable.

However, an option trader has an additional problem that we might call the "speed" of the market. If we ignore interest and dividend considerations, a trader who believes that a stock will rise in price within a specified period can be reasonably certain of making a profit if he is right. He can simply buy the stock, wait for it to reach his target price, and then sell the stock at a profit.

The situation is not quite so simple for an option trader. Suppose that a trader believes that a stock will rise in price from $100, its present price, to $115 within the next five months. Suppose also that a $110 call expiring in three months is available at a price of $2. If the stock rises to $115 by expiration, the purchase of the $110 call will result in a profit of $3 ($5 intrinsic value minus the $2 cost of the option). But is this profit a certainty? What will happen if the price of the stock remains below $110 for the next three months and only reaches $115 after the option expires? Then the option will expire worthless, and the trader will lose his $2 investment.

Perhaps the trader would do better to purchase a $110 call that expires in six months rather than three months. Now he can be certain that when the stock reaches $115, the call will be worth at least $5 in intrinsic value. But what if the price of the six-month option is $6? In this case, the trader still might show a loss. Even if the underlying stock reaches the target price of $115, there is no guarantee that the $110 call will ever be worth more than its $5 intrinsic value.

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Chapter 5 — Theoretical Pricing Models

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