Global Execution Services
Algorithmic Trading

Making the world liquid
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Our Execution Services

Natixis delivers high value-added tailor-made services combining Quant Research, Sales Trading and Execution expertise in a team of 50 specialists with an outstanding understanding of local needs.

Beyond our focus on European Markets and major MTF, we are constantly improving our service offer and expanding our worldwide network. We can offer a wide diversity of services ranging from pure Direct Market Access (DMA) to Direct Capital Access (DCA) and Direct Strategy Access (DSA).

Our expert proprietary algorithmic strategies provide opportunistic event-driven execution and robust risk control. They are back-tested daily and are continuously evolving.

Natixis algorithms are developed in-house using all Natixis execution and market expertise and embedded specific cash and derivatives techniques. Natixis Execution tools allow our clients to trade in line with the market, capture liquidity, and increase alpha return.

WHAT WE OFFER

We Provide Clients with Broad Access to Equity Markets
- Direct access or via external brokers
- Direct Market Access (DMA) / Sales Trading execution
- Long standing markets and alternative platforms
- Institutional, corporate and retail network clients
- Commission Sharing Agreement (CSA)

Algorithmic Execution
- In-house algorithms with proven track records
- Direct Strategy Access (DSA)

Direct Capital Access (DCA)
- Electronic access to cash equity market making
- Trading for size at best bid/offer

Market Making – Cash Equity, ETF, Convertible Bond, Flow Derivatives
- Dedicated desks for each activity

Leader in Order Routing for Retail Network and Small Asset Managers

Synthetic prime brokerage
- Access to Natixis repo and financing capabilities
- Integrated with our execution facilities

Smart Order Router
- Access to a broad spectrum of alternative platforms

Internal Matching
- Recognised cross-network capacity

Customized Single Order Execution
- 10 pan-European traders-dealers

Program Trading – Pair Trading
- Customized product range

Best Execution Analytics
- Market watch publications
- Client-based transaction cost analysis (TCA)
- Client assistance to formulate best execution strategies
Our Algorithmic Trading

Simplicity
Natixis algorithms are easy to use and require minimum user input: numerous parameters are automatically determined by the algorithms according to the characteristics and value of the targeted markets.

Innovation
Our experts are constantly developing prototypes to improve algorithms already in production. We run daily performance analyses of our algorithms and focus our efforts on sub-optimal executions.

Flexibility
Our algorithms are the result of pure in-house developments. This allows for a dynamic evolution of algorithms according to changing market conditions and Quant Research innovation. Such flexibility is also leveraged to offer fast customisation and tailor-made solutions to our clients.

Focus on multi-venue
In order to cope with the fragmentation of modern financial markets, Natixis algorithms are designed to trade on any available source of liquidity and our benchmarked algorithms integrate multimarket price sources.

The opportunity to connect to and trade on new external and internal liquidity pools is permanently screened by our expert team with a view to finding the perfect balance between latency, coverage and costs while maximising execution quality. Our execution team can also access third party algorithms for specific purposes such as liquidity hunting on dark pools.

Integration of standard order types
In addition to our Price and Volume Driven Algorithms, Natixis Equity Markets has leveraged its trading and IT infrastructure to offer the whole range of standard orders (Market on Open/Close, Peg, Iceberg).
Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

1.0 Volume Weighted Average Price

A strategy that releases waves into the markets (Primary exchange and MTFs) using stock specific historical volume profiles in order to execute the order close to the Volume Weighted Average Price (VWAP) over a chosen period of time, with some randomization to reduce gaming risks.

The VWAP algorithm aims to execute a global quantity at an average price close to the Market Volume Weighted Average Price over a defined period of time.

CHARACTERISTICS

VWAP is to be favoured in the following cases

- To limit the market impact by executing a large quantity not too quickly.
- To execute totally an order (without guarantee if the order is limited).
- Suitable for a liquid security with a stable volume profile from one day to the next.

