A handbook of

Stock Options Charts

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Index

Chapter 1

Introduction

This booklet serves as a supplement to the book "Trade Stock Options" by the same author, aimed at providing a quick reference to all the relevant charts presented in the original book.

Profitable trading of stock options requires an understanding of certain intrinsic properties of stock options, as well as the dynamics between the price of a stock option and various market elements. Charts are invaluable tools for visualizing these properties and dynamics, offering substantial assistance. For instance, Figure 4.6 on page 26 lays the groundwork for some proven trading strategies, suitable for both income generation and speculation.

However, it is crucial to recognize that interpreting a chart without context can lead to misunderstandings. Executing trades based on such misunderstandings is a surefire recipe for failure. Therefore, readers are strongly advised to refer back to the aforementioned book for a comprehensive description when necessary. It is important to never trade based on the assumed meanings of these charts.

Chapter 2

Basic Charts

2.1 Intrinsic Value

The intrinsic value of an option is never negative: it is positive when the option is in-the-money, and zero when it is at-the-money or out-of-the-money.

When an option is in-the-money, its intrinsic value is equal to the difference between the market price of the underlying stock and its strike price.

The intrinsic value of a call option can increase indefinitely, as there is no theoretical upper limit to the price of the underlying stock.

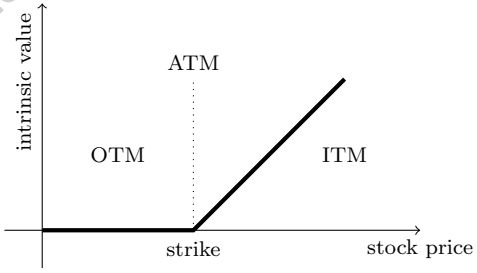

Figure 2.1: Intrinsic Value - Call

The maximum intrinsic value of a put option is equal to its strike price, as the price of the underlying stock cannot fall below zero.

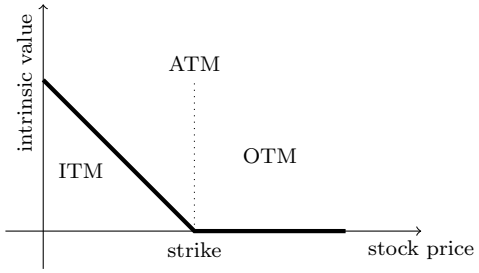

Figure 2.2: Intrinsic Value - Put

2.2 Option Price

The price (or premium) of an option is always the sum of its intrinsic value and extrinsic value. The extrinsic value, commonly referred to as the time value, is positively correlated with the time-to-expiration of the option. As an option approaches expiration, its time value diminishes to zero.

The time value is at its highest when the option is at-the-money. As the option moves deeper in-the-money or further out-of-the money, its time value gradually decreases to zero. This reduction occurs because the uncertainty surrounding its potential to be in or out of the money lessens.

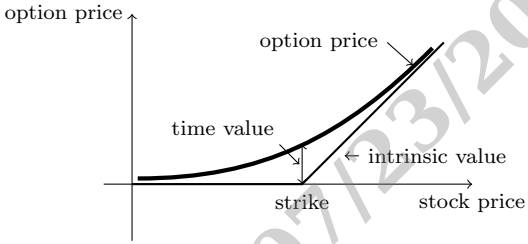

Figure 2.3: Option Price - Call

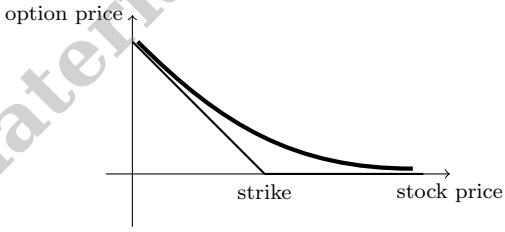

Figure 2.4: Option Price - Put

Exercising an option early is generally not optimal because the time value of an option is never negative. One exception to this rule is a deep in-the-money option which expires after the ex-dividend date of its underlying stock. In this case, exercising the option early to capture the dividend may outweigh the benefits of retaining the remaining time value of the option.

