

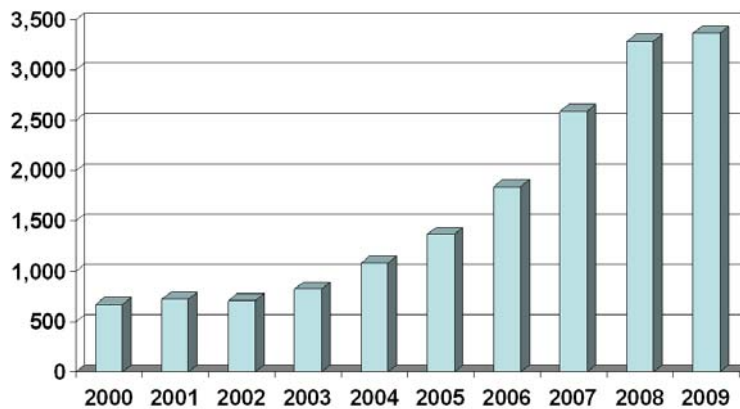
# Options Trading Algorithms

BLOOMBERG TRADEBOOK®

## Pegging to the Greeks

The options markets are exploding. Volumes and the number of exchanges have increased since the electronic ISE exchange was founded in 2000 (Figure 1). Despite fragmented liquidity, the U.S. Options markets are efficient, and electronic trading enables the number of new participants to steadily grow. Options' trading, once characterized as high stakes, highly leveraged gambling, is now embraced as part of risk management and acceptable portfolio strategies. Institutional activity is growing, in part because academic papers illustrate that options overlay strategies can help portfolios earn superior returns while reducing overall risk. The TABB group estimates that over 30 percent of institutional investors now include options in their investments. Electronic markets provide the infrastructure for innovative automation that enable investors and traders to design and implement strategies that are simply too challenging to trade manually.

### Equity Options Volumes



Source: OCC

Figure 1

these strategies is “price” or spread based. In addition to price, options are also traded by their constituent components, also known as the “Greeks.” The Greeks (delta, gamma, vega, etc.) describe how an option is expected to behave in relation to its underlying stock (or index). If you are a trader implementing overlay strategies, Tradebook’s new “PegTo” benchmarks enable you to trade options based on the view that the particular components are rich or cheap. The automation of this type of trading is incredibly powerful. Let’s look at some examples.

### Automated Options Strategies

Bloomberg Tradebook is at the forefront of options strategy automation. Over the past three years, we have created a platform that empowers you to seek superior executions when trading complex multi-leg options strategies (with and without stock), and single-leg tactical trading algorithms, such as hidden orders, Discretion, Trigger Trading, etc. The implementation of

## PegTo Volatility (Vega)

If you are naturally long stock, you can sell out of the money calls as part of a strategy that not only generates income but also sets up an exit price for a long stock position. Let's assume that you own stock XXX at 100. You would like to lighten up on the long stock position around 130. Selling out of the money calls with a strike of 130 enables your portfolio to generate income at the same time as setting up an exit strategy at 130 for the long stock position (if the stock reaches 130, you are called out of the stock). To implement your strategy, you could simply sell the current at-the-money call option at the market. A more optimal strategy may be to apply a more robust set of selection criteria, based on the price of the call's greek components. For example, you might have the view that the implied volatility in the stock is relatively expensive and the call option relatively over-valued.

On the Bloomberg Professional® service, use the **TRMS<Go>** and **GV<Go>** analytics to graph the historical volatility to gain a sense of the trend. For example, you may plan to sell the 2<sup>nd</sup> month out and keep rolling, but a comparison between the same strike and different months in TRMS<Go> may indicate that the 3<sup>rd</sup> month out is showing a richer volatility (perhaps due to an earnings event).

If your choice of strikes is flexible, then the **GV<Go>** and **SKEW<Go>** analytics on the Bloomberg Professional (as well as **OMON<Go>** monitor) can help you get a feel for which strikes have relatively rich implied volatility.

Let's assume you have selected an appropriate call option to sell. The PegTo Volatility algorithm enables you to implement the strategy by selecting the level of volatility to sell. Tradebook takes your designated volatility limit and the underlying stock price to calculate a limit price for your option order.

