



Probability Calculator User's Guide

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1. Introduction

The Probability Calculator allows you the choice of using the implied volatilities of options or historical volatilities of securities to assess your strategy's chances of success before you place your trade. It factors in dividends and interest rates over any time period you input and returns the statistical probability the underlying will finishing above, below or between two target prices of your choosing.

The Probability Calculator can be useful for both stock and options traders alike.

2. Stock Traders

Start by entering your stock symbol and clicking "GO". The Probability Calculator then fills in the stock's current price, its implied volatility, interest rate and dividend data automatically. You can adjust all of these fields if you wish.

Symbol	<input type="text" value="GOOG"/>	<input type="button" value="Go"/>
Underlying Price	<input type="text" value="1103.69"/>	
Future Date	<input type="text" value="Oct Exp. 10/26/18"/>	
Implied Volatility	<input type="text" value="ATM Volatility"/>	<input type="text" value="74.05%"/>
Interest Rate	<input type="text" value="2.2865"/>	
Dividend Date(mm/dd/yy)	<input type="text" value="N/A"/>	
Dividend Amount	<input type="text" value="0"/>	
Dividend Frequency	<input type="text" value="Monthly"/>	



The Probability Calculator defaults to the implied volatility of At-The-Money (ATM) option on your stock or index, factors in the current risk-free interest rate, plus any dividends on the stock. This sums up the key factors of what the market's activity is "implying" about future stock prices. Usually you're contemplating holding a position over a certain timeframe; the Probability Calculator helps you gauge the statistical likelihood of hitting certain price highs and lows through that time period.

Choose your timeframe according to a certain options expiration date, as show above, or enter your own date by selecting "Custom" in the "Future Date" drop-down, then entering a date or number of days forward you plan to hold the stock.

Underlying Price

Future Date

Actual Date or Days Forward

As you adjust your time frame further into the future, note how the implied volatility and interest rates change, too. Interest rates typically go up over time, because you'd earn a higher interest on your cash if you're willing to commit it for a longer period.

Now you're ready to test your price targets. Enter a high and low price target at the right, then click "Calculate". In this example, say you're bullish on GOOG for the upcoming month. You have a price target on the upside of 1200, but if the stock goes below 1050 you want out - and plan to set a stop sell order accordingly. What's the probability that those price targets will happen in the next month?

First Target Price

Second Target Price

Probability of Touching	1200	12.71%
Probability of Touching	1050	36.31%

First you'll see the chances of touching either price target during the time frame you chose. In other words, how likely is it that your stock will trade at least once at either target price during the time frame you selected?

These figures help you assess broad risks and opportunities.



To gauge your chances of finishing the time period above, below or between your price targets, refer to the table at the bottom of the page.

Probabilities at the Future Date of the Underlying

Finishing Below Lowest Target Price	Finishing Between Target Prices	Finishing Above Highest Target Price
18.82%	75.14%	6.04%

On the last day of your time period, there's a 6.04% probability of Google finishing the day above 1200, and a 18.82% probability of finishing below 1050. Chances are 75.14% that Google will finish on this date somewhere between those two target prices you chose.

To get a sense of probable price distributions, take a look at the very bottom table. Of course, keep in mind that the calculator assumes a log-normal distribution of prices and because of this it can calculate what a one, two and three Standard Deviation move would be.

Underlying Prices for each Standard Deviation Interval at the Future Date

-3	-2	-1	+1	+2	+3
935.04	987.73	1043.38	1164.27	1229.87	1299.17

In layman's term we are talking about all the possible prices for Google as distributed over a bell-curve chart. The center bulge of the price chart marks one standard deviation, in statistical terms. Prices are expected to stay within this one standard-deviation range, either on the plus or minus side of the centerpoint, 68% of the time. Should stay within two standard-deviations 95% of the time, and within 3 standard deviations 99% of the time.

In this example, Google has a 68% chance of finishing between 1043.38 and 1164.27 at your future date, and 95% probability of finishing between 987.73 and 1229.87. These ranges, your risk tolerance, and your plans for the trade can help you assess in statistical terms if these price targets seem right for you.

3. Option Traders

Start by entering your underlying symbol and clicking "GO". The Probability Calculator then fills in the underlying's current price, its ATM implied volatility, interest rate and dividend data automatically. You can adjust all of these fields if you wish.

Symbol	<input type="text" value="IBM"/>	<input type="button" value="Go"/>
Underlying Price	<input type="text" value="131.21"/>	
Future Date	<input type="text" value="Oct Exp. 10/26/18"/>	
Implied Volatility	<input type="text" value="ATM Volatility"/>	<input type="text" value="26.95%"/>
Interest Rate	<input type="text" value="2.2865"/>	
Dividend Date(mm/dd/yy)	<input type="text" value="08/09/18"/>	
Dividend Amount	<input type="text" value="1.57"/>	
Dividend Frequency	<input type="text" value="Quarterly"/>	

The Probability Calculator takes volatility in current prices of At-The-Money (ATM) options on your underlying stock, index or ETF, factors in the current risk-free interest rate, plus any dividends. This sums up the key factors of what the market's activity is "implying" about future prices on the underlying. Usually you're contemplating holding a position over a certain timeframe; the Probability Calculator helps you gauge the statistical likelihood of hitting certain price highs and lows through that time period.