2.3 Basic Payoff Charts

2.3.1 Long Call & Long Put

There are two types of payoff charts for options trading: those that exclude the premium and those that include it. The former type highlights the intrinsic characteristics of the option trade, making it suitable for analyzing complex strategies. In contrast, the latter type, which incorporates the premium, provides a realistic picture of the actual payoff, accounting for the cost of entering the trade.

The primary difference between these two types of charts is a vertical shift by the amount of the net premium paid or received for the legs.

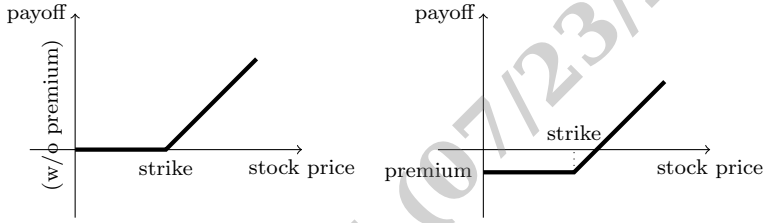

Figure 2.5: Long Call

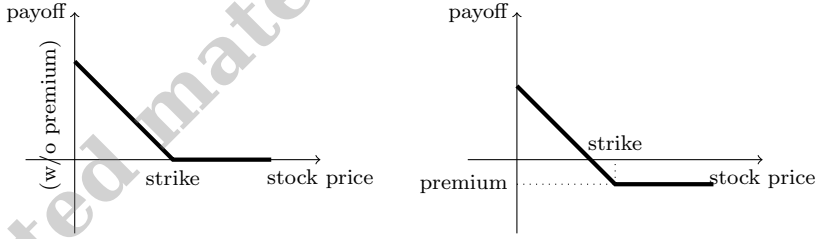

Figure 2.6: Long Put

2.3.2 Short Call & Short Put

Payoff charts for a short position are effectively the mirrored image of those for a corresponding long position, reflected across the horizontal axis. This reflection arises from the zero-sum nature of options trading, where the gain of one party directly corresponds to the loss of the other, and vice versa.

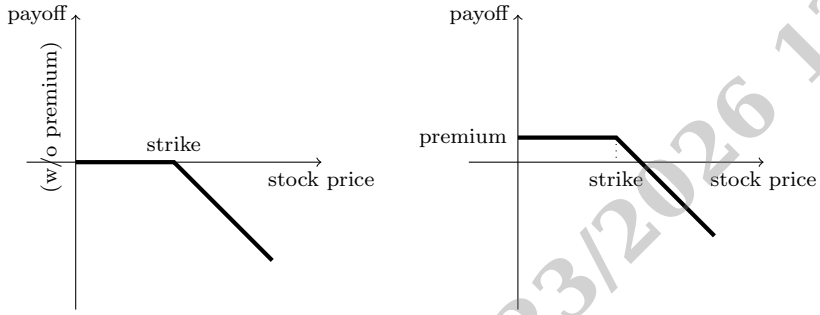

Figure 2.7: Short Call

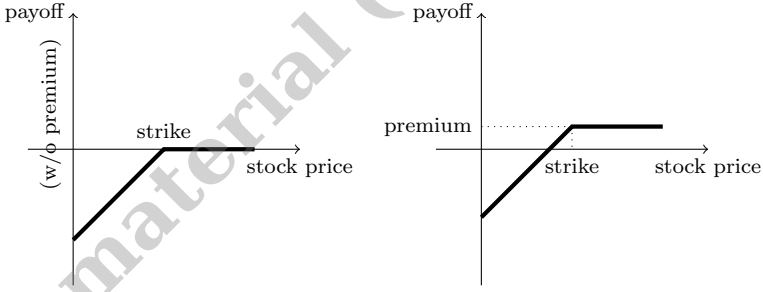

Figure 2.8: Short Put

2.3.3 Stock Position

When creating a payoff chart for a stock holding, the current market price of the stock is utilized as an artificial strike price. This approach ensures consistency within the payoff chart for a trading strategy that involves direct stock holdings.

