Options Probability Calculator
Trading Guide

Precision and Profits via Probability

First Edition

By Craig Severson
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Foreword

If you’ve picked up this trading guide, chances are you’ve been trading for at least a few months, with varied success in stocks and options trades. You’ve learned how to buy stocks, puts, calls, and even place multiple-position options spreads. You’ve learned some technical analysis, and your winning percentage and returns are rising.

You’re not consistently profitable, though.

You still make arbitrary decisions about what strike prices to place your options spread trades at, and you’re never really sure whether your trades are risky or conservative. If you get into a long call position, you’re not sure where to take your profits at.

You need to bring some objective data to your trades, such as **Probability Analysis via Implied Volatility**!

**Probability Analysis? Implied Volatility? Whazzat?**

If you’ve been following the OptionsLinebacker.com newsletter for any length of time, you’ll see the editors refer to current positions with terminology such as “XXX is 50 points out of the money with a 92% probability of winning the trade”. These numbers are actually calculated by manipulating the Black-Scholes options pricing formula to extract probability. Since volatility is defined as one standard deviation of the natural logarithm of the price change of an asset (annualized), if we already know the Implied Volatility of the asset and the options price, then we can solve for the missing variable – probability.

Right about now, your eyeballs should be rolling back into your forehead. Don’t worry - this is a guide on Application, not Theory. All the mathematicians have done the hard work; all you have to do is learn to use the tool to start applying more **Precision and Profits** to your Trading!

Let’s dive right into applications, starting with Spread Trades!
Probability - Spread Trades

When you set up an options credit spread, this usually involves the selling of one strike price, and the buying of the next strike price out of the money. Your sold strike is a “line in the sand” that must not be crossed for you to attain maximum profitability.

How far out should that strike price be? What will be your probability of winning that trade after you enter it? How can you objectively balance your need for a decent return, without taking on undue risk? Let’s go through our first example to see how we would use the calculator to determine these answers:

**Example 1 - Determining Which Strike Price to Sell in a Spread Trade**

For the following chart, we’ve determined that we’d like to set up a bearish credit spread; we will sell to open a call option out of the money, and buy to open a call option further out of the money:

![Figure 1](image)

Where should we place our sold strike? To answer this question, we need to know three things:

1. The current stock price
2. The current Implied Volatility of the ATM call options on this stock
3. The number of calendar days to expiration
Since we know that the number of calendar days to expiration is 25 (yes, you count weekends too!), and we know from the chart above that the current stock price is 1261.49, all we need to know is what the Implied Volatility is for the At-The-Money calls for this stock.

For that, we go to the website of the Chicago Board of Options Exchange, or the CBOE: http://www.cboe.com

At the main page, we will select the Trading Tools tab, the Volatility Optimizer selection, and finally the IV Index.

This is what we’ll see at that page. The upper left corner of the screen near the yellow box is where we’ll enter our ticker symbol, which automatically defaults to SPX for the S&P 500 index.

The red oval is where our target information is located:

Figure 2
Zooming in on the red oval, here’s the information that we’re after:

**Figure 3**

<table>
<thead>
<tr>
<th></th>
<th>Historical Volatility</th>
<th>Implied Volatility</th>
<th>Historical 30-Days Correlation Against S&amp;P 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 days</td>
<td>12.37%</td>
<td>10.44%</td>
<td></td>
</tr>
<tr>
<td>20 days</td>
<td>11.43%</td>
<td>9.08%</td>
<td></td>
</tr>
<tr>
<td>30 days</td>
<td>9.84%</td>
<td>8.52%</td>
<td></td>
</tr>
</tbody>
</table>

We can see that the Implied Volatility of the Calls is 11.65. So now we have everything that we need to calculate probability, and select our strike prices:

1. The current stock price = 1261.49
2. The current Implied Volatility call options = 11.65
3. The number of calendar days to expiration = 25

Now which strike price should we sell? That depends on what type of probability target that you have. At OptionsLinebacker.com, we typically shoot for a winning probability of 90% or better. We will forfeit some return in exchange for a margin of safety, as it’s hard to put a price on sleep.

For this example, considering the chart above and the fact that we’re about four weeks out from Options Expiration, we will try for a position that’s about 50 points out of the money, so let’s try the 1315 position.

Now it’s time to open up the tool; it is a Microsoft Excel spreadsheet which is named probabilitycalculator.xls. You must have Microsoft Excel on your computer to run this program.

When we open this Probability Calculator file, in the “probability” worksheet we will enter the Current Stock Price, the Current Call Implied Volatility of 11.65, (we can also enter the Put Implied Volatility now as well) and the number of Calendar Days to Expiration.
In the next grid below that (in the yellow field) we will enter our “Target Stock Price” for the sold position of 1315. After you enter a value in that field, you should see some results in the green squares in that same grid:

**Figure 4**

![Figure 4](image)

For this example, with a current stock price of 1261.49, a Call Implied Volatility of 11.65, and 25 Calendar Days to Expiration, a 1315 sold strike will have a 91.35% probability of winning the trade!

The next field “Probability of Closing Above Target” is really the inverse of the Winning Probability number, meaning that there is an 8.65% chance of the stock actually closing above 1315, meaning by extension that there is a 91.35% chance of closing below 1315, equating to a “win” for a Bear Call credit spread.

