6 Puts

Having spent a few chapters focusing on call options, we will now do the same for puts. Basic information on options can be found in chapter 1 — if you are new to options, you should read that before continuing.

Puts and calls have many similarities. Both have an underlying security, a strike price, an expiration date and a premium. A put's premium, like like the premium of a call, has an intrinsic value portion and a "time value" portion.

While a call gives the buyer the right to buy stock at the options strike price, a put gives the buyer the right to *sell* stock at the options strike price. And while the call buyer will exercise his right when the stock price is higher than the strike, it only makes sense for the put buyer to exercise his right when the stock price is lower than the strike price of the put.

Puts can be described as "upside down calls", and you'll find that many of the strategies that you can use with puts are mirror images of call strategies. However, the mirroring is not exact — there are differences.

6.1 Put Pricing

The same four factors that influence call prices also influence puts:

1. The relationship of the strike price to the share price of the underlying stock.
2. The time left until the option expires, and the volatility of the stock.
3. The dividend yield of the underlying stock.
4. The current risk-free rate.

Example

Shares of Laughingbrooke Industries are selling for $20. A $30 put on this stock would be worth at least 10-points, because the put gives its owner the right to sell 100 shares of Laughingbrooke Industries for $30 — 10-points above the market price.

A $10 put, with a strike 10-points below the current share price, will be worth very little and if the stock stays above $10, will eventually expire worthless.

Unlike a call, *a put becomes more valuable as the stock price drops.* A put is in-the-money when the stock price is below the strike price, and out-of-the-money when the stock price is higher than the strike price. As illustrated in Figure 6.1, the definitions of in-the-money and out-of-the-money for puts are "upside down" versions of the definitions for calls. However, both calls and puts become more valuable as they go deeper in-the-money, and less valuable when they move out-of-the-money.