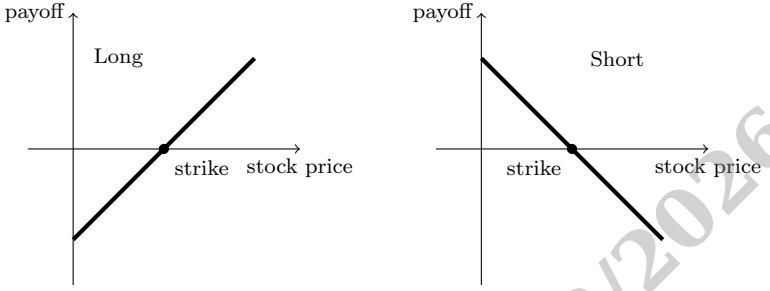

Figure 2.9: Stock

2.3.4 Synthetic Option

A synthetic option is a trading strategy that combines multiple positions in the underlying assets to mimic the payoff profile of another type of position. One example is given below which shows combining a long call and a short put is equivalent to an outright stock position (if premiums are not considered).

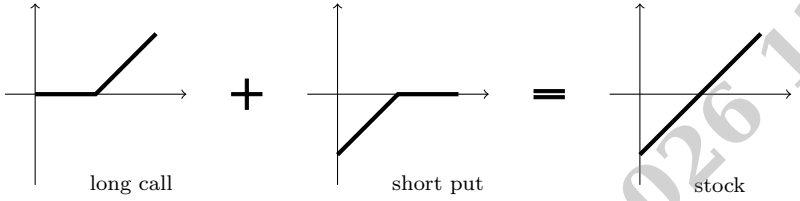

Figure 2.10: Synthetic Option

Chapter 3

Strategy Payoff Charts

3.1 Vertical Spreads

3.1.1 Bull Call Spread

A bull call spread consists of a long call at a lower strike and a short call at a higher strike. Like all vertical spreads, a bull call spread reduces the net premium by relinquishing excessive upside potential. One direct benefit of reduced premium is an increase in the success rate.

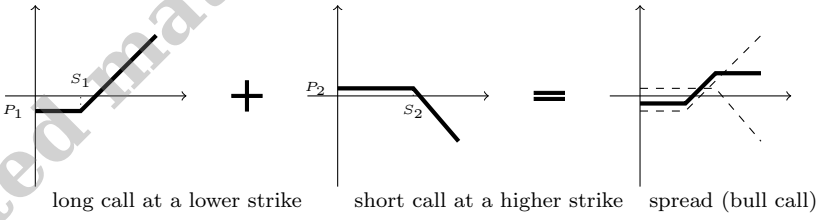

Figure 3.1: Bull Call Spread

3.1.2 Long Spread v.s. Short Spread

Generally speaking, a long spread position is net debit while a short spread is net credit. Hence, a short bull call spread is an income generating strategy.

Unlikely a naked short, a short spread position limits the downside risk by purchasing a call at the higher strike as a protection against a surging stock price, at the cost of a reduced overall net premium.

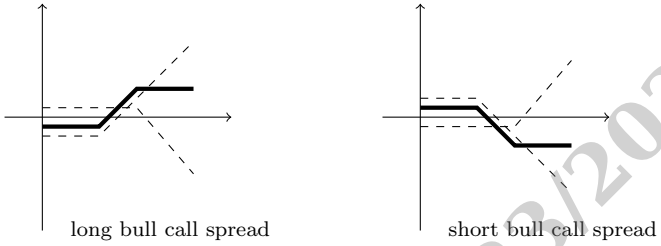

Figure 3.2: Long and Short Bull Call Spread

A significant practical benefit of shorting a spread, as opposed to engaging in a naked short position, is the reduced impact on buying power.

3.1.3 Long Spread v.s. Short Spread

A bear put spread uses puts instead of calls as constituents. Hence, it is a bearish bet.

