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Strategy Explorer Selection Window Browse the Possibilities!

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Strategy Explorer Selection Window Overview

The Options Investigator is designed for the investing public. It is a tool meant to assist the typical investor in developing a better understanding of derivative products. It is aimed at all those who own a modest portfolio of equities, and who seek to optimize their portfolio's performance in order to better provide for their retirement and other financial goals.

In the world of investing, there is no such thing as a magic bullet. However useful a tool the Options Investigator might be, it does not relieve investors of the duty to use due diligence when making any investment decision. Whether selecting a broker, purchasing a stock or making an option trade, it is always incumbent on the investor to carefully weigh all the factors involved before making a final decision.

The Strategies Explorer describes over forty option and stock combinations. Not all of these strategies are suitable for every investor. In fact, many of them may only be suitable for the

professional investor, or for individuals with very large portfolios. It is hoped, however, that increasing the typical investor's awareness of how all these various strategies might play out in the ebb and flow of general market activity will increase the investor's ability to take advantage of the more appropriate opportunities that do present themselves.

Strategy Explorer Selection Window Strategies & Categories

Drift vs. Deviation

Without understanding these concepts, no investor can even pretend to have a working knowledge of options and the strategies that employ them.

Drift is a stock's price trend. Historically, the stock market grows at an annual rate of around 8-10%. That is its drift. Though it may surprise many new option investors, the fact is that drift has nothing to do with an option's theoretical value.

The options pricing model is derived by setting two equivalent portfolios equal to each other. One portfolio is long a call option, and the other is short a fractional share of stock. When the terms are reduced the drift factor cancels out of the equation, and therefore drift is not a factor in how an option is priced. Luckily, you don't have to understand the math. You will see next why this result makes perfect sense.

Deviation is how much a stock's price movement in specific time periods differs from its drift. It is usually measured by the standard deviation, commonly referred to simply as volatility. To better understand how volatility differs from drift, consider the following hypothetical situation.

Trick question: If a stock rises by 1% every day, what is its volatility?
Answer: Zero.

Think about that for a moment. If a stock never deviates from its drift, then it has no deviation, i.e. its volatility is zero. People buy insurance to protect themselves from the unknown. Without uncertainty there would be no insurance industry. And without volatility, there would be no options market because all future values of a stock would be known and certain.

In other words, drift doesn't matter to option pricing because it is immaterial to the level of doubt about the stock's future value. In contrast, volatility represents the very uncertainty that gives rise to the demand for options. And that demand is what gives contracts their value. So while drift is not taken into account, volatility is a crucial factor for determining an option's value.

Directional vs. Volatility Strategies

Option strategies can be divided into two broad categories: directional plays and volatility plays. But the line between those categories is sometimes very blurred, and it's not always clear to which category a strategy should be assigned. The Strategy Explorer only deals with directional strategies. Having said that, volatility is a theme that runs constantly through all the discussions. How could it be otherwise, when volatility is such a key factor in valuing options?

A pure volatility play potentially profits from a change in the volatility of a stock and is not affected by its price movements; it is often a strategy for the very short-term. And many

volatility strategies, in order to maintain their price-neutral character, may require additional trading to rebalance the position whenever price moves occur. These strategies require more sophisticated modeling tools and trading facilities than what most individual investors need, and are beyond the scope of this program. The Strategy Explorer is meant for investors who are comfortable holding positions for longer periods of time, instead of just minutes or hours, and who do not spend their entire day watching the markets.

Risk vs. Reward

A common term in finance is the *risk-free* rate of return. In theoretical terms, the risk-free rate reflects the productive capacity of economic assets employed in an enterprise where the future holds absolutely no uncertainty and where the money involved has a constant value for all eternity. As a practical matter, most investors use the rate on Treasury bills as a benchmark. The key point to remember, however, is that to earn a higher return requires taking on additional risk.

You can use the Implied Volatility Calculator feature of the Simulator to find out more about how the market perceives the risk of an actual option position. The Calculator can take an option's market price and key characteristics and tell you just how much volatility is implicit in the premium.

Unavoidable Ambiguities

In many cases, a particular strategy may not lend itself to an easy categorization. A classic example is the 'Cash-Backed Call', which consists of buying a call option and having sufficient funds to exercise the call. Generally, this strategy is an alternative to purchasing the stock. If the stock rises the investor can exercise the call, in which case the effective purchase price would be the strike price plus the premium paid for the option. If the stock declines, however, the investor allows the option to expire worthless and purchases the stock in the market. It should be mentioned, by the way, that the owner of a Call will not receive benefits of stock ownership, such as voting rights, dividend payouts, etc.

There's no doubt that in this situation the investor's long-term outlook for the stock is bullish. The question regards their short-term outlook during the life of the option. If the investor were definitely bullish for the short term, the best strategy would probably be to simply buy the stock. On the other hand, if the investor were bearish, the best strategy might be to simply wait for the stock to decline. This implies that the investor is either undecided about the short-term direction, or neutral, in the sense of expecting a flat trading range. But if the investor were neutral, might not the best strategy be to wait and earn interest on their funds in the meantime?

The point of this discussion is to demonstrate that the bullet-point classification of option strategies is, by its very nature, somewhat arbitrary. To get a more complete understanding of a strategy, the user can click on an option and peruse a more complete discussion of the strategy's characteristics.

Strategy Explorer Selection Window Short-term Outlook

Bullish

Strategies in this category might be appropriate for an investor who believes the stock will move higher during the life of the option. One important note: in the case of a LEAPS

option, *short-term* could refer to years rather than months or weeks. The life of the option is what matters here.

