Long iron butterfly spread

THE OPTIONS INSTITUTE AT CBOE®

Neutral

Goal

To profit from a stock price move up or down beyond the highest or lowest strike prices of the position.

Explanation

A long iron butterfly spread is a four-part strategy consisting of a bear put spread and a bull call spread in which the long put and long call have the same strike price. All options have the same expiration date, and the three strike prices are equidistant. In the example above, one 95 Put is sold, one 100 put is purchased, one 100 Call is purchased and one 105 Call is sold. This strategy is established for a net debit, and both the potential profit and maximum risk are limited. The maximum profit is the difference between the lower and center strike prices less the net debit paid. The maximum profit is realized if the stock price is above the highest strike price or below the lowest strike price at expiration. The maximum risk is the net cost of the position including commissions, and the maximum risk is realized if the stock price is equal to the strike price of the long options (center strike) on the expiration date.

Example of long iron butterfly spread

Sell 1 XYZ 95 Put at 1.20	*1.20*
Buy 1 XYZ 100 Put at 3.20	*(3.20)*
Buy 1 XYZ 100 Call at 3.30	*(3.30)*
Sell 1 XYZ 105 Call at 1.40	*1.40*
Net Debit =	*(3.90)*

This is an advanced strategy because the profit potential is small in dollar terms and because “costs” are high. Given that there are four options and three strike prices, there are multiple commissions in addition to four bid-ask spreads when opening the position and again when closing it. As a result, it is essential to open and close the position at “good prices.” It is important to ensure the risk/reward ratio including commissions is favorable or acceptable.

Maximum profit

The maximum profit potential is equal to the difference between the lowest (or highest) and middle strike prices less the net debit paid including commissions. In the example above, the difference between the lowest and middle strike prices is 5.00, and the net debit paid is 3.90, not including commissions. The maximum profit potential, therefore, is 1.10 less commissions.

There are two possible outcomes in which the maximum profit is realized. If the stock price is below the lowest strike price at expiration, then the calls expire worthless, but both puts are in the money. With both puts in the money, the bear put spread reaches its maximum value and maximum profit. Also, if the stock price is above the highest strike price at expiration, then the puts expire worthless, but both calls are in the money. Consequently, the bull call spread reaches it maximum value and maximum profit.

Maximum risk

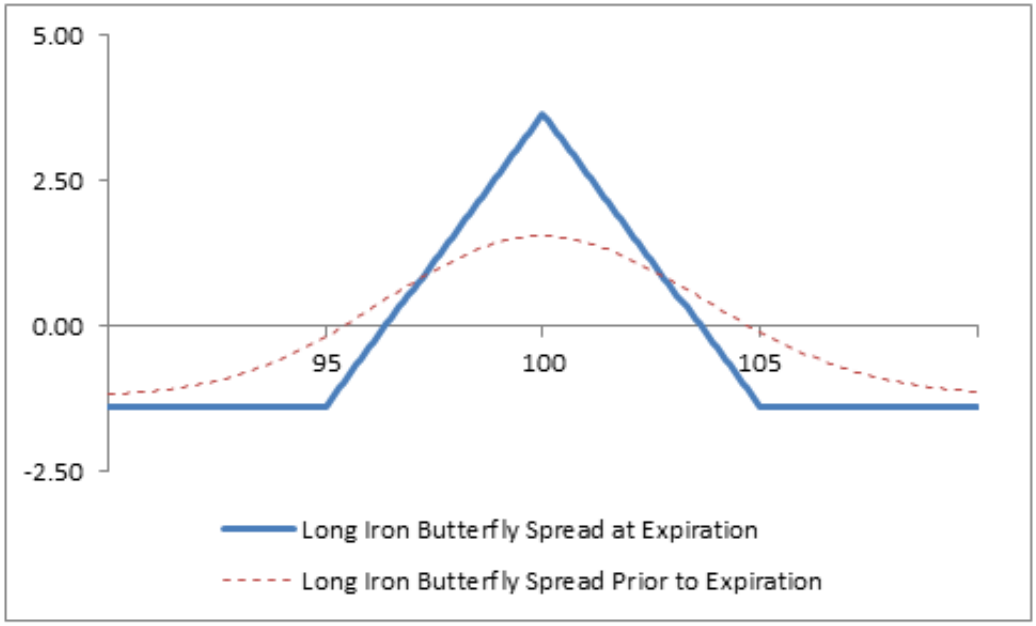
The maximum risk is equal to the net debit paid plus commissions, and a loss of this amount is realized if the stock price is equal to the strike price of the long options (center strike) at expiration. In this outcome, all options expire worthless and the net debit plus commissions is lost.

Breakeven stock price at expiration

There are two breakeven points. The lower breakeven point is the stock price equal to the center strike price minus the net debit paid. The upper breakeven point is the stock price equal to the center strike price plus the net debit paid.