Similar to a bull call spread, a bear put spread also reduces net premium by relinquishing the potential for excessive profits.

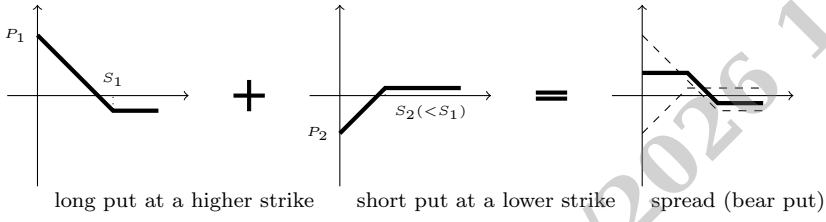

Figure 3.3: Bear Put Spread

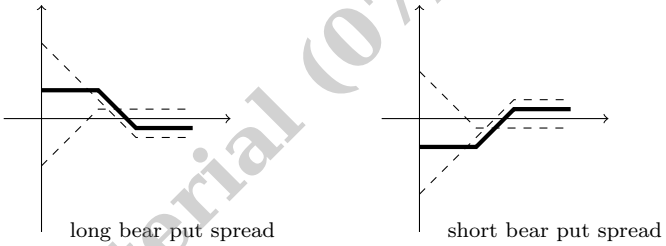

Figure 3.4: Long and Short Bear Put Spread

3.2 Iron Condor

An iron condor is a directional-neutral strategy. A long position is a range bet and is appropriate when expecting the stock price to stay within a range.

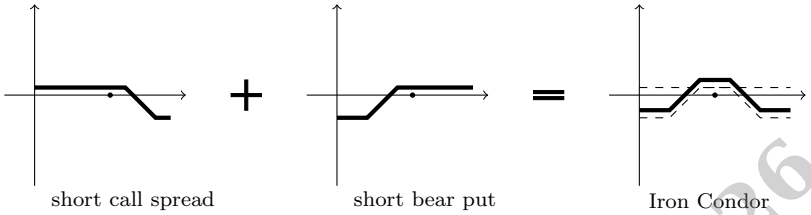

Figure 3.5: Iron Condor

A short position expresses a belief that the stock price will make a wild move at either direction.

Figure 3.6: Iron Condor

3.3 Straddle and Strangle

A straddle and a strangle are both directional-neutral strategies and only differ in whether or not the strike prices of the two underlying legs are the same.

A long position bets the stock price will make significant move at either direction, while a short position bets the price will stay within a range.

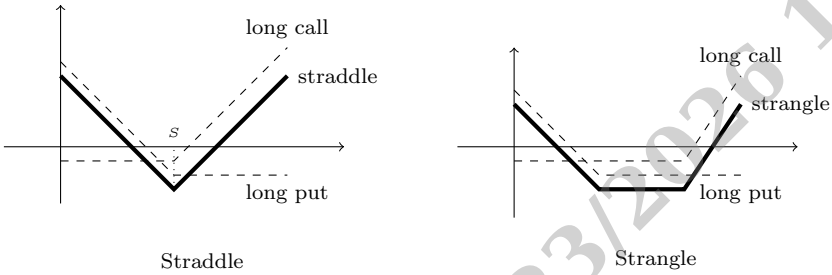

Figure 3.7: Straddle and Strangle

Unlike a short iron condor where the downside risk is limited, a short straddle or strangle position has unlimited downside risk. To mitigate this risk, a long call position can be established as shown below.

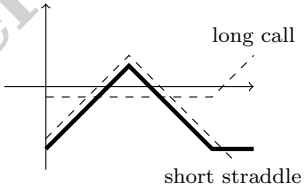

Figure 3.8: Protected Short Straddle

3.4 Strip (Ratio Straddle)

It is not necessary to limit the ratio between the calls and puts to 1 : 1 when constructing a straddle or a strangle. A different ratio can be employed to express a biased view.

The chart below shows a 2 : 1 strip which will generate more profits when the stock price drops than when it rises.

