# Quantcha Option Analytics

Equity derivatives, such as options, provide unique insight as to the sentiment and pricing behavior the market has towards an underlying asset. This data set provides three useful types of option analytics: put/call ratios, forward prices, and option breakevens.

## Terms

Each of the types of analytics are provided for 10, 20, 30, 60, 90, 120, 150, 180, 270, 360, 720, and 1080 calendar day future terms. The values for these terms are linearly interpolated from the nearest straddling option expirations. For example, the 30-day put/call ratio would be the linear interpolation of the put/call ratios for the data at the 27-day and 34-day expirations (assuming those are the closest straddling expirations). If the term does not have a pair of straddling expirations, the values from the closest expiration are used. For an example illustrating how these terms are calculated, please see the [VOL methodology](https://www.quandl.com/data/VOL/documentation/methodology).

For put/call ratios, an “All” term is provided that includes all available data and is not normalized.

## Put/call ratios

A put/call ratio is a quantity of puts divided by a quantity of calls. This data set includes put/call ratios measured for two different option quantities:

* **Volume** (“PcrVol”, such as PcrVol10, etc) is calculated by dividing the sum of all puts transacted during that trading day by the sum of all calls. For example, if a total volume of 10 puts were transacted and a total volume of 20 calls were transacted during that day, the PcrVolAll would be 10 / 20 = .5.
* **Open interest** (“PcrOi”, such as PcrOi10, etc) is calculated by dividing the sum of all puts outstanding at the end of that trading day by the sum of all calls outstanding. For example, if the total open interest at the end of a given day were 10 puts and 5 calls (regardless of when they were opened), the PcrVolAll would be 10 / 5 = 2.

The put/call ratio is a metric that is commonly used to measure market sentiment based on the relative interest in puts vs. calls. For many stocks, calls typically outnumber puts. As a result, a ratio around .6 (3 puts to every 5 calls) is considered to indicate a bullish sentiment, whereas a ratio around 1 (1 put per call) is considered to reflect a bearish sentiment. However, when the ratio pushes the extremes, the sentiment flips and high readings are viewed as bullish signals and vice versa.

Note that when there are no calls available for a given term, the value is null. If there are calls but no puts, the value is 0.

## Forward prices

A forward price is calculated by determining where a synthetic long option position would break even. A synthetic long is a combination of a long at-the-money (ATM) call and a short ATM put. This option strategy replicates a long stock position in that its payoff diagram matches a long stock diagram, except that the fundamentals or pricing discrepancies of the options vs. the stock may shift the chart to a higher or lower breakeven point.

For example, suppose it’s Thursday and a stock were trading at $100. The stock is going ex-dividend for $5 tomorrow, meaning that it will open at $95. Buying the stock would mean a breakeven at $100 - $5 = $95 for the 1-day term if bought right now at $100. The comparable 1-day synthetic long position would not benefit from the dividend because the owner of the call would not receive the dividend since they don’t actually own the stock, so its pricing would account for that. As a result, today’s 1-day ATM call option at 100 might cost $1.15, whereas the 1-day ATM put might sell for $6.05. Entering the option position would result in a $4.90 credit. However, after the stock goes ex-dividend on the last day before expiration, the put will carry a $5 liability and the call will be well out of the money. In this scenario, the forward price calculated on Thursday would be $100 - $4.90 = $95.10.

In another scenario, consider a stock under significant short pressure. As it becomes hard to borrow for shorting, traders will often turn to options. This increased demand will drive up the price of puts (because they want to buy them) and drive down the price of calls (because they want to sell them). As a result, the forward price calculated will end up being significantly lower than the current price of the stock. For example, a heavily shorted stock may be trading at $100, which is at a premium partly due to short-driven reasons. Since many traders are unable to easily borrow the stock to short, they turn to puts, which drives a 100 put up to $20. At the same time, they may also be selling the 100 call for $5. Entering this synthetic long would result in a $15 credit, which would result in a breakeven of $100 – $15 = $85 at expiration.

## Option breakevens

An option breakeven is the price where a given option breaks even at expiration based on its most recent bid/ask mean. For example, a 100 call option with a bid/ask mean of $10 would break even at $110. The option breakeven is a useful metric because it provides insight as to the pricing tension between the buyer and the seller. The option breakevens in this data set are weighted by their relative open interests at the end of the day. This is based on the premise that an investor would generally stay long a given option because they expect its value to increase, whereas the short investor would generally expect it to decline. There are three kinds of breakevens provided in this data set:

* **All** (“OptionBreakeven”, such as OptionBreakeven10, etc) is calculated using both calls and puts.
* **Call** (“CallBreakeven”, such as CallBreakeven10, etc) is calculated using only calls.
* **Put** (“PutBreakeven”, such as PutBreakeven10, etc) is calculated using only puts.

For example, suppose the option chain looks like this for a given expiration:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Option** | **Bid/Ask Mean** | **Breakeven** | **Open Interest** | **Weighted Sum** |
| 90 Call | 17 | 107 | 10 | 1070 |
| 100 Call | 11 | 111 | 7 | 777 |
| 110 Call | 3 | 113 | 0 | 0 |
| 90 Put | 2 | 88 | 1 | 88 |
| 100 Put | 8 | 92 | 2 | 184 |
| 110 Put | 15 | 95 | 2 | 190 |

The **All Breakeven** for this expiration would be (1070 + 777 + 0 + 88 + 184 + 190) / (10 + 7 + 0 + 1 + 2 + 2) = 104.95.

The **Call Breakeven** for this expiration would be (1070 + 777 + 0) / (10 + 7 + 0) = 108.65.

The **Put Breakeven** for this expiration would be (88 + 184 + 190) / (1 + 2 + 2) = 92.4.