

Looking for Liquidity? Try the Auction

Intelligent participation in closing auctions

Many global exchanges conduct auctions at the end of the trading session to establish the official closing price in a fair and orderly manner. Executions in these auctions can represent a significant portion of a stock's average daily volume (ADV). Even so, many algorithmic trading strategies are not yet participating in closing auctions, and the few tactical trading algorithms that do are not taking full advantage of the opportunities available.

BLOOMBERG
TRADEBOOK® gives you the edge by offering multiple closing auction participation options that allow you to interact with the continuous market while intelligently leveraging one of the most significant periods of liquidity during the trading day. The result is additional liquidity at potentially better prices.

With Bloomberg Tradebook's tactical trading algorithms, you can choose your degree of participation in closing auctions. For example, you can specify your own allocation into the closing auction or work a passive order over the day with the residual flowing into the auction. You can also elect to not participate.

Percent of ADV Executed in Closing Auction

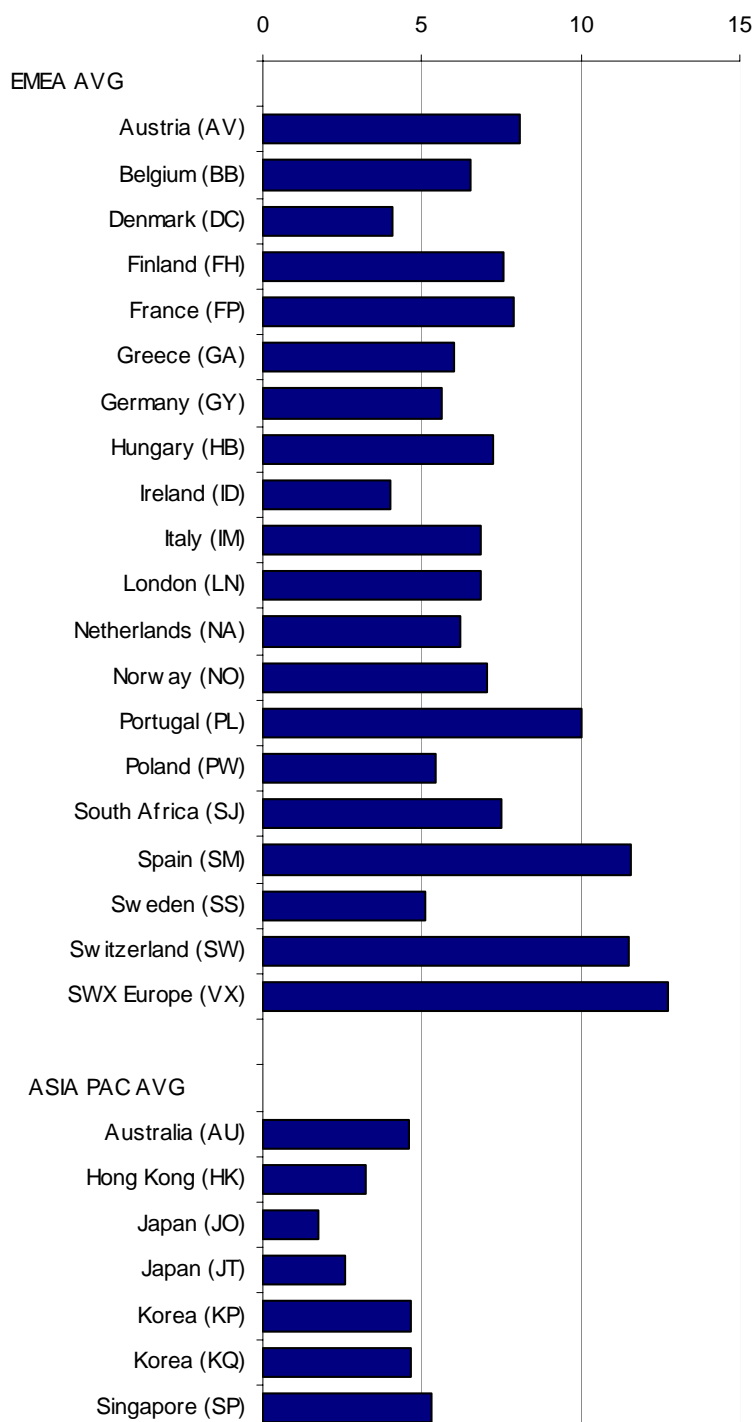


Figure 1

The Value of the Closing Auctions

The closing price is perhaps the most important price of the trading day. Mutual fund managers calculate net asset value from the official closing price, while prime brokers calculate margin calls. In addition, many technical and black box traders use closing prices as a basis for their indicators.

Most stock exchanges conduct a closing auction at the end of the trading session to set the official closing price. Prior to closing auctions, exchanges used the last traded price as the official closing price. The last price methodology was changed to an auction methodology at the urging of regulators, investors, and listing companies because these constituents believed that auctions had less potential to be manipulated from “tape painting” or “price running.”

Closing auctions consolidate all buy and sell orders in specific securities into batches for a single priced execution that reflects the market supply and demand at the close. As a trader, the closing auction is important to you for several reasons:

- The closing auction is a period of significant liquidity. A study of the characteristics of the closing auction in more than 12,000 global stocks by Bloomberg Tradebook’s quantitative research group produced

the following findings, over a 50-day average:

- The exchanges across EMEA (Europe, Middle East and Africa) execute more than 7% of ADV in the closing auction (Figure 1);
- Core Europe (i.e., Belgium, France, Germany, Italy, London, Netherlands, Portugal, Spain, Switzerland, SWX Europe) executes, on average, 8.5% of ADV in the closing auction.