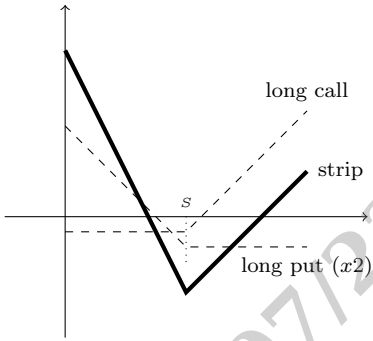

Figure 3.9: Strip

3.5 Collar

A collar is similar to a bull spread, but focuses more on value preservation of the underlying stock holdings. Its net premium can be credit, debit or zero depending on the premium paid on the long put and received on the short call. Therefore it is possible to use a collar as a zero-cost hedging strategy.

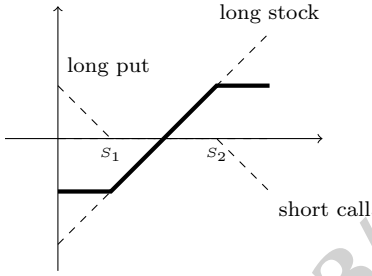

Figure 3.10: Collar

3.6 Butterfly

A butterfly can be decomposed in different ways which correspond to different expressions of the trading idaea.

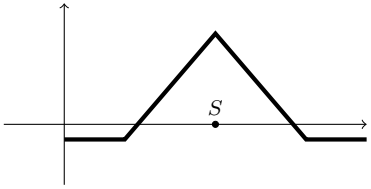

Figure 3.11: Butterfly Spread

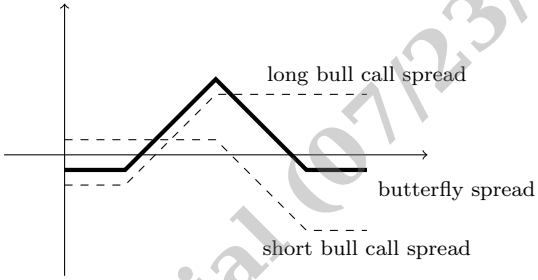

Figure 3.12: Butterfly Spread

3.7 Calendar Spread

A calendar spread is an advanced trading strategy. Unlike all the basic strategies, the payoff chart of a calendar spread varies at the different time. The chart below illustrates a typical payoff when the front leg expires and before it expires.

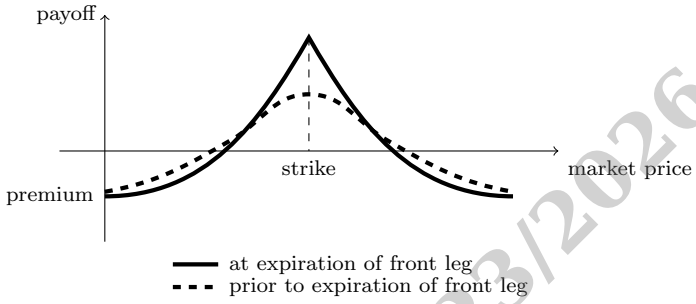

Figure 3.13: Calendar Spread Payoff

The chart above also signifies the importance of maintaining the spread to be near at-the-money when the front leg expires as this scenario will yield the greatest profits.

3.8 Diagonal Spread

A diagonal spread can be viewed as a combination of a calendar spread (representing the difference in time value) and a vertical spread (representing the fixed different in strikes). There are a total of 8 different configurations, two of which are illustrated below.