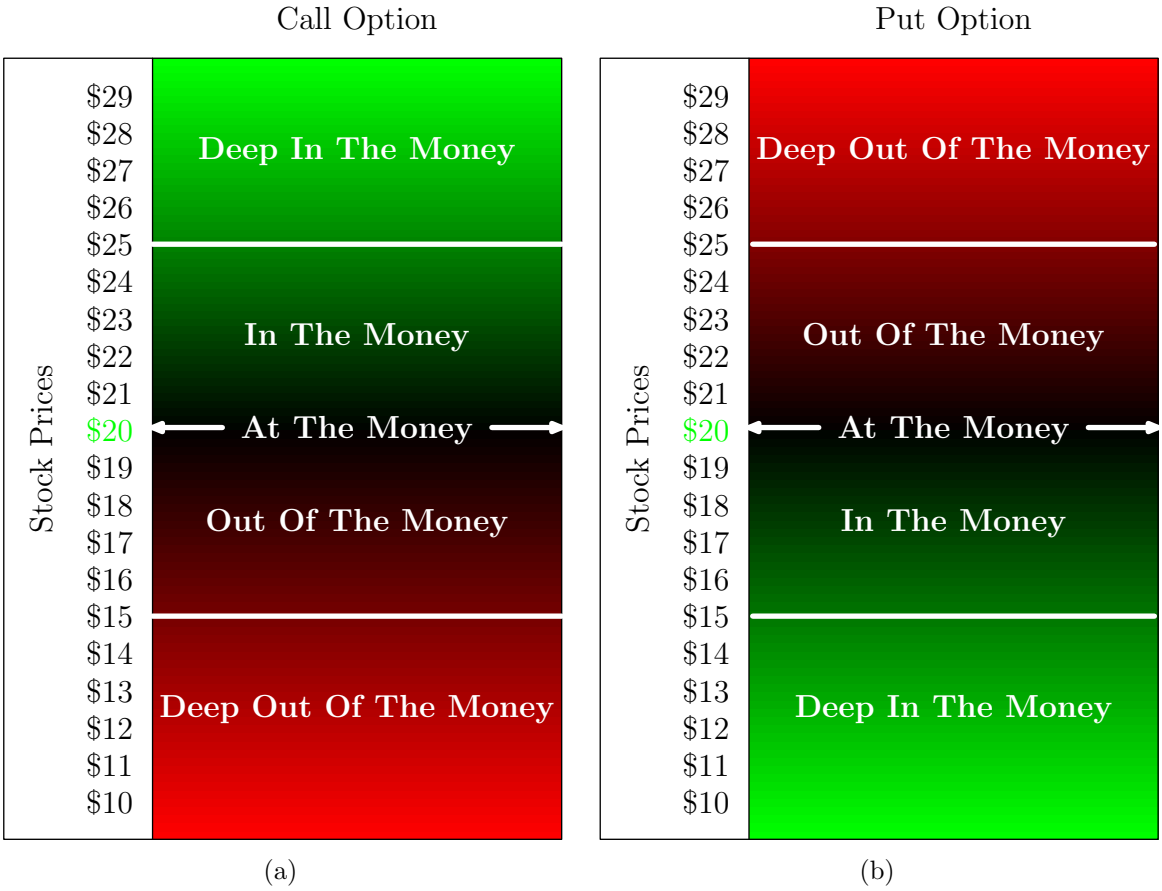

Figure 6.1: Relationship of stock price to (a) call with a $20 strike price; (b) Put with a $20 strike price.

Just like call premiums, put premiums have an intrinsic value component and a time value component. As with calls, the intrinsic value of a put is the difference between the stock price and the strike price:

Intrinsic Value = Strike Price of Put - Stock Price

The time value premium is the difference between the options premium and the intrinsic value:

Time Value = Put Premium - Intrinsic Value

A little algebra gives a single formula for the time value:

Time Value = Put Premium + Stock Price - Strike Price

Note that these formulas are slightly different from the formulas given for calls. Here are the call formulas for comparison:

Intrinsic Value of Call = Stock Price - Strike Price of Call

Time Value of Call = Call Premium + Strike Price - Stock Price

The formulas need to be different so the sign of the time value will be correct[1].

As with calls, when a put is out-of-the-money, its intrinsic value is zero. The entire premium of an out-of-the money option, whether a call or a put, is time value.

EXAMPLE

Laughingbrooke Industries shares are at $28, and a March $30 put is selling for 5-points.

Intrinsic Value = $30 - $28 = $2.

Time Value = $5 - $2 = $3, or using the alternate formula:

Time Value = $5 + $28 - $30 = $3

6.1.1 The Put Option Price Curve

Figure 6.2(a) shows the put option price curve, and Figure 6.2(b) shows the call option price curve. These are closer to an actual options price curve in the marketplace than the idealized one shown in Figure 1.3. The overall shape of both remains a gentle, concave curve.

The most obvious difference is that the intrinsic value lines are *mirror images* of each other. The intrinsic value of the put is zero until the stock falls far enough to reach the strike price, and then angles sharply upward, going up one point for every point the stock *decreases*. The calls intrinsic value remains zero until the stock reaches the strike price, and then angles sharply upwards.

The actual price curves are not exact mirrors of each other. The time value of both puts and calls will be greatest when they are at-the-money, but *the call option typically has a higher price at the strike than the put option does.* Also notice that *an in-the-money put loses time value faster than an in-the-money call.* Time value decay is non-linear for both types of options.

[1] Time value *can* be negative so it would not be correct to use the absolute value function.