- SWX Europe has the highest average volume at the close - more than 12% of ADV executes in the closing auction.
- Asia executes only 4% of ADV in closing auctions (Figure 2), but many differences in exchange rules for this region could explain the lower volume. In Japan, for instance, the stock may not close if there is significant imbalance. Furthermore, the lack of certain order types (e.g., Market-on-Close) for the exchanges in Singapore and Australia may cause traders to send in limit prices that are not aggressive enough to execute the order. The Hong Kong Stock Exchange recently announced changes to limit movements in the closing session to 2% in either direction, which may artificially

suppress the amount crossed in the auction.

- The closing auction (vs. the last priced methodology) reduces trading volatility and enhances price discovery. Researchers of global stock exchanges have concluded that the closing auction is less prone to gaming and manipulation compared to the continuous session.
- There is potentially less impact to participating with the closing auction than just participating in continuous trading.

Volatility, Spread, and Closing Auction Participation

Bloomberg’s study of volatility, volume, and spread characteristics in the closing auction ranked more than 12,000 stocks. The stocks were then separated into thirds for each grouping (volatility, volume, and spread) with the top 33% indicating the highest level, the middle third indicating the medium level, and the bottom 33% indicating the lowest level for the grouping. Averages were calculated as a simple average across the grouping and in the relevant geographic region.

A breakdown of closing auction percentages by volatility revealed that stocks with lower volatility tend to execute much more on the close compared to higher volatility stocks. This was true in both the EMEA and

Asia-Pacific regions (Figure 3).

Looking at the bid-offer spread, we found that more than 8% of ADV for low spread EMEA stocks was executed in the closing auction. EMEA medium spread stocks executed 7% in the auction. Although these numbers are high, this is not unexpected. The surprise arises in comparison of these results to high spread stocks in EMEA, which only traded 4% of ADV (Figure 4).

In a breakdown by volume, however, stocks exhibited relatively uniform behavior across volume groupings. *Both high and low volume stocks trade almost the same relative percentages in the closing auction (Figure 5).*

These statistics give some insight into how Bloomberg Tradebook analyzes the closing auction in aggregate. Each stock has its own characteristics. You can use the Bloomberg Tradebook AlphaPro Strategy Monitor

function (**BVA<GO>**) to find the percentage of the 50-day ADV which trades in the closing auction, as well as to display the stock's typical trading pattern, including the liquidity that is found in the closing auction (Figure 6).