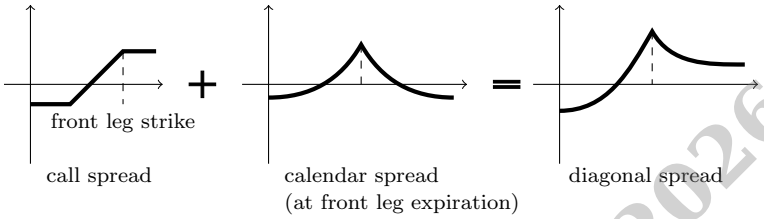

Figure 3.14: Diagonal Spread Type A

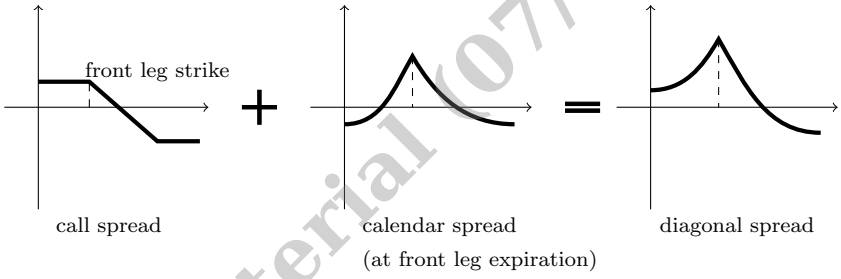

Figure 3.15: Diagonal Spread Type B

Chapter 4

Greek Curves

4.1 Delta

4.1.1 Delta vs Moneyness

Delta represents the slope of the option price curve. For a call option, it starts at 0 and gradually increases to 1. When a call is at-the-money, its delta is approximately 0.5.

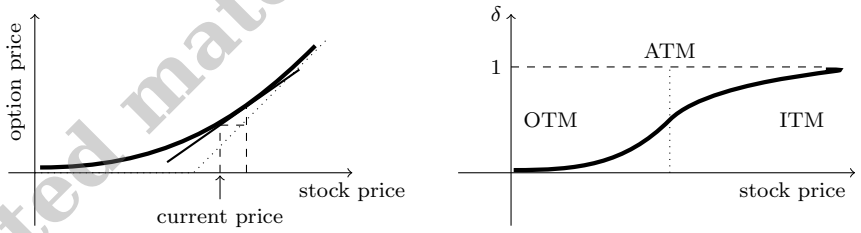

Figure 4.1: Call Option: Delta vs. Moneyness

Note that the delta curve is steepest around at-the-money. This holds true for both a call and a put (shown below).

The delta of a put option starts at -1 and gradually increases to 0. Its value is approximately -0.5 when the put is at-the-money.

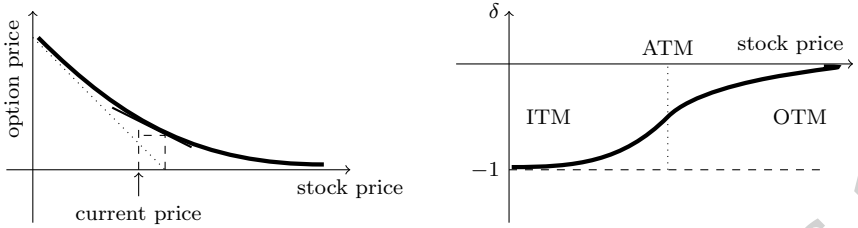

Figure 4.2: Put Option: Delta vs. Moneyness

4.1.2 Delta vs Time-to-Expiration

Delta changes more dramatically as the time-to-expiration of the option decreases. It follows that the delta of an about-to-expire at-the-money option will change at the fastest speed. This pattern is consistent with Figure 4.5 in the next section.

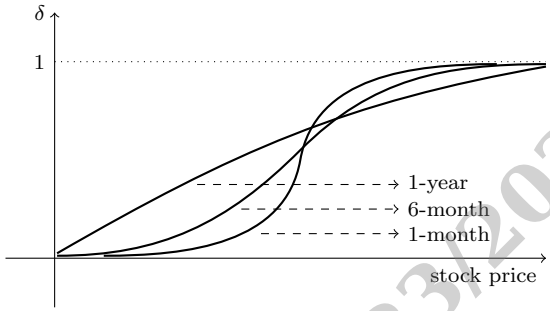

Figure 4.3: Delta vs. Time-to-Expiration

4.2 Gamma

4.2.1 Gamma vs Moneyness

Gamma is at its peak around at-the-money and gradually reduces to zero when the price moves away at either direction. This patter is the same for both a call and a put, and is consistent with the observation in Figure 4.1 and 4.2 on page 21.

