

## Nordea FX algo suite

- Your provider of Scandi Liquidity
- Full suite of benchmarking and execution optimisation algos
- Transparent and understandable algo logic

As the biggest Nordic bank – we have the solutions you need to interact with Scandi and Major Liquidity. Our Execution Advisory Specialists let you manage your FX trades efficiently while minimising market impact and transaction cost.

[nordeamarkets.com/fxalgo](https://nordeamarkets.com/fxalgo)

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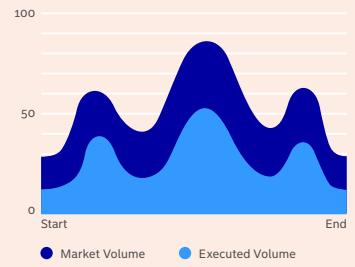
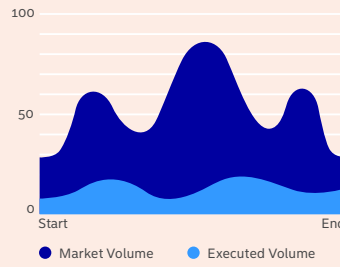
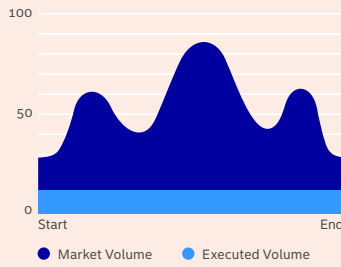
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**Benchmarking algos**

**TWAP**

**VWAP**

**POHV**



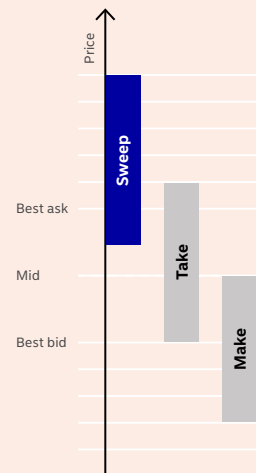
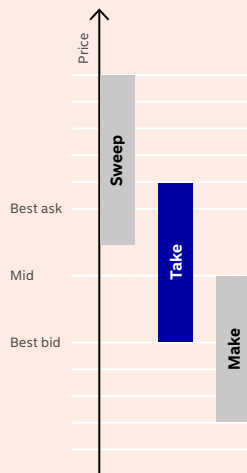
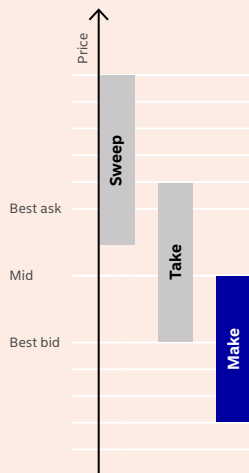
<b>Spread capture</b>	Medium	Medium	Medium
<b>Certainty of execution</b>	Based on schedule	Depends on market and based on schedule	Depends on market
<b>Expected market impact</b>	Low	Low	Low

**Execution optimization algos**

**Make**

**Take**

**Sweep**



<b>Spread capture</b>	High	Low	None
<b>Urgency</b>	Low	High	Very high
<b>Expected market impact</b>	Very low	High	Very high

Comparison between the algorithms assumes default parametrization.

## Algorithmic Trading

# Make

## A passive liquidity providing algorithm that will never cross the mid-price

Make will post limit orders to the market and update their price to maintain a constant distance to the top of the book. The Aggression parameter is used by the algorithm to guide its pace of execution. The algorithm will adjust the position of the limit orders relative to the top of book based on how well it is tracking the desired aggression level. If the algorithm is ahead of the chosen pace, it will post as passively as possible. On the other hand, if the algorithm is falling behind, it will post more aggressively.

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### Optional Parameters

#### Limit Price

Price that the algorithm will never breach. That is, for buy orders the algorithm will never place orders above this limit, for sell orders it will never place orders below this limit.

#### Aggression (Default = Medium)

Decides which fraction of the market trades the strategy strives to be. Possible values are:

- Low
- Medium
- High = keep active order in the market all the time by replenishing after each fill.

#### Price Aggression (Default = Medium)

Decides how the algorithm will post limit orders relative to bid and ask. Possible values are:

- Low = top of book
- Medium = between top of book and mid-price
- High = mid-price

Price aggression represents the maximum aggression. Make algorithm with High price aggression will be able to place limit orders up to the mid-point of the spread, but will not do so unless it has fallen behind the schedule.

#### Max Display Size

Maximum size that can be posted across all venues available to the algorithm at a time.

#### Would Feature

Allows user to specify a price, which will trigger the completion of the order up to a size specified as a parameter.