Bearish

Strategies in this category might be appropriate for an investor who believes the stock will decline during the life of the option. In the case of a LEAPS option, *short-term* could refer to years rather than months or weeks. The life of the option is what matters here.

Neutral

The way the term *neutral* is used here, strategies in this category might be appropriate for an investor who believes the stock will be relatively unchanged over the life of the option. In the case of a LEAPS option, *short-term* could refer to years rather than months or weeks. The life of the option is what matters here.

Sharp Move

Strategies that are checked in this category might be candidates for an investor who believes that the stock is due to make a big move during the life of the option. In fact, the success of some strategies almost demands that the stock move sharply; think of a Long 1-month out-of-the-money Call, for example.

The *Sharp Move* criterion works to exclude some alternatives, too. If the investor thinks there is a good chance of a big move, there is cause to rule out strategies where a sharp shift might spell big trouble.

Strategy Explorer Selection Window Longer-term Outlook

Some strategies combine instruments with different time frames. An example would be the 'Covered Call', which involves being short a call and long the underlying stock. In this case, the option will eventually expire while the stock has no set term of life, so the investor's outlook might be subdivided into two periods:

1. from the present until the option expires
2. for all time after the option has expired

It is often the case that the investor will have different outlooks for the same stock for the two periods. That is fine, provided that the strategy is compatible with those predictions. In our Covered Call example, the investor might consider the stock slightly overbought and therefore be somewhat neutral over the near term. On the other hand, if the fundamentals remain solid the investor's longer-term outlook might be bullish. Both views are consistent with a reasonable use of this strategy.

However, a difference between short-term and long-term forecasts can also be a key criterion for excluding certain strategies. For example, consider one that involves the chance of being assigned stock: the 'Naked Put'. We can presume the investor leans toward a bullish outlook for the life of the option; after all, that scenario results in the biggest immediate payoff. But say the investor's long-term forecast for the equity is bearish. The risk of assignment (which would force the investor to buy an undesirable stock) makes this strategy a dubious alternative.

Strategy Explorer Selection Window Motivations

Favorable Price Move

This includes strategies that are intended to gain in value if the investor's prediction for the stock is correct.

A typical example would be a long option or option spread that becomes more valuable if the stock moves sufficiently in the right direction. (Note that in some examples the direction is irrelevant, as long as a sizeable move takes place before expiration.)

This also includes the basic long stock and short stock positions. They appreciate if the stock moves in the desired direction.

Produce Income

This includes any strategy that generates up-front net premium income when the position is first established. It always contains a short option position. Usually the goal is to collect the premium income and hope that the short option will expire worthless, allowing the investor to keep 100% of the premium.

In the riskiest examples, the investor is taking on the risk of devastating losses. In more conservative examples, the strategy also contains a long position that limits the extent of unexpected losses.

A classic example is the Covered Call. The investor writes a call against stock in their portfolio and immediately receives a premium for selling the option. If the stock languishes for the life of the option, both the Call premium and the stock are retained, effectively boosting the returns on that stock. If the stock rallies, the Call will be assigned and the stock will have to be sold at the strike, but even so, the premium boosts the effective returns.

Acquire Stock

One of these strategies might be appropriate for an investor who would like to acquire the underlying stock but hesitates to buy the shares now. Some of these strategies lower the cost -- though also the probability -- of acquiring the stock. Others open up more choices for the investor -- but have the potential to raise the acquisition cost.

Hedge Stock

Stockowners and stock buyers often use options to help reduce possible losses on the stock. Some of the strategies provide a high degree of insurance against losses, while others merely produce a small income that helps to mitigate the loss. The investor may also be able to mix and match these combinations with the goal of finding an optimal strategy.

Exit Stock

In some cases, stockowners who are ready to sell the stock might have an alternative to immediate liquidation. This category includes some ideas.

Keep in mind that exit strategies involving options are generally not suitable for investors who expect an imminent and sustained downturn. For example, a Protective Put usually requires a long-term bullish view to justify its cost, and a Covered Call merely mitigates losses if the stock falls sharply and stays down. If the investor's outlook is negative, and there is no other reason to hold on to the shares, liquidating may still be best.

Strategy Explorer Selection Window Buttons

Helpers

The Strategy Explorer comes with tool tips to explain various terms. Holding the mouse over a term causes a tiny window to pop up with an explanation of the term. Unchecking this box disables these tool tips. By default the tool tips are enabled.

Click to Sort

Clicking on one of the column headings will sort all the strategies according to that criterion. Clicking the first time will cause all the Xs to float to the top, and clicking a second time causes them to sink to the bottom.

At this time, the program is unable to allow a secondary search to narrow your list down further. One solution is to examine the list of the strategies that meet your primary criterion and see what their other X-marks look like. Some alternatives may appear more applicable for your purposes than the rest.

Scroll up/down

Use these buttons to scroll the strategies list up or down.

Click to Explore

Clicking on a specific strategy loads a new window with an extensive discussion of the strategy and its characteristics and risks.

Strategy Explorer Details Window Study a Strategy in Depth!

- [Overview](#)
- [Highlights](#)
 - Where They Appear
 - Maximum Gain & Loss
 - Example
- [Icons](#)
 - What is a Payoff Profile
 - This Strategy
 - Comparable Position
 - Opposite Position
- [Discussion Points](#)
 - A.K.A.