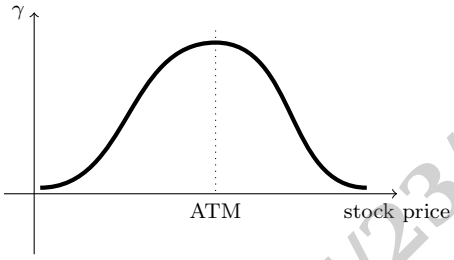

Figure 4.4: Gamma vs. Moneyness

4.2.2 Gamma vs Time-to-Expiration

An at-the-money option nearing expiration exhibits the highest gamma, making it extremely sensitive to price movements of the underlying stock, even shortly before expiring.

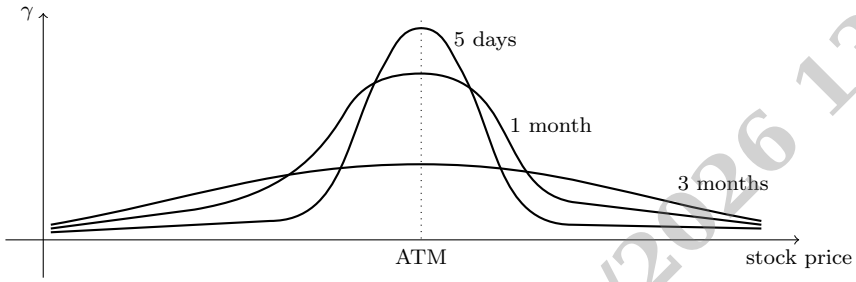

Figure 4.5: Gamma vs. Time-To-Expiration

4.3 Theta

4.3.1 Theta vs Time-to-Expiration

A deep out-of-the-money option often loses most of its time value early on, whereas an at-the-money option retains its time value well into its lifespan. These characteristics can be leveraged to design diverse trading strategies.

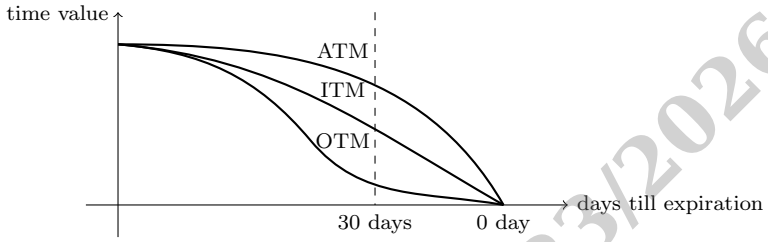

Figure 4.6: Theta vs. Time-to-Expiration

The chart above highlights the varying decay rates of the time value of an option. Recognizing that an at-the-money option holds the highest time value, the subsequent chart provides a more realistic depiction of this decay.

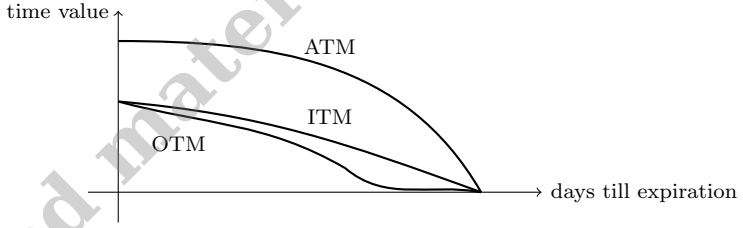

Figure 4.7: Time Decay

4.4 Vega

A longer-dated option exhibits a higher vega compared to a shorter-dated one, making the back leg of a calendar spread more sensitive to volatility changes.

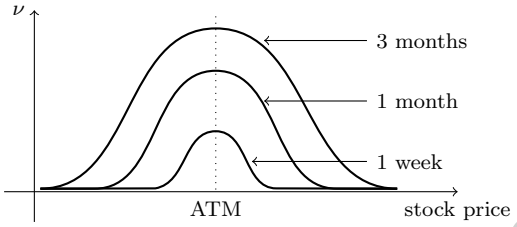

Figure 4.8: Vega