Participating in the Closing Auction Avoids Adverse Impact

You can miss out on a significant portion of liquidity at the close when you choose not to participate in the closing auction. Trading without the closing auction may cause a larger market impact because orders are only trading in a subset of liquidity. Benchmark algorithms that are customized for the different characteristics of the global exchanges may leave an even larger footprint because of excessive information leakage during continuous market trading or disproportionately crossing the spread. Traders who benchmark to the VWAP may experience larger deviation from their benchmark because they do not participate in the closing auction.

If you are a trader who is benchmarked to the day's closing price using Bloomberg Tradebook's tactical trading algorithms, you are able to seek average prices closer to the closing price. Bloomberg Tradebook algorithms participate in the closing auction and are tuned differently for each exchange's order types and

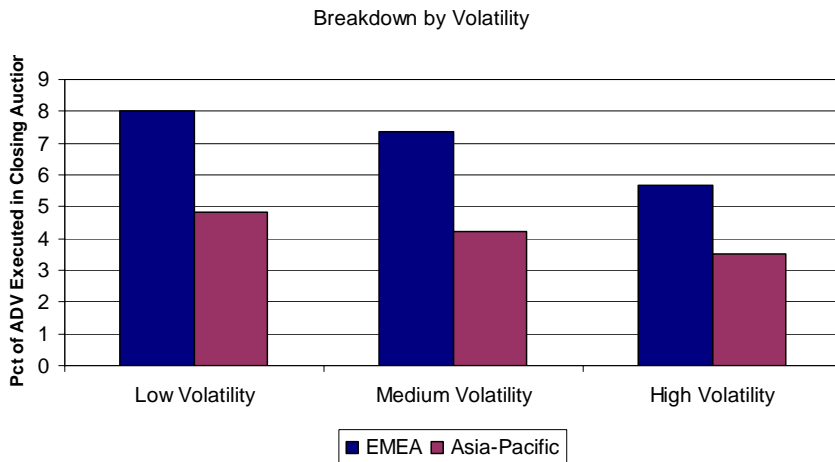


Figure 2

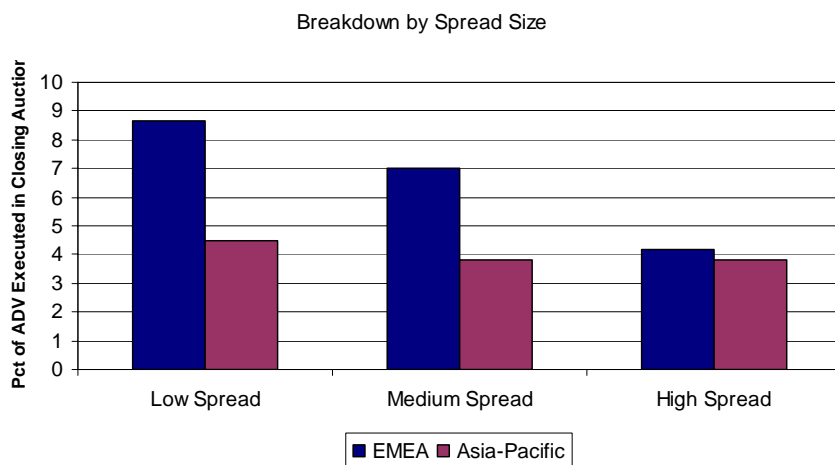


Figure 3

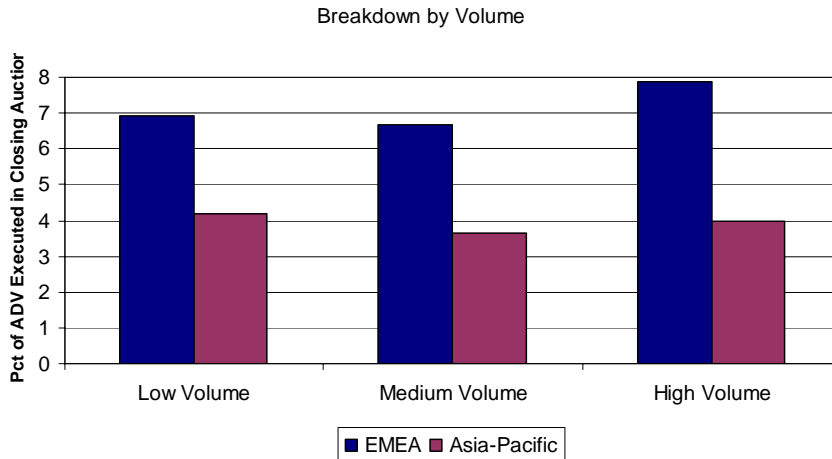


Figure 4

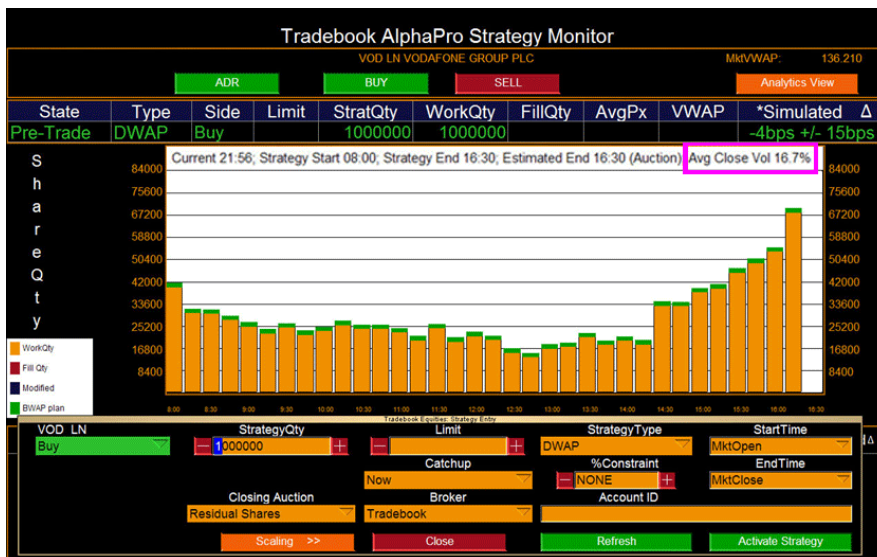


Figure 5

rules. You can display a complete list of the exchange auction rules by market using the Bloomberg Tradebook Market Information function (BTMI<GO>).

Algorithmic Trading Strategies Can Participate in the Closing Auction

Bloomberg Tradebook's algorithms empower you to take advantage of global exchange auctions intelligently, using automated auction logic. This