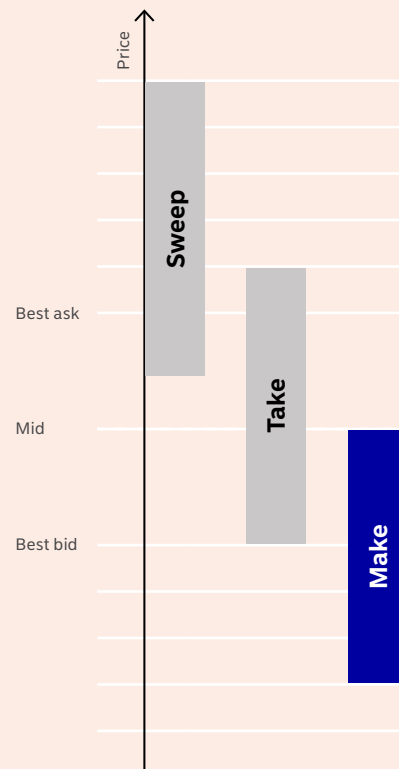
#### Would Price

Trigger price to invoke the feature.

#### Would Size

The percentage of the order that should be completed by sweeping the market if would price is triggered.

### Our FX Algo Trading Patterns



# Take

## An algorithm meant for urgent but smart execution

Take combines passive limit orders with opportunistic taking of liquidity. This allows Take to capture some of the spread given the urgency of the execution. The algorithm will also prefer firmly quoted liquidity over last-looked liquidity.

The Aggression parameter sets a minimum pace that the algorithm needs to keep up with. The pace estimate is based on the real-time and historical trading characteristics of the currency pair in question. Take will transition from posting limit orders to taking liquidity from the market based on how well it is able to track the chosen aggression level. If the algorithm is ahead of the chosen pace, it will post passively to make sure that the market impact is minimized. If Take falls behind the given pace, it will start aggressively taking liquidity from the market.



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### Required Parameters

#### Include Liquidity

Decides whether the algorithm has access to aggress against Nordea’s own liquidity pool. This pool allows the algorithm to execute without showing the interest to any other market players than Nordea. The algorithm will use liquidity from this pool only if it offers a price that is better than any other pool available to the algorithm at the time of execution.

### Optional Parameters

#### Limit Price

Price that the algorithm will never breach. That is, for buy orders the algorithm will never place orders above this limit, for sell orders it will never place orders below this limit.

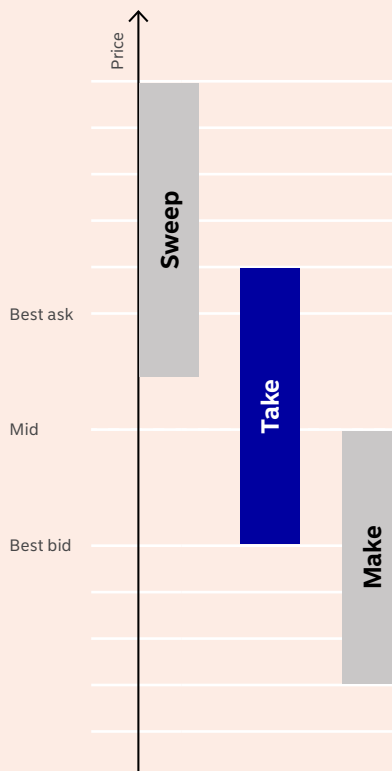
#### Aggression (Default = Medium)

Decides the minimum pace that the algorithm needs to keep up with. Possible values are Low, Medium and High.

#### Stop-Loss Threshold

When the algorithm starts, it calculates sweep-to-fill price that is an estimate of the cost that would be accrued if the whole amount was traded at once. Afterwards, the algorithm will continue to update the sweep-to-fill price to reflect order book changes. If this price moves more than the stop-loss threshold, the algorithm will automatically sweep the remaining from the market.

### Our FX Algo Trading Patterns





## Algorithmic Trading

# Sweep

## The Sweep algorithm uses the smart order routing logic to take liquidity aggressively

Sweep gathers all the available liquidity from firm and last-look ECNs. These sources are evaluated dynamically by the algorithm to find an optimal allocation between the available liquidity sources.

### Note

If the limit set for the algorithm is out of money, any unfilled amount will be cancelled automatically and the algorithm will stop.

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### Optional Parameters

#### Limit Price

Price that the algorithm will never breach. That is, for buy orders the algorithm will never place orders above this limit, for sell orders it will never place orders below this limit.

### Execution Advisory

Our Execution Advisory Specialists let you manage your FX trades efficiently while minimising market impact and keep transaction cost low.