Profit/Loss diagram and table: long iron butterfly spread

Sell 1 XYZ 95 Put at 1.20	1.20
Buy 1 XYZ 100 Put at 3.20	(3.20)
Buy 1 XYZ 100 Call at 3.30	(3.30)
Sell 1 XYZ 105 Call at 1.40	1.40
Net Debit =	(3.90)



Stock Price at Expiration	Short 1 95 Put Profit/(Loss) at Expiration	Long 1 100 Put Profit/(Loss) at Expiration	Long 1 100 Call Profit/(Loss) at Expiration	Short 1 105 Call Profit/(Loss) at Expiration	Net Profit/(Loss) at Expiration
110	1.20	(3.20)	+6.70	(3.60)	+1.10
105	1.20	(3.20)	+1.70	+1.40	+1.10
100	1.20	(3.20)	(3.30)	+1.40	(3.90)

95	1.20	+1.80	(3.30)	+1.40	+1.10
90	(3.80)	+6.80	(3.30)	+1.40	+1.10

Appropriate market forecast

A long iron butterfly spread realizes its maximum profit if the stock price is above the highest strike or below the lowest strike on the expiration date. The forecast, therefore, must be for "high volatility," i.e., a stock price move outside the range of the strike prices of the butterfly.

Strategy discussion

A long iron butterfly spread is the strategy of choice when the forecast is for a stock price move outside the range of the highest and lowest strike prices. Unlike a long straddle, however, the profit potential of a long iron butterfly spread is limited. Also, the commissions for a butterfly spread are higher than for a straddle. The tradeoff is that a long iron butterfly spread has breakeven points much closer to the current stock price than a comparable long straddle or long strangle.

Long iron butterfly spreads are sensitive to changes in volatility (see Impact of Change in Volatility). The net debit paid for a long iron butterfly spread rises when volatility rises and falls when volatility falls. Consequently some traders establish long iron butterfly spreads when they forecast that volatility will rise. Since the volatility in option prices tends to rise in the weeks leading up to an earnings reports, some traders will open a long iron butterfly spread two to three weeks before an earnings report and close the position immediately before the report. The potential profit is "high" in percentage terms and risk is limited. Success of this approach to trading long iron butterfly spreads requires that the stock price rise above the highest strike price or fall below the lowest strike or that volatility rises. If the stock price does not move, or if volatility falls, then a loss will be incurred.

If volatility is constant, long iron butterfly spreads do not show much of a loss until it is very close to expiration and the stock price is close to the center strike price. In contrast, long straddles suffer much more from time erosion and begin to show losses early in the expiration cycle as long as the stock price does not move beyond the breakeven points.

Furthermore, while the potential profit of a long iron butterfly spread is a "high percentage profit on the capital at risk," the typical potential dollar profit of one iron butterfly spread is "low." As a result, it is often necessary to trade a large number of iron butterfly spreads if the goal is to earn a "large profit" in dollars. Also, one should not forget that the risk of a long iron butterfly spread is still 100% of the net debit paid plus commissions. Therefore, if the stock price remains near the center strike price as expiration approaches, a trader must be ready to close out the position before a large percentage loss is incurred.

Patience and trading discipline are required when trading long iron butterfly spreads. Patience is required because this strategy profits from trending stock price movement outside the range of strike prices, and stock price action can be unsettling as it rises and falls around the highest or lowest strike price as expiration approaches. Trading discipline is required, because, as expiration approaches, "small" changes in stock price can have a high percentage impact on the price of a butterfly spread.

Traders must, therefore, be disciplined in taking partial profits if possible and also in taking "small" losses before the losses become "big."

Impact of stock price change

"Delta" estimates how much a position will change in price as the stock price changes. Long calls have positive deltas, short calls have negative deltas, long puts have negative deltas, and short puts have positive deltas.

Regardless of time to expiration and regardless of stock price, the net delta of a long iron butterfly spread remains close to zero until one or two days before expiration. If the stock price is below the lowest strike price in a long iron butterfly spread, then the net delta is slightly negative. If the stock price is above the highest strike price, then the net delta is slightly positive. Overall, a long iron butterfly spread profits from a stock price move outside the range of strike prices.

Impact of change in volatility

Volatility is a measure of how much a stock price fluctuates in percentage terms, and volatility is a factor in option prices. As volatility rises, option prices tend to rise if other factors such as stock price and time to expiration remain constant. Long options, therefore, rise in price and make money when volatility rises, and short options rise in price and lose money when volatility rises. When volatility falls, the opposite happens; long options lose money and short options make money. "Vega" is a measure of how much changing volatility affects the net price of a position.

Long iron butterfly spreads have a positive vega. This means that the net debit for establishing a long iron butterfly spread rises when volatility rises (and the spread profits money). When volatility falls, the net debit falls (and the spread loses money). Long iron butterfly spreads, therefore, should be established when volatility is "low" and forecast to rise.

Impact of time

The time value portion of an option's total price decreases as expiration approaches. This is known as time erosion. "Theta" is a measure of how much time erosion affects the net price of a position. Long option positions have negative theta, which means they lose money from time erosion, if other factors remain constant; and short options have positive theta, which means they make money from time erosion.