technology makes every effort to maintain queue position, which is highly critical in obtaining the most liquidity possible. Moreover, Tradebook algorithms seek to take advantage of the nuances of each exchange to ensure that the price and quantity sent to the exchange does not adversely impact the market equilibrium. All of this is done while preserving anonymity.

Bloomberg Tradebook provides you with multiple options for taking advantage of the closing auction. Let's look at the benchmark algorithmic trading strategies in more detail.

Tradebook offers six benchmark trading strategies:

- BWAP (scheduled VWAP algorithm)
- DWAP (a dynamic VWAP that anticipates and adjusts to different volume changes)
- TWAP (Time weighted strategy)
- Go-Along (a volume participation strategy)
- VIP (Volume-in-Price strategy that participates only with volume that is within a limit price)
- ARR-PX (Arrival Price)

There are three ways to participate in the closing auction (Figure 6).

1. Allocate Shares – For BWAP or DWAP benchmarks, the algorithm sets aside the historical VWAP percentage traded on the close. This portion then goes into the closing auction. For DWAP orders, this amount may vary throughout the day as volume differs from historical norms. For TWAP traders, the algorithm treats the auction as an additional period which is able to allocate shares. While using the Allocate Shares

option, a strategy may not fully execute as it depends on the closing auction volume and the trade's ultimate limit price.