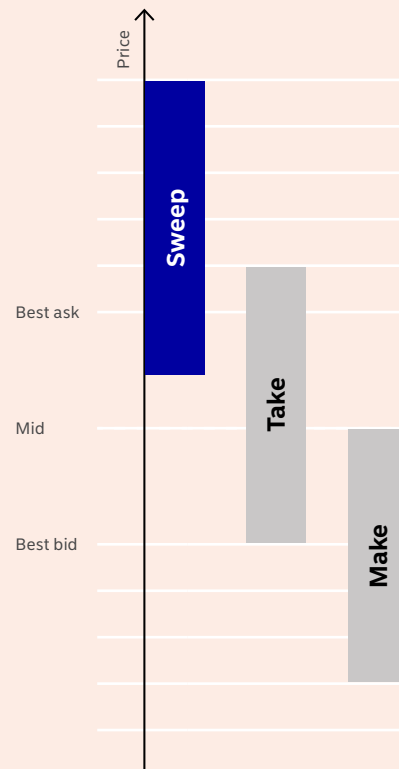
We are ready to advise you on algo usage and parameter settings to ensure optimal results are achieved. Our Execution desk provides first class execution with unique liquidity access to Scandi liquidity.

Our Execution Advisory specialists are available during market opening hours and secure voice execution in all four local languages.

Execution desk is staffed on all business days, our New York and Singapore branches enable access to FX markets outside European opening hours. We offer a lot of different analysis on request, such as:

- Market impact analysis
- Liquidity analysis
- TCA's / Cost & charges
- Emerging markets: we assist and execute in difficult and illiquid markets

### Our FX Algo Trading Patterns

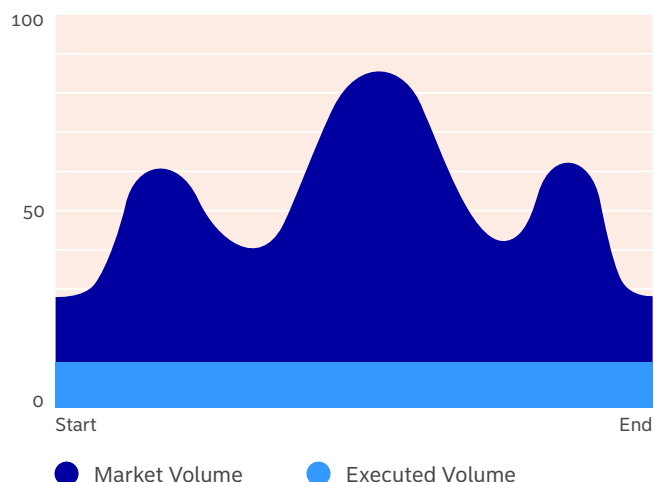


# TWAP

An algorithm that targets the time weighted average price (TWAP) benchmark and strives to minimize slippage against it

The algorithm divides the orders uniformly over the specified time interval. By combining passive posting of limit orders when ahead of the chosen schedule and aggressive taking of liquidity when behind the chosen schedule, the algorithm offers the possibility of beating the benchmark.

TWAP uses discretionary bands to gauge how well it is tracking the chosen schedule. The discretionary bands are based on historical estimates supplemented by dynamic real-time estimates. Using the discretionary bands the algorithm first tries to capture spread by posting limit orders. However, if the algorithm falls behind, it will aggressively take liquidity from the market.



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### Required Parameters

#### Include Liquidity

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### Optional Parameters

#### Limit Price

Price that the algo will never breach. That is, for buy orders the algo will never place orders above this limit, for sell orders it will never place orders below this limit.

#### Price Sensitivity Feature

Price sensitivity determines how much ahead/behind compared to the schedule the algo can move when a favourable/unfavourable price emerges. A high price sensitivity means that the algo can deviate further away from the schedule than it would be able to do with a lower price sensitivity.

Allowing more flexibility for the algo to deviate from benchmark may save spread for the user in situations where market exhibits a lot of volatility. For example, if a user uses high price sensitivity and price moves favourably for the order, then the algo will speed up the rate of trading. This may mean that the order completes much earlier than expected unless an unfavourable price movement is observed.

#### Minimum Quantity

Minimum quantity the algo should complete with Price Sensitivity enabled. By using minimum quantity, the user can still make sure that the order will strive to complete when price sensitivity feature is used.

#### Would Feature

Allows user to specify a price, which will trigger the completion of the order up to a size specified as a parameter.

#### Would Price

Trigger price to invoke the feature.