- Outlook
 - Summary
 - Motivation
 - Description
 - Variations
 - Maximum Loss
 - Maximum Gain
 - Profit/loss
 - Breakeven
 - Volatility
 - Time Decay
 - Assignment Risk
 - Expiration Risk
 - Comments
- [Buttons](#)
 - Helpers
 - View All Strategies
 - Return to Tutorials

Strategy Explorer Details Window Overview

This window presents a complete discussion of the various characteristics of a given strategy. The discussion is organized by topic to present a familiar look and feel to the user. It is also more *searchable* than a solid block of text.

To keep the presentation brief, Strategy Explorer assumes the reader is already familiar with all fundamental equity options concepts. Even investors who are savvy about other securities will have trouble following the arguments unless they have sufficient option experience or have read the tutorials. Equity options come with unique contract characteristics, exercise and assignment issues, terminology, etc. If you find that the text doesn't provide enough detail, we recommend that you review the applicable tutorials. It could potentially save you from an expensive misunderstanding.

Strategy Explorer Details Window Highlights

Where They Appear

At the bottom on the right side of this window appear key characteristics that the user can easily reference.

Maximum Gain & Loss

These two items are simply algebraic expressions stating the theoretical limit to potential gains and losses from the strategy. In some cases, where there is no theoretical limit, the maximum is simply described as 'Unlimited.' Even where there is a theoretical limit, however, the gain or loss could be very substantial.

Example

This is simply a generic example of what specific options would be combined to create an instance of the strategy. In all cases, these examples involve options on the mythical stock XYZ, currently trading at \$60.

Strategy Explorer Details Window Icons

What is a Payoff Profile

A payoff profile reflects the profit/loss that would occur if an option strategy were held until expiration and then liquidated at its theoretical value. This is an extremely simplified graphical display of how a strategy will perform. It ignores real-life complications such as bid-ask spreads, commissions, taxes and interest rate charges. The graph does, however, provide a quick at-a-glance description of a strategy's basic character.

This Strategy

The largest icon displays a payoff profile of the strategy currently under discussion. See above for a description of payoff profile.

Comparable Position

This icon displays the payoff profile of another strategy whose risk and reward is substantially the same as the strategy currently under discussion. Not surprisingly, this icon should look just like the icon for the current strategy. Clicking on this icon, however, will load that comparable strategy into the current window. Note: not all strategies have a comparable strategy, so in some cases this icon will be absent.

Opposite Position

This icon displays the payoff profile of the current strategy's opposite. By opposite is meant that all long positions become shorts and all shorts become longs. For example, a Covered Call strategy is long the stock and short a call. So the opposite would be short the stock and long a call. Clicking the icon will load the opposite strategy in this window. Note: for some strategies, the concept of opposite may not make sense even as an academic exercise, in which case this icon will be absent..

Strategy Explorer Details Window Discussion Points

A.K.A.

Also Known As: other names by which this strategy may be called.

Outlook

What might be the market expectations of an investor who uses this strategy? Do they expect the stock to rally sharply, plummet to new lows or simply go sideways? And are the investor's short-term outlook and long-term outlook opinion different, which might rule out this particular alternative immediately?

Summary

This is a discussion of the basic characteristics of the strategy. The emphasis here tends to be placed on elements of the strategy that stand out. In some cases that might be the high level of risk, and in others such factors as time decay.

Motivation

Why would an investor use this strategy? Is it an attempt to profit from an expected price move or earn additional income, to hedge their current stockholdings or acquire new stock.

Description

A synopsis of the strategy and its basic components.

Variations

This is a brief text noting some other strategies that are almost -- but not quite -- the same as the current strategy. In some cases, there aren't really any variations and so this area is indicated as not applicable.

Maximum Loss

This is a discussion, in some cases quite lengthy, detailing how much the investor might lose with this strategy in various worst-case scenarios. Unlike the bullet-type description of the maximum loss, which is simply an algebraic expression, this includes some of the finer points involved.

Maximum Gain

This is a discussion, in some cases quite lengthy, detailing how much the investor might profit with this strategy in various best-case scenarios. Unlike the bullet-type description of the maximum gain, which is simply an algebraic expression, this includes some of the finer points involved.

Profit/loss

This area describes the dynamics of maximum gain and maximum loss in a broader context. It focuses on how the two balance with each other rather than on a single extreme.

Breakeven

Here is discussed where the underlying stock needs to be at expiration of the option(s) in order for the strategy to neither gain nor lose. As always, real life complications like commissions, interest charges and taxes are ignored.

Volatility

Most of our discussions focus on the nature of strategies when they are held to maturity, i.e. expiration of the option(s). This area talks about what happens during the life of the strategy. More specifically, the focus is on how changes in implied volatility, or the

market's perception of risk, can affect a strategy long before its maturity, even in the absence of a significant move in the underlying stock.

Time Decay

Most of our discussions focus on the nature of strategies when they are held to maturity, i.e., expiration of the option(s). Here is discussed the degree to which a strategy is expected to gain or lose from the passage of time when all other factors are held constant.

Assignment Risk

At the present time, all exchange-listed stock options in the U.S. are American-style, which means they can be exercised at any time. (The Options Investigator does not deal with European-style options, which can only be exercised at expiration.) This area discusses the likelihood of an investor receiving an assignment before expiration, and how disruptive such an event might be to the strategy.

Obviously, this area is not applicable to strategies that involve only long option positions.