Main Parameters

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start / End time</td>
</tr>
<tr>
<td>By default, start time is at reception of the order, potentially including market open if received before the opening auction.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trading style</td>
</tr>
<tr>
<td>Conservative, neutral and aggressive. The conservative option suits a favorable price variation while Aggressive option applies better to an adverse price trend.</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Volume</td>
</tr>
<tr>
<td>The strategy will limit the participation rate to this maximum volume constraint. Order may not be completed. As soon as the limit constraint is respected, the strategy spreads the volume over a short period in order to reduce market impact.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
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<tr>
<td>Price limit</td>
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<tr>
<td>The strategy will apply the price limit to orders. Orders may not be completed. As soon as the limit constraint is respected, the strategy will spread the volume over a short period in order to reduce market impact.</td>
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<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would price</td>
</tr>
<tr>
<td>The strategy will aim to complete the order if the stock trades at the Would price or better. The use of the Would option may significantly deviate the execution price from the benchmark price.</td>
</tr>
</tbody>
</table>
Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

1.0 Volume Weighted Average Price

VWAP Algorithm Specificities
During the related period, the algorithm regularly sends orders to the market according to a distribution function of the representative curve of the considered stock historical volumes.

The period is broken down into execution intervals, the duration of which is determined optimally by the algorithm to reduce the market impact. Trading strategy will adapt to real time market conditions in order to limit and reduce the risk of price deviations.

To go further...
Adjustments are automatically applied to the execution strategy if the algorithm detects significant spreads between the price estimations and/or volumes and the intraday prices/volumes. The algorithm uses iceberg orders on exchanges where this order type is available.

VWAP Parameters

![VWAP Parameters GUI](image-url)
 Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

2.0 Time Weighted Average Price

A wave trading strategy that releases waves into the markets (Primary exchange and MTFs) using evenly divided time buckets between start and end time, with some randomization to reduce gaming risks.

The Time Weighted Average Price (TWAP) algorithm aims to execute a quantity by following a linear volume allocation profile.

**CHARACTERISTICS**

TWAP is to be favoured in the following cases

- Anticipation of high volume periods with adverse prices (TWAP better than VWAP in that case).
- To limit the market impact by not executing a large quantity too quickly.

**Main Parameters**

<table>
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<tr>
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<tr>
<td><strong>Start / End time</strong></td>
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**Optional Parameters**

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<tr>
<td><strong>%Volume</strong></td>
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<td><strong>Price limit</strong></td>
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<td><strong>Would price</strong></td>
</tr>
</tbody>
</table>
Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

2.0 Time Weighted Average Price

TWAP Algorithm Specificities
During the related period, the algorithm regularly sends the markets equal quantities of orders to execute. In order to avoid suffering a sudden temporary market variation, a maximum percentage of participation might be added.

The execution is made so as to minimize market impact. The user can act on the impact’s level by configuring the level of aggressiveness (on the price). When a limit price is reached, executions are suspended as long as the limit is not met. The linear allocation profile of the executed quantities might not be respected (the price condition has priority over the volume) and the order may not be completed at the end of the period.

To go further...
Execution Strategy adjustments are automatically applied if the algorithm detects significant spreads between price and/or volume estimations and intraday prices/volumes. The algorithm uses iceberg orders on exchanges where this order type is available.

TWAP Parameters

![Parameters: TWAP](image)
Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

3.0 Participate

The Participate strategy, also known as Percentage of Volume (POV) trades at a user defined percentage of the current market volumes on primary exchanges and MTFs until the order is completed or market closes. This strategy can be strict or dynamically adapted to market conditions.

Participate algorithm aims to follow (live) the exchange volumes on the market by respecting a target level of participation.

### CHARACTERISTICS

Participate is to be favoured in the following cases

- Satisfied with current prices.
- Willing to limit the market impact on the execution period.