#### Would Size

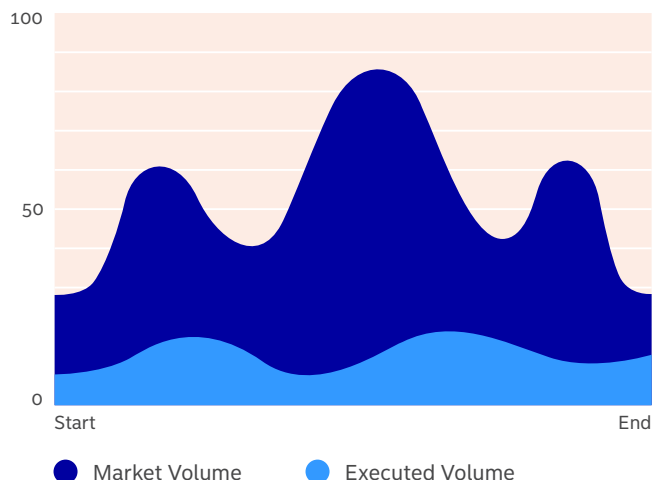
The percentage of the order that should be completed by sweeping the market if would price is triggered.

# VWAP

## An algorithm that targets the volume weighted average price (VWAP) benchmark

The algorithm uses historical volumes to estimate the expected volume over the trading interval, but also updates the estimate on the fly based on trades observed in the lit market. The algorithm acts both passively by posting limit orders and aggressively by taking liquidity in an effort to earn as much of the spread as possible.

VWAP uses discretionary bands to gauge how well it is tracking the chosen schedule. The discretionary bands are based on historical estimates supplemented by dynamic real-time estimates. Using the discretionary bands the algorithm first tries to capture spread by posting limit orders. However, if the algorithm falls behind, it will aggressively take liquidity from the market.



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### Required Parameters

#### Include Liquidity

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### Optional Parameters

#### Limit Price

Price that the algo will never breach. That is, for buy orders the algo will never place orders above this limit, for sell orders it will never place orders below this limit.

#### Price Sensitivity Feature

Price sensitivity determines how much ahead/behind compared to the schedule the algo can move when a favourable/unfavourable price emerges. A high price sensitivity means that the algo can deviate further away from the schedule than it would be able to do with a lower price sensitivity.

Allowing more flexibility for the algo to deviate from benchmark may save spread for the user in situations where market exhibits a lot of volatility. For example, if a user uses high price sensitivity and price moves favourably for the order, then the algo will speed up the rate of trading. This may mean that the order completes much earlier than expected unless an unfavourable price movement is observed.

#### Minimum Quantity

Minimum quantity the algo should complete with Price Sensitivity enabled. By using minimum quantity, the user can still make sure that the order will strive to complete when price sensitivity feature is used.

#### Would Feature

Allows user to specify a price, which will trigger the completion of the order up to a size specified as a parameter.

#### Would Price

Trigger price to invoke the feature.

#### Would Size

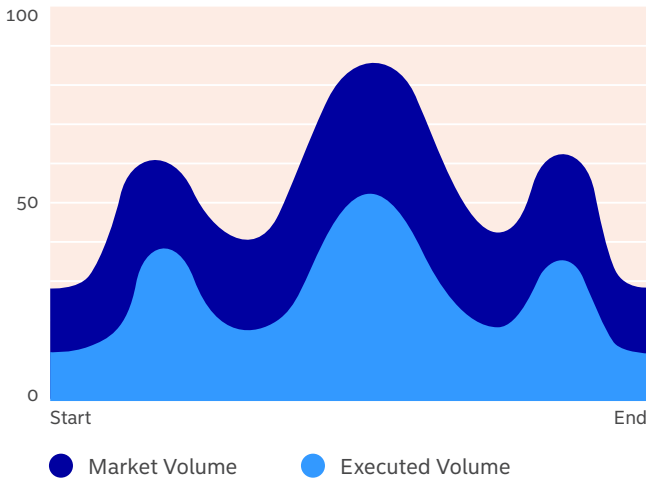
The percentage of the order that should be completed by sweeping the market if would price is triggered.

# POHV

## This algorithm participates in the market passively based on the percentage of historical volume (POHV) in the traded currency pair

The algorithm strives to move along the historical volume trajectory based participation rate defined by the user. This means that an algorithm launched with lower participation rate will run longer than an algorithm launched with higher participation rate.

To make sure the algorithm captures as much of the spread as possible, it will both post limit orders passively and take liquidity aggressively.



### Required Parameters

#### Include Liquidity

Decides whether the algorithm has access to aggress against Nordea's own liquidity pool. This pool allows the algorithm to execute without showing the interest to any other market players than Nordea. The algorithm will use liquidity from this pool only if it offers a price that is better than any other pool available to the algorithm at the time of execution.

#### Target Volume

Participation rate compared to the market volume.

### Optional Parameters

#### Limit Price

Price that the algorithm will never breach. That is, for buy orders the algorithm will never place orders above this limit, for sell orders it will never place orders below this limit.

#### Would Feature

Allows user to specify a price, which will trigger the completion of the order up to a size specified as a parameter.

#### Would Price

Trigger price to invoke the feature.

#### Would Size

The percentage of the order that should be completed by sweeping the market if would price is triggered.

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