Expiration Risk

This area discusses the risks involved with holding a strategy into the expiration, and how disruptive to the strategy any unexpected assignments or non-assignments might be. These risks are real, and are important for every investor to consider before keeping an option position open into expiration.

Here is another practical issue. In most strategy discussions, there is an implicit assumption that at expiration the strategy will be liquidated at its intrinsic value. But in fact that's not the case. Whether a position is liquidated on the last day of trading before expiration, or whether it is held into expiration and possibly assigned or exercised, the final profit/loss usually also depends on things such as the bid-ask spread, commission costs, interest charges and taxes. It is important for all option investors, holders and writers alike, to research these specifics ahead of time.

Comments

Though this area is blank for some strategies, it contains important notes for others.

Here is space for comments that do not fit the standard categories, or if they appear in those areas they are not discussed in sufficient detail. In many cases, this area deals with quite significant topics, such as unique risks, or practical obstacles to executing the strategy.

Strategy Explorer Details Window **Launch Interactive Analysis**

Clicking this button launches the Simulator and loads a sample of the current strategy under discussion. The actual strategy loaded is what you see displayed in the Example area (see above, Highlights/Example). Once the Analysis window has been launched and the strategy loaded, however, the user is at complete liberty to customize the position in whatever manner desired.

Strategy Explorer Details Window **Buttons**

Helpers

The Strategy Explorer comes with tool tips to explain various terms. Holding the mouse over a term causes a tiny window to pop up with an explanation of the term. Unchecking this box disables these tool tips. By default, the tool tips are enabled.

View All Strategies

This button simply returns the user to the Strategy Explorer, where they can resume perusing all the strategies listed there.

Return to Tutorials

As you have learned, the Strategy Explorer operates in its own separate window. This button returns the user to the tutorial section of the Options Investigator. Expect the re-loading to take a moment.

Simulator Settings Window Define the Underlying Stock

- [Overview](#)
- [Stock Settings](#)
 - Today's Date
 - Starting Stock Price
 - Starting Volatility
 - Interest Rate
 - Quarterly Dividend
 - Ex-Dividend Date
 - Does it have LEAPS?
 - Expiration Cycle
- [Implied Volatility Calculator](#)
 - Description
 - Option Premium
 - Put or Call
 - Strike Price
 - Expiration
 - Calculate
 - Implied Volatility
 - Override Default Volatility
- [Buttons](#)
 - Help
 - Reset
 - OK
 - Cancel

Simulator Settings Window **Overview**

The Settings window is where the underlying stock is defined. The user sets the stock's price, its volatility, what if any dividends are paid out, the cycle according to which its

options are listed and the interest rate level. Based on these basic inputs, values will be calculated for the option positions the user enters on the other windows.

It should also be mentioned that, for the user who desires to navigate from one data-entry textbox to the next using their keyboard, it is necessary to employ the **TAB** key rather than the **ENTER** key. The designers of the Options Investigator apologize to those of you who are inconvenienced by this limitation.

Simulator Settings Window **Stock Settings**

Today's Date

The default value is, not surprisingly, today's date. In most situations, where the investor wants to test a strategy going forward from today, there will be no need to change the default. But in some cases, where it is desired to recreate a position from the past in an effort to determine what factors might explain today's value, any valid date can be entered in the format MM/DD/YY. Also, in the case of calendar spreads where the user desires to continue the analysis beyond the first expiration, it may be useful to enter a future date corresponding to the first option expiration.

Starting Stock Price

Enter the stock's current value, i.e. where it's trading right now. If the date entered was other than today, the default, then enter a stock price from that day. The Investigator has arbitrarily established a maximum permissible price of \$500.

Starting Volatility

If the user knows what is the volatility of their stock, then enter that value. In most cases, however, the volatility is unknown. For precisely that reason, The Investigator provides an Implied Volatility Calculator that will allow the user to calculate a volatility level. Please see below for details on using that tool. If known, please enter a number in whole number format, i.e. enter 35% as 35 without a decimal point.

Quarterly Dividend

Many, if not most stocks, in today's market do not pay dividends. For those cases, simply leave this value at zero, its default. For stocks that do pay a dividend, enter the amount of its quarterly dividend here. Attention: many data vendors who provide this information will list the annual dividend, which of course would need to be divided by four to provide the correct input for The Investigator. The amount needs to be entered in dollars and cents, so a nickel would be entered as *0.05* and one dollar as *1.00*.

Note: see below, Limitations of the Simulator/Dividends

Ex-Dividend Date

The ex-dividend date is the first trading day where a buyer of the stock would not be entitled to the dividend. In theory, if a stock pays out a dividend of \$1.00, then on the ex-dividend date the stock would be exactly one dollar lower to adjust for the drop in the stock's value (due to the \$1.00 it paid out to shareholders). Most data vendors will include the ex or *ex-div* date in their basic information for a stock. For stocks that don't pay a

dividend, leave this field blank. Otherwise, enter the date in *MM/DD/YY* format. To better understand the impact of dividends, please read the topic of 'Dividends' in the section about 'Limitations of the Simulator', which appears below.

Does it have LEAPS®?

If long-term options are listed on this stock, select *Yes* in order to include these distant expirations in the choices available for constructing positions in the next window. Sometimes there is a near-time January expiration that was originally a LEAP. To include that extra month, select 'Yes'.

Expiration Cycle

For any given stock on which options are listed, there will be at least four expirations. The first two months are the same for all stocks, and the next two months are drawn from that stock's expiration cycle. The quick test is to look at the 3rd and 4th expiration months for a given stock: are those two months the 1st, 2nd or 3rd month of their respective quarterly cycle?