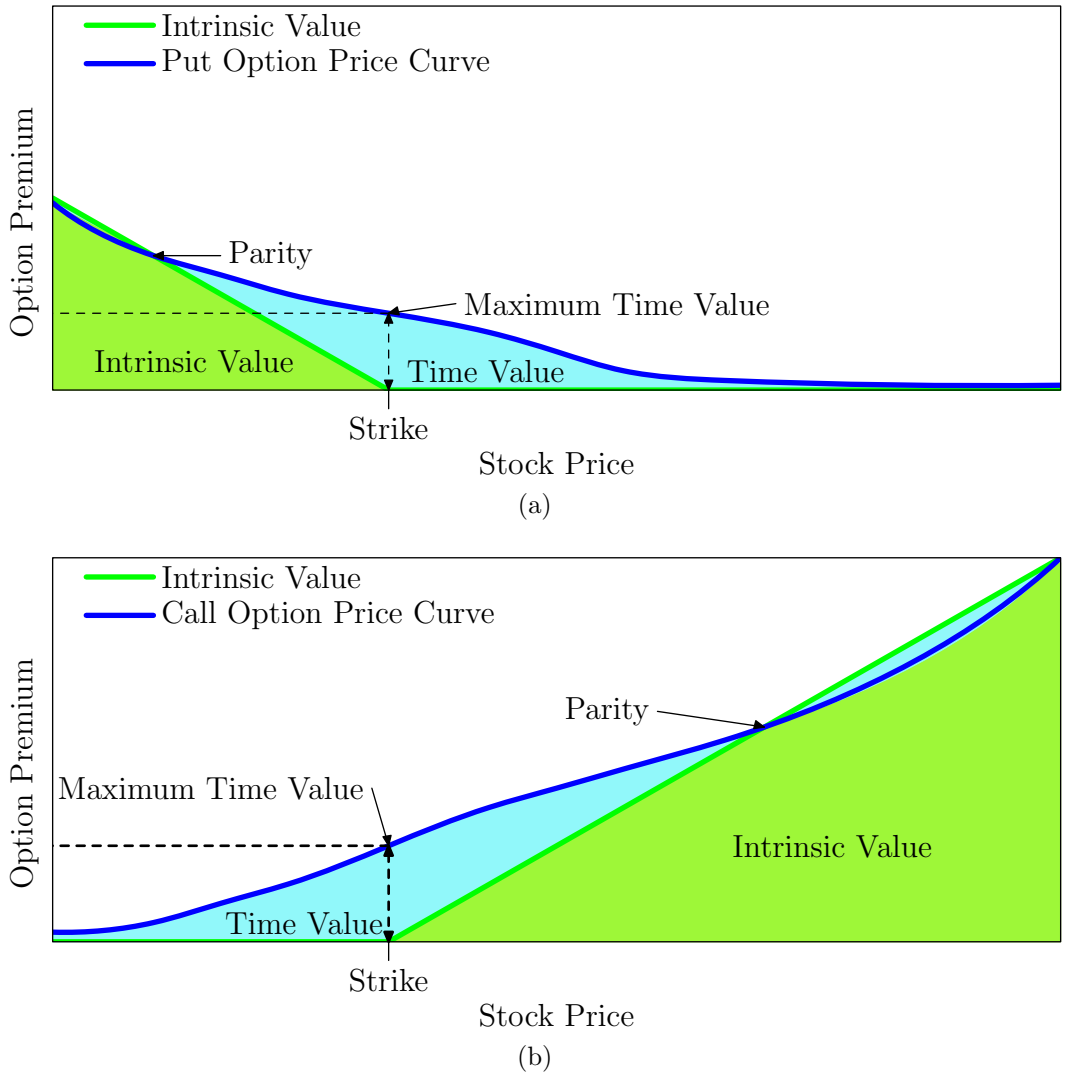

Figure 6.2: The Put Option Price Curve (a) and Call Option Price Curve (b) with their Intrinsic Value Lines.

6.1.2 Effects of Volatility and Interest Rates on Put Premiums.

Premiums of both calls and puts are increased when the volatility of the underlying stock increases. As mentioned in section 1.2, the precise effects of interest rates on option premiums is a subject of debate. It's generally agreed that a higher risk free rate tends to increase option premiums, but no one seems to agree on how much.

6.1.3 The Effect of Dividends on Put Premiums

A large dividend payment reduces the price of the stock. This has the expected effect on call and put premiums. Since the price of the shares is less, large dividends depress call premiums, but increase put premiums. This is a logical consequence of the way calls and puts respond to any change in the underlying stock's price.

6.2 Exercising the Put

If you are the owner of a put, and you decide to exercise it, you sell the stock to your counterparty at the striking price of the option. You may use stock that you currently hold, or you may purchase it on the market. If you do neither, the exercise of the put (which may done for you automatically on expiration day), creates a short position in the underlying stock in your brokerage account. This may cause a margin call if you do not have enough collateral.

If you are a put seller, you must buy the stock when the put is exercised. You can sell the stock immediately, or you may hold it. Should you already have a short position in this stock when you are assigned, the assignment may be used to cover your short.

6.2.1 Warning Signs of Early Exercise

In general, options are not exercised prior to expiration. When an option (either a call or a put) begins to trade near or below parity, it is at risk of early exercise. The option price curves (Figures 6.2(a) and6.2(b)) illustrate such points — note that when options trade below parity, their time value is negative.