2. Residual Shares – For all strategies, any unfilled shares in the continuous market flow into the closing auction. The strategy attempts to finish all of its trading in the continuous session, sending any unfilled shares into the auction.
3. None – The strategy does not participate in the closing auction. The strategy attempts to finish all of its trading in the continuous session.

Tradebook Analytics Give You a Trading Edge

As previously mentioned, Bloomberg Tradebook's algorithmic trading platform **BVA<GO>** indicates the percentage of ADV that occurs in the closing auction. Simply choose an option from the Closing Auction dropdown menu and click on the green Refresh button to quickly determine the effect of the closing auction on the selected security. Figure 7 depicts a Vodafone order with the Residual closing auction option selected to show the VWAP distribution without the closing auction.

Once you choose the Allocate Shares option, then

Strategy Type	"Allocate Shares" option for auction?	Amount sent to auction under "Allocate Shares"	"Residual Shares" option for auction?	Amount sent to auction under "Residual Shares"
BWAP	Yes	Based on historical average	Yes	Sends any unfilled shares up to user constraints
DWAP	Yes	Based on historical average and real time trading	Yes	Sends any unfilled shares up to user constraints
TWAP	Yes	Adds an extra trading period	Yes	Sends any unfilled shares up to user constraints
Go-Along/VIP	No	N/A	Yes	Sends up to the Go-Along/VIP percentage times the expected volume in the auction
ARR-PX	No	N/A	Yes	Sends any unfilled shares up to user constraints

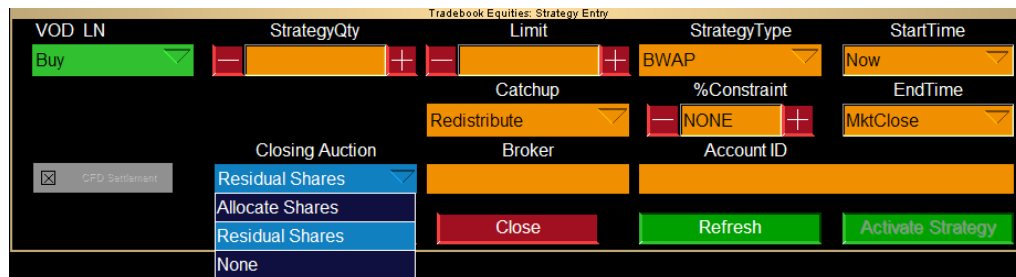


Figure 6

click on the Refresh button, the VWAP curve displays the closing auction percentage in the last slice. In Figure 10, more than 16% of the order will be allocated in advance for the closing auction.

Tactical Trading Algorithms that Participate in the Closing Auction

1. **Market-on-Close and Limit-on-Close orders.** Bloomberg Tradebook supports the native exchange's Market-on-Close (MOC) and Limit-

on-Close (LOC) order types. Where the exchange does not support such an order type, Tradebook offers synthetic TB MOC and TB LOC order types

2. **Work a Limit order during the day; make sure it completes by the end of the day.** In Japan and Korea, a "Funari" exchange order type enables traders to work a straight limit order that puts the balance into the closing auction. This is a