Simulator Settings Window **Implied Volatility Calculator**

Description

Of the six inputs that determine an option's value, volatility is the one measure that cannot be directly observed. However, since we can observe where an option is trading, it's a simple matter to use the option's quoted price as an input and solve for the volatility implied by where the option is actually trading in the marketplace.

Option Premium

Enter the option's value in dollars and cents, so \$1.25 would be entered as *1.25* In most cases, it's best to use the midpoint between an option's bid/ask spread. So if an option is quoted \$2.00 bid and \$2.50 asked, enter \$2.25 in this box. In general, bid-ask spreads are being constantly updated during the trading day while actual trades may occur only sporadically. Also, try to use an option price from the same time period as the stock price.

Put or Call

This should be fairly obvious. When deriving the implied volatility from a Put, select *Put*, and when deriving the implied volatility from a Call, select *Call*.

Strike Price

Here again, this should be fairly obvious. Enter the strike price from which the implied volatility is being calculated.

Expiration

Select the expiration month for the option from which the implied volatility is being derived. If the desired expiration month is not available, try re-setting the Expiration Cycle on the left side of the window. There is a known bug here. Options with LEAPS that are listed on cycles #2 & #3 may sometimes have seven expiration months trading at one

time. In those situations the most distant LEAPS expiration will not be available here. The workaround solution is to change the setting in the 'Expiration Cycle' box to cycle #1.

Calculate

Clicking here should launch the calculation. There is an issue of which the user needs to be aware, however, and which has the potential to trigger an error message instead of the desired result. The Investigator is designed for stock options, and in the U.S. at present all stock options are American-style. Since these options can be exercised at any time during their life, their theoretical value can never fall below their intrinsic value. Entering an option premium less than the option's intrinsic value generates an error.

The computer algorithm used to calculate an option's theoretical value adds another wrinkle. Basically, running the algorithm with a volatility of zero causes the program to crash. When solving for implied volatility, therefore, the algorithm first calculates an option value using the minimum volatility of 1%. If that value exceeds the option premium entered by the user, it's an error.

Let's clarify this issue with an actual example using a \$100 call with a year to expiration on a stock currently at \$100. Set the volatility at 1% and the interest rate at zero. At the time of this writing, those inputs yield a theoretical option value of \$0.40 (40 cents). So even though the option's intrinsic value is zero, entering a premium of \$0.25 and solving for implied volatility would generate an error.

Now let's try changing the interest rate to a more realistic rate of 2%, and the same option's theoretical value jumps to \$2.03. Raising the interest rate to 5% gives us a theoretical value of \$4.98. In each case, the user who entered an option premium below that theoretical value and attempted to solve for implied volatility would receive an error.

The user is very much encouraged to experiment with different interest rates and volatilities in order to better understand how these inputs affect the theoretical value of an option.

Implied Volatility

This is our result, i.e. the volatility that when plugged into the option pricing model gives us the option's price in the market.

Override Default Volatility

If the user desires to use the calculated implied volatility for building and analyzing an options position, click here. The same result could be obtained by typing the number into the 'Starting Volatility' box on the left side of the 'Settings' window, but this shortcut is provided as a convenience to the user.

Simulator Settings Window **Buttons**

Help

As you may have noticed, the help button brings up this window.

Reset

Set all values to the defaults built into the Investigator. Effectively, this erases all data the user has entered. A warning is provided.

OK

This causes all the settings to be saved and closes the window.

Cancel

This closes the window without making any changes to what has previously been entered.

Simulator Edit Position Window
Create a Hypothetical Position

- [Overview](#)
- [Options](#)
 - Long/Short
 - Number Contracts
 - Call/Put
 - Expiration Month
 - Strike Price
 - Starting Option Price
 - Starting Delta
 - Clear
- [Underlying Stock](#)
 - Long/Short
 - Number Shares
 - Put or Call
 - Starting Stock Price
 - Total Stock Delta
 - Clear
- [Net Position](#)
 - Net Credit (Debit)
 - Total Delta
 - Days to Nearest Expiration
- [Buttons](#)
 - Help
 - Settings
 - Clear All
 - Proceed

Overview

The Position Entry window allows the user to create a hypothetical position consisting of the underlying stock and as many as four different options. The rows labeled 'Option 1' through 'Option 4' are, not surprisingly, where each individual option is defined and the corresponding position established. The row labeled 'Stock' performs a similar function for the stock portion of the position, if there is one. There is also a box that displays some key parameters such as the net cost of the combined position, its delta and number of days until the nearest-term option's expiration.

It should also be mentioned that, for the user who desires to navigate from one data-entry textbox to the next using their keyboard, it is necessary to employ the **TAB** key rather than the **ENTER** key. The designers of the Options Investigator apologize to those of you who are inconvenienced by this limitation.

Simulator Edit Position Window **Options**

Long/Short

Enter 'Long' if the user is the holder (owner, purchaser) of the option or 'Short' if the user is the writer (seller).

Number Contracts

Enter the number of contracts, which can be any whole number from 1 - 100. The upper limit on the number of contracts was an arbitrary decision made to avoid problems with calculation and display requirements. The user who wants to analyze a larger position should simply divide the size of their position by a round number, for example ten, and then after analyzing the reduced position multiply by the same number to get the theoretical result for the larger position.

Call/Put

Select 'Call' for a Call option or 'Put' for a Put option.