You can also experiment with different strike prices in the “Target Stock Price” field to determine what probability winning percentage that you can target, and balance that against your expected return for your credit. Invariably, the further out of the money that you go, the smaller the return that you will see. Every investor will need to find his/her comfort zone to balance risk and reward.

The example that we showed above was for a Bear Call Spread position, targeting an Out Of-The-Money position well above the current stock price. We
can use the lower grid to determine probabilities of target stock prices below our current position, using Bull Put Spreads.

Traders must use these numbers with caution; obviously the stock price and the Implied Volatility numbers reflect conditions TODAY, not 25 calendar days from now. No one can predict the future, however the At-The-Money options do telegraph the potential magnitude and direction of a possible move. Short of a time tunnel, it’s the best view into the future that a trader can expect.

Another caution is to understand what the winning percentage really means; if you have one calendar day left to trade, and the current price of the stock is 1250 and you have sold the 1250 call, your chances of winning will be 50%. That means that you have a 50/50 chance of closing in or out of the money. So if your position is out of the money, you will typically see values between 50% and 100%. Traders who follow our newsletter know that we will typically “roll out” or adjust a position that sees a winning probability below 70-75%. And our readers know not to hold a position that’s within 10-15 points of SPX settlement.

The bottom line here is to use these numbers to help you identify an “edge” at the beginning of the trade, and to continue to help you identify an edge during the trade, so you don’t rely on that cancerous word, “Hope”. Don’t ever let a trade’s probability approach 50%; you’re gambling and hoping, not trading.

**Example 2 - Identifying a Probability Range**

Instead of poking numbers into the “Target Stock Price” field as we did above, wouldn’t it be great to get a quick snapshot of what a certain probability range might be? In other words, if your trading rules state that a trade probability must be greater than 85% before you enter it, what would those price limits be?

To determine the probability range, we need to exact same information that we used above to determine the probability of winning at a certain strike price:

1. The current stock price
2. The current Implied Volatility of the ATM call options on this stock
3. The number of calendar days to expiration

Since we already know these variables and have input them into the Options Probability Calculator, we can look at the range values in figure 5 to see how we can interpret them:
This table is showing:

- There is an 85% probability that the stock will close either under 1301.99 by expiration, or above 1217.95
- There is a 90% probability that the stock will close either under 1311.76 by expiration, or above 1207.87, etc....

Note that there is a 50% probability that the stock will close above/below 1261.49, which is the current stock price.

So now it’s a simple matter to provide more objectivity to your trades on credit spreads. Simply choose the probability limit that you’re most comfortable with (we typically use 90% or greater as a requirement) and the Options Probability Calculator will show you what the probability is that your stock will finish within a specific range for the month.

One of the simplest ways to use this tool is to use the “Range” table to get a rough idea of what strike prices that you should be looking at, and then use the more specific fields of “Probability of Hitting Target Price” to understand what the trading probability is on the actual strike price that you choose.

And trading probability isn’t everything in a trade; this is just the first step to qualify the trade. Make sure that the premium found at the strike prices that you choose make the trade worth it, that you’re getting an acceptable return for your risk. Using this tool will show you that some stocks/indices are not favorable for selling time value; you might not be able to set up a trade with a high enough probability to earn any kind of worthwhile return.
Probability - Long Trades

If we can use this tool to understand our probability of winning a Spread trade, we can just as easily apply our application of probability to use it for a Long trade, such as buying stock/puts/calls for a specific directional movement.

Figure 6

Figure 6 shows a stock that has just broken from an ascending triangle chart pattern. The vertical distance of the open end of the triangle is represented by the pink line, which also corresponds to the price target for this formation. The expected $8 move is shown at the $56 level by the green line.

If we were feeling very bullish on this stock and wanted to play long calls to take advantage of the expected price movement, what is the probability that we would reach our price target at $56 within a specified period of time?

For this stock as with any other, we need to know 3 things before we can apply our Options Probability Calculator:

1. The current stock price
2. The current Implied Volatility of the ATM call options on this stock
3. The number of calendar days to expiration

Our current stock price is $48.18, we can look up our Implied Volatility figures from the [www.cboe.com](http://www.cboe.com) website, and for this example let’s buy a call that
expires in 3 months, or 90 days. We will buy three months of time value to give the stock enough time to hit our target of $56. When we input those values into the Options Probability Calculator, we get the following probability of hitting a higher target price:

![Figure 7]

In this case, we would use the field “Probability of Closing Above Target” which returns us a value of 21.20%. WOW! Isn’t that a low value? Remember that the highest value that we’ll see with this calculator is if we asked it to calculate the probability of a stock remaining at the same price, which was $48.18; that would return a 50% probability. If you think about it, it makes sense - stocks go up, down, and sideways and only if you’re lucky do they go in the direction that you forecast.

So expecting this stock to move in one direction (up) and close at a specific price target ($56) within a specific period of time (90 days) only results in a probability of 21.20%. Those are not very high odds, so a wise approach may be to take profits on an interim basis should the trade go in your favor.

**Summary**

I hope that this tool provides you with a way to be much more objective with your trades and trade with higher precision, leading to more consistent profits.

Notice how much your probability improves if you just ask the stock to remain within a range for a small period of time. This shows why selling premium (instead of buying it) is a higher-probability venture. Long plays certainly have their place as they produce much higher returns, but selling time should be the foundation of your trading success.

If you understand how to harness probability, then you have an edge in the Marketplace. A disciplined trading system coupled with an edge means consistent profits.