The reason options trading below parity are vulnerable is because they create opportunities for arbitragers to make risk-free profits:

Example

McKinnon's Instant Haggis (PUKE) shares are selling for $20, and a $30 put is selling for 9.75-points, or 1/4th-point below parity. An arbitrager can make money with the following trades:

1. Buy the put at 9.75.
2. Buy 100 shares of PUKE at $20.
3. Exercise the put to force a sell of the PUKE shares at $30, making 1/4-point of profit.

A similar arbitrage exists for calls. Obviously, to make money at this trade, you must have extremely low commissions costs. It is typically done by exchange traders or floor traders whose commission costs are practically zero.

As a result of this type of arbitrage, when your put is in the money and the time value disappears, if you do not wish to be assigned shares, you need to take action.

Ex-dividend dates can also cause early exercise. If you have short calls, they may be exercised on the ex-dividend day of the underlying stock. This allows the call owner to capture the dividend from the stock. If you have short puts, the puts may be exercised the day *after* the ex-dividend date of the underlying. The reason for this is that in order

for a shareholder to receive dividends from stock ownership, they only need to own the shares on the ex-dividend day. Someone whose only interest is in capturing the dividend will obtain the shares, hold them for the day, and then exercise your short put to get rid of them.

Unlike call sellers, who only have to check to see if their short calls are trading at or below parity as the ex-dividend date approaches, the put seller must check the amount of time value premium left in the put and compare it to the amount of the dividend to be paid. *If the amount of time value left in the put as the ex-dividend approaches is greater than the amount of the dividend per share that will be paid, then the risk of assignment is much less.*

If you do not want to be assigned shares on the day after the ex-dividend date, it is best to take action before that.

6.3 Explanation of the Relationship Between Call and Put Premiums.

This section is included for the curious. You do not need the information in this section to invest with options.

The reason that a call with the same strike price and expiration date as a put will generally sell for a higher price is due to do the actions of arbitragers. When prices are favorable, arbitragers will buy 100 shares of stock, then buy a put and sell a call, both with the same strike and expiration date. This is an absolutely risk free position. Should the stock rise, the long position in the stock offsets the rising price of the call. Should the stock fall, the long put can be exercised. There are many arbitragers, and they must take large positions since the profit for each one of these is small. The action of these arbitragers cause the stock to rise (because so many of them are buying shares). The put price will go up for the same reason. Since the call is short, its price will drop because there are so many sellers.

Once this occurs, the position would no longer be profitable. In that case, arbitragers would perform the reverse trade: They short 100 shares of stock, sell a put and buy a call. This position has no risk and once again will cause a price adjustment in the market, lowering share prices, lowering put prices, and causing call prices to rise.

Without going into the details of the pricing, costs and returns of such arbitrage, this is the reason that puts tend to sell for less than calls when they both at the strike price. It is also the reason that puts lose time value premium faster than a call does when it is in the money.

6.4 Up to the Minute Summary

- Calls and puts have many similarities:
    1. Underlying security

2. Strike price
3. Expiration date
4. Premium, composed of intrinsic value and time value.

- Puts give the buyer the right to sell stock at the strike price of the option.
- The same factors that influence call premiums also influence put premiums, with these differences:
  1. Puts become more valuable as the stock price *drops*.
  2. Puts are generally less expensive when at-the-money than an at-the-money call option. This relationship is caused by the activities of arbitragers.
  3. In-the-money puts lose time value faster than in-the-money calls. This is also caused by the activities of arbitragers.
  4. Large dividend payments *increase* the price of a put option.
- Any option trading at or below parity is vulnerable to early exercise.
- A put may be exercised on the day after the ex-dividend date, especially if the amount of time value left in the put is less than the amount of dividend per share that will be paid.

6.5 Chapter Glossary

Margin Loosely defined, **margin** is the amount of money your broker is willing to loan you for the purchase of securities in your brokerage account. This is based on the total value of the account.

Margin Call When the amount of securities you purchase exceeds the amount of money your broker is willing to loan you, you will be asked to deposit cash or securities to make up the difference. This can also be caused by a down market, when the total value of your account decreases. It can also be caused by the exercise of one of your short puts.