Expiration Month

Select the expiration month/year for the option. If the desired expiration is not available, go back to the 'Edit Settings' window and check the selection in the 'Expiration Cycle' and 'Does the Equity Have LEAPS?' boxes.

Strike Price

Enter the strike price for the option. The current version of the Investigator will only accept strike prices that agree with established conventions. That is to say, the strike prices must be in increments of \$2.50, \$5 and \$10 for strikes from \$5-25, \$25-200 and \$200-500 respectively.

Starting Option Price

Once all the information has been entered for an option, its starting value per share will appear in this box. The option's value is calculated based on the data entered by the user in the 'Edit Settings' window, and if the user feels the calculated value is not appropriate then further adjustments should be made to the parameters in the 'Edit Settings' window. For more details, the user should read about volatility in [Limitations of the Simulator](#) which appears below.

Starting Delta

This is the second value calculated based on user inputs. It is the option's delta, and should be read as the share equivalence of the option. It is common to express delta as a percent, so an option whose value moves half as much as that of the underlying stock is

said to have a delta of 50%. If that option were entered here as a position consisting of a one contract, the Investigator would display '50' as its delta. But if the user entered the same option as a ten contract position then the display would be '500'. This topic is addressed in more detail in the 'Net Position/Total Delta' area below.

Clear

This feature is provided as a convenience to the user. Clicking the icon deletes all the data entered on that row. Try it.

Simulator Edit Position Window **Underlying Stock**

Long/Short

This is the same as for the options above. Enter 'Long' to indicate the stock has been purchased (ownership) or enter 'Short' to indicate that borrowed stock has been sold (shorted).

Number Shares

Enter the number of shares of stock, which can be any whole number from 1 - 1,000. The upper limit on the number of shares was an arbitrary decision made to avoid problems with calculation and display requirements. The user who wants to analyze a larger position should simply divide the size of their position by a round number, for example ten, and then after analyzing the reduced position multiply by the same number to get the theoretical result for the larger position.

Starting Stock Price

The number that appears here is simply the stock price entered by the user in the 'Edit Settings' window. The stock's default value in that window is \$60, for no particular reason except that it's a nice round number.

Stock Delta

This number is simply the number of shares of stock. For a long stock position the delta is positive and for a short stock position it's negative. This topic is addressed in more detail in the 'Net Position/Total Delta' area below.

Clear

This feature is provided as a convenience to the user. Clicking the icon deletes all the data for the stock.

Simulator Edit Position Window **Net Position**

Net Credit (Debit)

This number represents the theoretical net cash flow that would occur if the user were to actually buy or sell the options and stock at the stated prices (ignoring all commissions and other transaction costs, of course).

Example: long a Call @ \$2.50 and short a (higher strike) Call @ \$1.50. The cost of purchasing the Call is \$250 and the amount received for selling the Call is \$150, so this position would have a net debit of \$100. Since it's a debit, i.e. the investor has to pay money and incurs a negative cash flow, the number appears in parenthesis. If the opposite position were entered, then of course there would be a credit and the number would appear without parentheses to indicate a positive cash flow.

Attention: the fact that a position has a net credit does not mean that an investor who actually implemented the strategy would see an increase in the cash balance of their brokerage account. Credit positions often require the deposit of margin that can easily exceed the credit from the position itself. The user should consult their broker for specific margin requirements.

Total Delta

This number represents the share equivalence of the total position when all the options and any stock are combined. In order to add together the deltas from each individual component of the position and get a coherent result, it is necessary that all deltas be stated in the same terms. That is why the delta for each component is calculated as an equivalent number of shares of stock.

Example: long a Call with delta of +50% and short 50 shares. Since an option contract's unit of trade is 100 shares, the delta of the option is $+50\% \times 100$, which is +50. The delta of the short stock position is simply the number of shares multiplied by -1, which is -50. Since both deltas are in the same terms they can be added together, so the combined delta is $(+50) + (-50)$, which is equal to zero.

In the above example, the combined delta of zero implies that the value of the position will remain constant no matter what. And that is correct, provided that all other things remain equal. But of course they never do; time moves forward, volatility shifts and even a movement in the stock price will change the delta of an option. The Investigator includes a Delta Analysis feature to help investors better understand the phenomenon of delta.

Days to Nearest Expiration

This is simply the number of calendar days (including weekends) until the option(s) expire. If there are options with different expiration dates, then the day count refers to the first expiration, since the Investigator cannot continue the analysis beyond that date.

Simulator Edit Position Window **Buttons**

Help

As you may have noticed, the help button brings up this window.

Settings

Click here to go directly to the 'Edit Settings' window, where the parameters that define the underlying stock and the rate of interest can be adjusted.

Clear All

This will erase all option and stock positions. The same result could be accomplished by clicking the five 'Clear' buttons associated with the individual rows. A warning is provided before actually erasing the data.

Proceed

Click here to proceed to the analysis function of the Investigator after the desired position has been created.

Simulator Main Window
Analyze a Hypothetical Position

- [Overview](#)
- [Elements of Analysis Window](#)
 - Profit/loss summary
 - Select Analysis Type
 - Select Graph Options
 - Chart Legend
 - Change Variables to Analyze Effects
- [Profit & Loss Analysis](#)
 - Position
 - Starting Value
 - Test Value
 - Profit (Loss)
 - Delta (%)
- [Analyzing the Graph](#)
 - Chart Window
 - Profit/loss Analysis
 - Delta Analysis
- [Buttons](#)
 - Edit Positions
 - Edit Settings
 - Help
 - Print

Simulator Main Window **Overview**

Once the underlying stock has been defined in the 'Settings' window and an option/stock position has been created in the 'Position Entry' window, the user can simulate the passage of time, a change in volatility or a movement of the stock price in order to observe the position's theoretical reaction to those changes. The boxes on the right side of the window are controls for manipulating the conditions and selecting how the user observes the effects. On the left side are windows that display the performance of the position both numerically and visually.