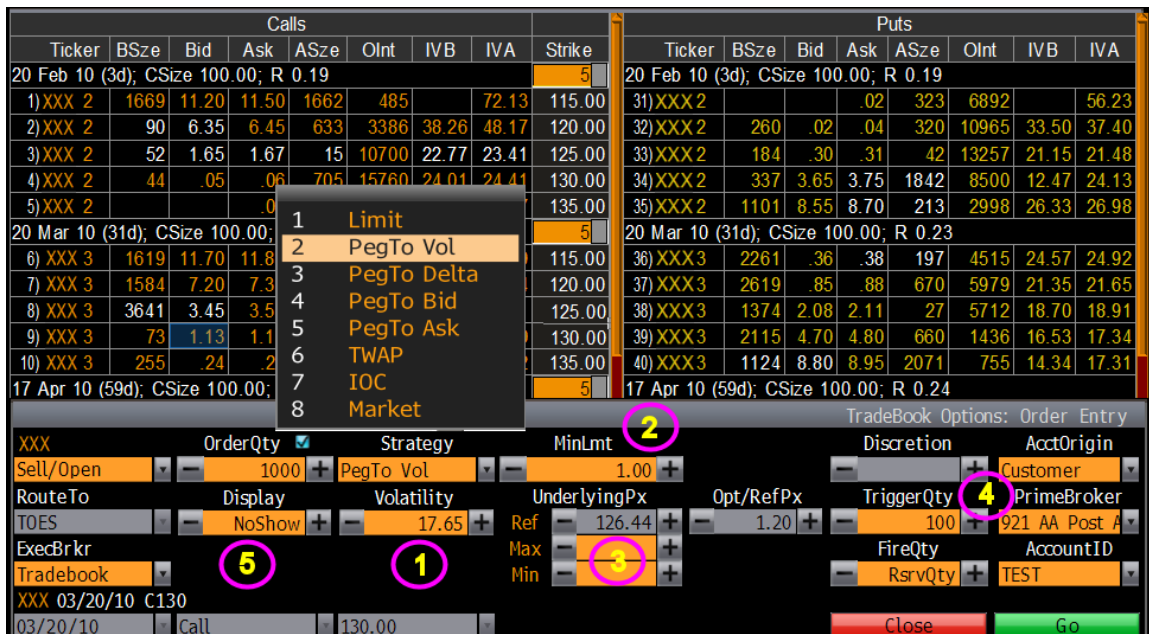


Figure 2, PegTo Volatility

The PegTo Volatility algorithm routes and adjusts your option order's limit to float with your specified volatility to the underlying security (See Figure 2 1). The algo utilizes the same volatility service that populates the volatility values in OMON. As the price of the underlying fluctuates, the Tradebook engine cancels and replaces your working limit order to match

the calculated volatility.

Customization “tools” enable you to set execution constraints (Figure 2):

- 2 Set a Min (on a sell) or Max (on a buy) price for the option contract
- 3 Set a Min and Max price range for the underlying stock. If the underlying breaches your range, the option order is paused
- 4 Trade only when your size is available rather than trading small amount of contracts – Trigger Trading enables you to set a block trigger quantity. When your trigger size is available in the market, the algorithm fires out an order. The order’s size is based on your Fire Quantity. You may under-size your fire quantity to leave some contracts behind – hoping that the market fills back in and provides another opportunity to purchase a block at your price level. For example, Trigger = 100, Fire Quantity = 80.
- 5 You can elect to display a portion of your order or hide your entire order upstairs (NoShow), only firing when your price and trigger parameters are met.

## PegTo Delta

The PegTo Delta algorithm routes and adjusts your order’s limit to float with your specified delta to the underlying security. As the price of the underlying fluctuates, the Tradebook engine cancels and replaces your working limit order to float with your delta. The PegTo algorithm enables many different types of strategies to be automated (see Figure 3 1).

Consider the following types of strategies:

- Net Dollar - You can use the PegTo Delta algo to hedge at an equal, slightly better or slightly worse net dollar exposure
- Aggressiveness based on the price action of the underlying stock – If you are a single-contract player, you can use PegTo Delta to be more aggressive or passive with your option orders, based on the movement of the underlying. By adjusting the delta higher when buying a call option, your order will become more aggressive as the stock trades higher. As the stock trades lower, your order will become more passive as the option limit fades more quickly than the other options in the market. By adjusting the delta lower, you can be more passive when chasing an upwards trading underlying and more aggressive when the market comes into the order
- Price Swing Protection – If you use the PegTo Delta algo to enter into new positions, set the Max and Min underlying contingents fairly tight, to protect against large underlying swings and changes in the market delta
- Knock In – You can also use the PegTo Delta algorithm to activate an order if the underlying moves up (or down) into your desired (delta) range. Let’s assume you are long 100,000 shares of stock A at 27.75, and hedged with 500 short calls. However, you feel the market may rally to 29.50, at which time you would like to maintain your neutral hedge with a new delta of .60.



Figure 3, PegTo Delta

Customization “tools” enable you to set execution constraints (Figure 3).

- 2 Delta – set your delta price;

- 3 Set the Min and Max price for the underlying stock;
- 4 When you set the Max/Min underlying contingents, Tradebook displays the corresponding prices for the option;
- 5 Set a Min (on a sell) or Max (on a buy) price for the option contract

## PegTo Bid/Ask

The PegTo Bid/Ask algo order floats with the market NBBO, to capture the spread. A PegTo Bid (buy) strategy with discretion enables you to float with the best bid to seek to capture the spread. Peg to Ask (sell) will constantly re-price to make sure that you are at the NBBO (Figure 4 1).

Figure 4, PegTo Ask

Customization “tools” enable you to set execution constraints:

- 2 PegTo Increment: Set to 1.00. If the best ask is 2.05, your order will post at 3.05, hidden to the NBBO.
- 3 Discretion: Set 1.02. If the best ask is 2.05, and a 2.03 bid appears, your order will route out (depending on your Trigger and Fire Quantity parameters).
- 4 Min Limit: Set a minimum floor, below which the order will not route out.

Electronic trading enables traders to design and automate new execution strategies that were simply not possible with manual execution. Tradebook’s new PegTo algorithms provide a powerful new dimension to options trading. These new algorithms enable traders to implement new overlay and re-hedging strategies. As the year progresses, Tradebook will bring more “strategic” algorithms like these to the market.

Options involve risk and are not suitable for all investors. For more information, please read the Characteristics and Risks of Standardized Options. For an updated copy please visit the OCC’s website (<http://www.optionsclearing.com/>) or contact us at 212.617.3917.

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