A long iron butterfly spread has a net negative theta as long as the stock price is in a range between the lowest and highest strike prices. Consequently, a long iron butterfly spread loses money from time erosion if the stock price stays inside the range of strike prices. However, if the stock price moves outside the range of strike prices, the theta becomes positive and the position profits as expiration approaches.

Risk of early assignment

Stock options in the United States can be exercised on any business day, and holders of short stock option positions have no control over when they will be required to fulfill the obligation. Therefore, the risk of early assignment is a real risk that must be considered when entering into positions involving

short options.

While the long options in an iron butterfly spread have no risk of early assignment, the short options do have such risk. Early assignment of stock options is generally related to dividends. Short calls that are assigned early are generally assigned on the day before the ex-dividend date, and short puts that are assigned early are generally assigned on the ex-dividend date. In-the-money calls and puts whose time value is less than the dividend have a high likelihood of being assigned.

If the short call in a long iron butterfly spread is assigned, then 100 shares of stock are sold short and the long call and both puts remain open. If a short stock position is not wanted, it can be closed in one of two ways. First, 100 shares can be purchased in the marketplace. Second, the short 100-share position can be closed by exercising the long call. Although exercising a long call forfeits its time value, in the case of a long iron butterfly spread, exercising the long call is generally preferred. Since the long call in this strategy has a lower strike price than the short call, it must have less time value than the short call. Buying shares to cover the short stock position and then selling the long call is only advantageous if the commissions are less than the time value of the long call.

Note, however, that whichever method is used, buying stock and sell the long call or exercising the long call, the date of the stock purchase will be one day later than the date of the short sale. This difference will result in additional fees, including interest charges and commissions. Assignment of a short option might also trigger a margin call if there is not sufficient account equity to support the stock position created.

If the short put is assigned, then 100 shares of stock are purchased and the long put and both calls remain open. If a long stock position is not wanted, it can be closed in one of two ways. First, 100 shares can be sold in the marketplace. Second, the long 100-share position can be closed by exercising the long put. Again, although exercising a long put forfeits its time value, in the case of a long iron butterfly spread, exercising the long put is generally preferred. Since the long put in this strategy has a higher strike price than the short put, it must have less time value than the short put. Selling shares to close the long stock position and then selling the long put is only advantageous if the commissions are less than the time value of the long put.

Note, again, that whichever method is used, selling stock or exercising a long put, the date of the stock sale will be one day later than the date of the purchase. This difference will result in additional fees, including interest charges and commissions. Assignment of a short option might also trigger a margin call if there is not sufficient account equity to support the stock position created.

Potential position created at expiration

The position at expiration of a long iron butterfly spread depends on the relationship of the stock price to the strike prices of the spread. If the stock price is below the lowest strike price, then both puts are in the money and both calls are out-of-the-money. In this case both calls expire worthless, but the short put (lowest strike) is assigned and the long put (center strike) is exercised. As a result, stock is purchased at the lowest strike and sold at the center strike, so the maximum profit is earned, but no stock position is created.

If the stock price is above the lowest strike and at or below the center strike, then the short put (lowest strike) and both calls expire worthless, but the long put is exercised. The result is that 100 shares of stock are sold short and a stock position of short 100 shares is created.

If the stock price is above the center strike and at or below the highest strike, then the short call (highest strike) and both puts expire worthless, but the long call is exercised. The result is that 100 shares of stock are purchased and a stock position of long 100 shares is created.

If the stock price is above the highest strike, then both calls are in the money and both puts are out-of-the-money. In this case both puts expire worthless, but the long call (center strike) is exercised and the short call (highest strike) is assigned. As a result, stock is purchased at the center strike and sold at the highest strike, so the maximum profit is earned, but no stock position is created.

Other considerations

There is considerable disagreement among experienced traders on how the terms “long,” “short,” “buy” and “sell” apply to iron butterfly spreads.

This strategy is labeled "Long Iron Butterfly". This use of terminology aligns “buying to open” with paying a net debit and “selling to close” with receiving a net credit.

On the other hand, some traders refer to this strategy as "Short Iron Butterfly," because its profit and loss diagram looks like the diagrams of a short butterfly spread with calls and a short butterfly spread with puts. However, it is confusing for some traders to think of a position that is established for a net debit as a “short position” or “sold position" and conversely closing, or “buying,” it for a credit.

Since even experienced traders frequently disagree on how to describe the opening and closing of this strategy, all traders who use this strategy should be careful to communicate exactly and clearly the position that is being opened or closed. Rather than say “buy” or “sell” or “long” or “short,” when trading long iron butterfly spreads, one might say “open for a net debit” or “close for a net credit.”

Related Strategies

Short iron butterfly spread

A short iron butterfly spread is a four-part strategy consisting of a bull put spread and a bear call spread in which the short put and short call have the same strike price.

Long straddle

A long straddle consists of one long call and one long put.

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