Simulator Main Window **Elements of Analysis Window**

Profit/loss Summary

Here the user can track the performance of their position in terms of profit and loss. This area is laid out in rows and columns. Each row displays information for an individual component of the position. Since a position can include up to four options and the underlying stock, there may be as many as six rows in the profit/loss summary: one row for each component of the position plus a row to display information for the net (combined) position.

Select Analysis Type

The user can choose either of two methods for displaying data in the graph. Profit and Loss Analysis creates a graph of the profit/loss of the position, while Delta Analysis creates a graph of the stock equivalence, or delta.

Select Graph Options

The user can choose between displaying a single line in the graph that represents the Net Position, or multiple lines with each line representing an individual component of the position.

Chart Legend

When the user has selected 'Components' from the 'Select Graph Options' window, each component of the position will be displayed here with a color code corresponding to its graph in the chart and its 'current' price, i.e., test date price. The user can select which graphs to display by checking or un-checking the box on each line.

Change Variables to Analyze Effects

This is where the user manipulates conditions of time, price and volatility in order to analyze the theoretical behavior of the position under those conditions. Remember that six inputs determine an option's theoretical value. The strike price is fixed by the terms of an option and the Investigator makes the assumption that interest rates and dividends do not change. The remaining three inputs can be any value within these ranges:

1. stock price, zero up to \$500
2. test date, today until option's expiration (number days down to zero)
3. volatility, 1% up to 300%

In addition, the user can select the increment size for moving the stock price up or down.

Simulator Main Window **Profit & Loss Summary**

Position

A short description of each component, e.g. long 10 Dec-01 60 Call.

Starting Value

The value of each component at time zero (today). Notice that this is the opposite of the cash flow incurred by creating that position. Take, for example, the purchase of a Call @ \$2.50. This means the investor has paid out \$250 (a negative cash flow) for an asset worth \$250 (a positive value). If an investor had sold the option short, there would have been a positive cash flow and the position would have a negative value.

It's important to realize that while the Investigator takes into account the cost-of-carry when calculating the value of an option, it does not have the ability to keep track of cash balances. Suppose an investor with \$6,000 in their brokerage account were to buy 100 shares of stock @ \$60 for a total cost of \$6,000. The total value of the account was \$6,000 both before and after the stock purchase. But as far as the Investigator is concerned, until the purchase of the stock the account had no value.

Test Value

This column displays the 'current' value of each component and the combined net, based on whatever price, volatility and time to expiration the user has selected for their analysis. At the beginning of the analysis, immediately after the position has been created, the Starting Value and Test Value will be identical.

Profit (Loss)

The P/L of each component of the position as well as the net P/L for the entire position. This is simply the Test Value minus the Starting Value. If the value of a component increases, there is a profit (positive number) and if the value has declined, there is a loss (negative number). Notice that a short position earns a profit when the absolute value of the position declines, i.e. a negative value becomes less negative.

Delta (%)

This is the share equivalence for each component of the position and for the net position. If the 'Test' date is identical to the 'Starting' date, this delta value will be identical to the one that appeared when the position was created in the 'Edit Position' window.

Simulator Main Window **Analyzing the Graph**

Chart Window

Here the position is displayed in visual terms. Always, the horizontal axis represents the stock's price. For a profit/loss analysis, the vertical axis is the profit and loss. For a delta analysis, the vertical axis is the stock equivalence. In addition, there is a vertical line in the chart itself to indicate the current stock price. If you click directly on the chart to move the line, it will change the test stock value, and all numbers on the entire screen will update accordingly.

The chart displays position values over a range of stock prices, with all the other inputs held constant. It's important to understand that changing the stock price does not change the graph, it merely moves you to a different point on the graph. In contrast, changing time-to-expiration or volatility causes the chart itself to be completely recalculated.

The horizontal axis of the chart window is limited to a range of \$40, no more or less. If the starting stock price is \$60 then the horizontal axis would extend from \$40 to \$80, and the

chart would only display graphs across that range of stock prices. As the user tests higher or lower stock prices, the chart will re-center itself on a regular basis.

Profit/loss Analysis

Example: long an at-the-money Call @ \$3. On the left side of the chart the graph is a flat line representing a loss of \$300, the maximum loss. On the right side the graph is a straight line with a slope of +1, indicating that when the Call is deep-in-the-money it moves dollar for dollar with the stock and that the potential profit is unlimited. In the middle, the graph crosses the current stock price at zero, the break-even point.

Delta Analysis

Example: long an at-the-money Call @ \$3. On the left side of the chart the graph is near zero, which indicates the option has almost no sensitivity to the stock's price. Where it crosses the current price the graph is around 50, indicating that the option is the equivalent of around 50 shares of stock. On the right side the graph approaches 100, indicating that the option has a share equivalence of 100 shares, i.e. moves dollar-for-dollar with the stock.

Simulator Main Window Buttons

Edit Positions

Opens the 'Edit Positions' window where the starting position can be created or changed.

Edit Settings

Opens the 'Edit Settings' window where the basic definitions of the underlying stock can be changed.

Help

Opens this window, as you may have noticed.