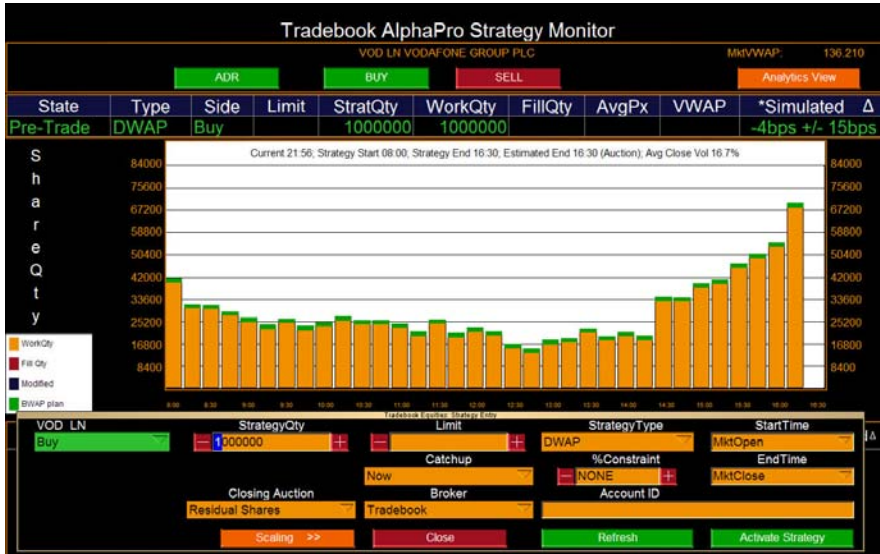


Figure 7

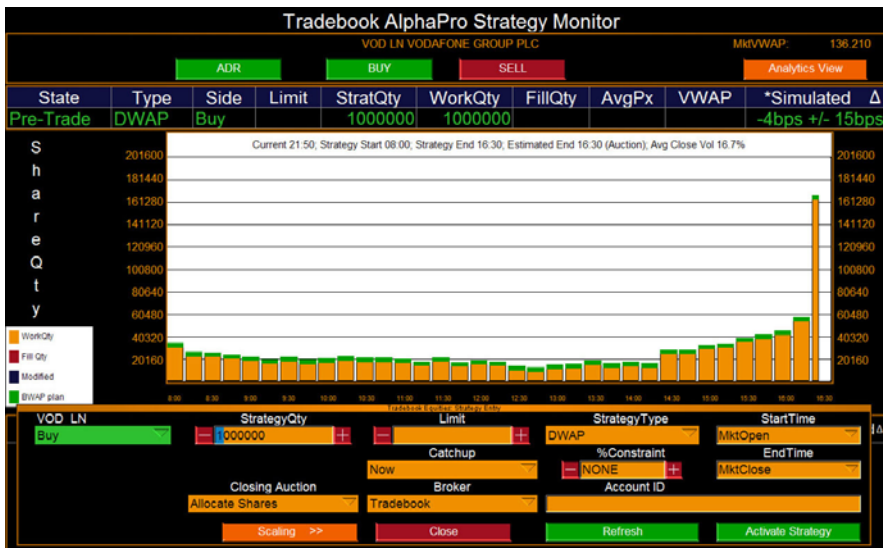


Figure 8

limit order that converts to an MOC order at the end of the continuous trading session. For markets that do not have this native order type, Tradebook offers the synthetic order type TB LMT2MOC. This order type can move with the market dynamically and only display a limited amount of shares smaller than the total order

- quantity.
3. **Work a Passive Pegged-Limit order during the day; make sure it completes by the end of the day.** Rather than staying FIXED at a specific limit, this strategy FLOATS, dynamically repricing to the BBO. At the end of the day, the unfilled balance of the order is sent as an MOC order to

4. **Work an algorithm over the day, but specify a different amount going into the auction.** With Bloomberg Tradebook, you can override the auction amount in a variety of ways. By using “Decrement Strategy,” you can remove shares from the algorithm manually and send them into the auction as an auction order type. This procedure is much faster than cancelling shares from the original algorithm, waiting for the acknowledgment and subsequently firing out the residual shares as another order. You can also specify a different amount to the closing auction by sending two orders at the same time. You may send one order as a closing auction order type and the second order to the algorithm with the specification that the algorithm will not participate in the auction.

Tradebook Provides the Complete Solution

The closing auction provides a significant source of liquidity for trading and most algorithmic trading vendors do not provide the robustness nor the options necessary to take full advantage of the closing auction. Bloomberg Tradebook’s automated tools and intelligent auction logic give you the edge you need to trade effectively in the closing auction.

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