Choose your timeframe according to a certain options expiration date, as show above, or enter your own date by selecting "Custom" in the "Future Date" drop-down, then entering a date or number of days forward you plan to hold the position.

Underlying Price	<input type="text" value="131.21"/>	
Future Date	<input type="text" value="Custom"/>	
Actual Date	or	Days Forward
<input type="text" value="10/26/18"/>		<input type="text" value="2"/>

As you adjust your time frame further into the future, note how the implied volatility and interest rates change, too. Interest rates typically go up over time, because you'd earn a higher interest on your cash if you're willing to commit it for a longer period.

Now you're ready to test your price targets. Enter a high and low price target at the right, then click "Calculate". In this example, say you'd like to set up a call credit spread on IBM. You're planning on selling one



call at 135 and hedging that risk by purchasing another call at 136. Should the market move above 135, your chances of getting assigned rise accordingly. What's the probability that the market will touch either price target before expiration?

First Target Price

Second Target Price

Probability of Touching	136	7.23%
Probability of Touching	135	15.35%

First you'll see the chances of touching either price target during the time frame you chose. In other words, how likely is it that your underlying will trade at least once at either target price during the time frame you selected? These figures help you assess the risk versus the reward of the trade. To gauge your chances of finishing the time period above, below or between your price targets, refer to the table at the bottom of the page.

Probabilities at the Future Date of the Underlying

Finishing Below Lowest Target Price	Finishing Between Target Prices	Finishing Above Highest Target Price
92.38%	4.04%	3.58%

On the last day of your time period, there's a 3.58% probability of IBM finishing the day above 136, and a 92.38% probability of finishing below 135. Chances are 4.04% that IBM will finish at expiration somewhere between those two target prices you chose. Since your call spread would yield maximum profits if IBM finishes below the 135 target price, allowing you to keep the credit premium received, based on this distribution there is a 92.38% chance of the strategy receiving the maximum profit. To get a sense of probable price distributions, take a look at the very bottom table. If you don't like the probabilities you've generated so far, this table can help you figure out a potentially smarter target range.

Underlying Prices for each Standard Deviation Interval at the Future Date

-3	-2	-1	+1	+2	+3
123.58	126.07	128.61	133.84	136.54	139.29

Think of all the possible prices for IBM as distributed over a big bell-curve chart. The center bulge of the price chart marks one standard deviation, in statistical terms. Prices are expected to stay within this one standard-deviation range, either on the plus or minus side of the centerpoint, 68% of the time. Should stay within two standard-deviations 95% of the time, and within 3 standard deviations 99% of the time.

In this example, IBM has a 68% chance of finishing between 128.61 and 133.84 at your future date, and 95% probability of finishing between 126.07 and 136.54. These ranges, your risk tolerance, and your plans for the trade can help you assess in statistical terms if these price targets seem right for you.

4. Changing the Default Settings

The Probability Calculator uses price volatility for ATM (At-The-Money) options on the underlying as a default, but you can adjust this if you choose. It can also be useful to compare how the projections change when they're based on different volatility figures.

To base your probability calculation on a weighted moving average, choose from the "Implied Volatility" pulldown menu. You can view probabilities based on historical volatility (HV), actual historical price patterns, or based on the iVolatility Index, a proprietary index model created by iVolatility, that calculates a weighted average implied volatility for specific time periods. You can also compare time frames ranging from 30-day to 180-day weighted averages.

Symbol

Underlying Price First Target Price

Future Date Second Target Price

Implied Volatility 26.95%

Interest Rate

Probability of Touching 136

Probability of Touching 135

Dividend Date(mm/dd/yy)

Dividend Amount

Dividend Frequency

Probabilities at the Future Date of the Underlying

Finishing Below	Finishing Between Target Prices	Finishing Above Highest Target Price
92.38%	4.04%	3.58%

Underlying Prices for each Standard Deviation Interval at the Future Date

-3	-2	-1	+1	+2	+3
123.58	126.07	128.61	133.84	136.54	139.29

The Probability Calculator also provides projected interest rate data and dividend information for the time period you choose. The interest rates used are the projected risk-free interest rate you'd earn over that time period.

If you believe interest rates will differ from what the Probability Calculator suggests, simply enter your own interest rate figure. Similarly, you can overwrite the dividend information if you anticipate changes on that front for the underlying.

Should you require any further details regarding Probability calculator service, please, don't hesitate to contact us. Customer Service e-mail: support@ivolatility.com