Print

Click here to print the entire Position Simulator as it currently appears on your screen.

Limitations of the Simulator

- [Volatility](#)
- [Time Frame](#)
- [Dividends](#)
- [Theoretical vs. Real Life](#)

Volatility

The Investigator allows only a single volatility to be used for all the options on a given underlying stock. From an educational point of view, this isn't really a problem. After all, in theory the option pricing model calls for the standard deviation (volatility) of the

underlying stock over the life of the option. There is a basic assumption that a stock can have only one volatility for a given period of time.

But in real life, as is often the case, it's not that simple. The option pricing model is actually a very complex mathematical equation based on a whole host of assumptions: that stock prices are log-normally distributed, for example, or that trading is continuous. In the real world, these assumptions don't always hold up.

As a practical matter, because there is no better alternative, the option pricing model is 'tweaked' to compensate for its deficiencies. And the most common method of 'tweaking' the model is to adjust the volatility level used as an input. This produces a skew in the implied volatility, where out-of-the-money options typically have a higher implied volatility than at-the-money options, and near-term options typically have a higher implied volatility than longer-term options.

Professional traders use software applications with complex mathematical formulas to take into account the skewed levels of volatility. The Options Investigator is not designed for professional option traders -- it is an educational tool to help investors learn about stock options and to gain an understanding of their basic concepts. It performs that function quite well, but the investor should be aware of its limitations.

The Implied Volatility Calculator can help the investor to develop a better understanding of how an option's strike price and time to expiration reflect different levels of implied volatility. Just pick a dozen or so different options on your favorite underlying stock and calculate the implied volatility for each one. That's really what the Implied Volatility Calculator is designed to do -- calculate a myriad number of implied volatilities quickly and with a minimum of effort.

Time Frame

The simulator can be used to test a theoretical position over a period of time extending from today, which can actually be any date, until the option expires. Actually, if the user just enters a stock position the time period extends through infinity because the stock never expires. But what's the point, since the graph is simply a straight line with a slope of +1 for a long position or -1 for a short.

A problem arises when the user enters a position with options expiring at different times. Take, for example, a position consisting of short a Put and long a second Put that differs only in that it expires further out in time (Long Put Calendar Spread). If the first option expired out of the money and worthless, the analysis is pretty straightforward. But in the case where the first option is in the money at expiration, the investor faces three choices.

1. Close out the entire position
2. Take the assignment, keep the stock and keep the other Put
3. Take the assignment and immediately close out the stock position by exercising the other Put.

The Investigator does not have the sophistication required to make this decision, so it simply stops its analysis when the first option expires, implicitly assuming that the entire position is liquidated. The user who wants to continue their analysis beyond the first expiration will need to re-enter a new position. That would mean going to the 'Edit Settings' window and changing the stock price and date (Today's Date) to their values at

the end of the previous analysis, and then clearing the expired option from the 'Edit Position' window.

Remember also: the analysis assumes you are free to hold the position, short or long, until expiration. So, for example, if you are writer of an in-the-money option, the P/L at expiration might be academic, since you might be assigned early.

Dividends

The original Black & Scholes options pricing model is not capable of taking into account the effect of dividends paid out by a stock during the life of an option. The Options Investigator uses the Cox, Ross & Rubenstein binomial pricing model, which does have that ability. However, in order to take into account the effect of dividends, their size and timing throughout the entire life of the option must be known with absolute certainty.

The Options Investigator makes some heroic assumptions with regard to dividends. It is assumed that:

- a. from the first ex-div date until the end of all time, dividends are paid every 3 months
- b. the size of the dividend never changes for all eternity

In fact, dividends do change and sometimes companies suspend or even eliminate their dividend. For the investor, the bottom line is that there's no substitute for doing one's homework and closely monitoring the fundamentals of the underlying stock.

As this is being written, in December 2001, a prominent financial web site lists a stock trading for 54 cents whose quarterly dividend is 12.5 cents. One could certainly plug that information into the Simulator, which would conscientiously crunch all the numbers and spit out a result. But that result would be gibberish because the input was gibberish. The company is in Chapter 11, its future prospects are doubtful, and the probability of dividends ever again being paid is extremely remote. In this case, the company has been dominating the headlines, so it's unlikely an unwary investor would make a decision based on incomplete information.

But there are many situations where the dangers may not be so obvious. All situations involving cash or stock dividends, splits, mergers, takeovers or any other capitalization event should be carefully studied for their potential impact on the stock's options. The Simulator can help the investor to understand the effect of dividends, but it cannot substitute for the judicious use of common sense and due diligence.

Theoretical vs. Real Life

The Simulator should be very helpful to understanding options concepts. But in the final analysis, prices in the marketplace are determined by supply and demand. An options pricing model -- any model -- is an attempt to represent the ebb and flow of human actions with a mathematical equation. It may seem like an elementary observation, but some investors who enjoy the theoretical analysis may be tempted to forget this fact of life.

There is an old saying that for someone who only possesses a hammer, every problem is a nail. It is important to remember that a theoretical framework for valuing options is only a tool. And like any tool, it has its strengths and its weaknesses. The importance of

common sense and due diligence in the investment decision-making process cannot be emphasized strongly enough.

Also, as you recall from The Investigator's disclaimer, the model does not factor in certain considerations that vary from one situation to another, but can have a significant impact on profitability. Transaction costs, taxes, and margins have the potential to favor one kind of strategy and hurt another. It is vital to get all the facts from your broker and financial advisor first.