![Market volume and Algo volume graph](image)

#### Main Parameters

<table>
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</tr>
<tr>
<td><strong>Trading style</strong></td>
</tr>
<tr>
<td>Conservative, neutral and aggressive. The conservative option suits a favorable price variation while the aggressive option applies better to an adverse price trend.</td>
</tr>
<tr>
<td><strong>%Volume</strong></td>
</tr>
<tr>
<td>Targeted participation rate.</td>
</tr>
</tbody>
</table>

#### Optional Parameters

<table>
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<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price limit</strong></td>
</tr>
<tr>
<td>The strategy will apply the price limit to orders. Orders may not be completed. Volume traded outside the price limit is not taken into account by the strategy.</td>
</tr>
<tr>
<td><strong>Would price</strong></td>
</tr>
<tr>
<td>The strategy will attempt to complete the order if the stock trades at the Would price or better. The use of the Would option may significantly deviate the final participation rate from the targeted participation rate.</td>
</tr>
</tbody>
</table>
Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

3.0 Participate

Participate Algorithm Specificities

Until the quantity to be executed is completed, the algorithm sends orders to the market to be executed, according to the defined participation ratio, and according to the volume traded in the markets.

In order to adjust the execution to market conditions, the algorithm may get behind/ahead the level of target participation, but still respecting a maximum spread (which is determined according to the security, etc...).

Furthermore, trading style is customizable. If you consider that favorable market conditions should apply, then select the conservative trading style. In the case of adverse market condition, the aggressive style would suit better. Executions are suspended as long as the limit is not respected.

This algorithm does not guarantee completion of the order on the current day (the risk is greater if the order is limited).

To go further...

A possible delay is gradually caught up to limit the market impact.

Participate Parameters
Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

4.0 Target Close

The **Target Close** strategy manages the market impact of the order on the closing price by defining the strategy’s optimal start time based on historical volumes and real-time market conditions.

The strategy is designed to require minimum input from user.

### CHARACTERISTICS

Target Close is to be favoured in the following cases

- This strategy allows the user to participate in auction phases without any concern about the opening/closing hours as well as auction order characteristics.
- Reduce market impact on closing price of significant orders while minimizing market risks.

#### Main Parameters

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>% Intraday volume</strong></td>
</tr>
<tr>
<td>Maximum intraday volume participation rate estimated from historical intraday volumes.</td>
</tr>
<tr>
<td><strong>% Close volume</strong></td>
</tr>
<tr>
<td>Maximum auction volume participation rate estimated from historical auction volumes.</td>
</tr>
</tbody>
</table>

#### Optional Parameters

<table>
<thead>
<tr>
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<td><strong>Price limit</strong></td>
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</tr>
</tbody>
</table>
Natixis Algorithmic Trading Strategies (Volume Driven Algorithms)

4.0 Target Close

Target Close Algorithm Specificities

According to specific market auction characteristics, the strategy uses the Stock Exchange standards to send orders. This strategy will automatically define the optimal start of the order, will use the VWAP strategy during continuous trading and send the remaining quantity during the auction, while targeting % volume parameters based on historical data.

Target Close Parameters

![Parameters: Target Close](image)
Natixis Algorithmic Trading Strategies (Price Driven Algorithms)

5.0 Steps

The **Steps** strategy trades at a user defined percentage of the primary exchange and MTFs volumes and increases or decreases this participation rate when the stock price reaches user defined levels.

### Characteristics

Steps is to be favoured in the following cases:

- The strategy makes it possible to simulate other algorithm behaviours such as Momentum, Value or Implementation Shortfall while offering better controls over specific constraints.

**Main Parameters**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start / End time</strong></td>
</tr>
<tr>
<td><strong>% Volume</strong></td>
</tr>
<tr>
<td><strong>Trading style</strong></td>
</tr>
</tbody>
</table>

**Optional Parameters**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price limit</strong></td>
</tr>
<tr>
<td><strong>Direction / Price level / Ratio %</strong></td>
</tr>
</tbody>
</table>
Natixis Algorithmic Trading Strategies (Price Driven Algorithms)

5.0 Steps

Steps Parameters
Natixis Algorithmic Trading Strategies (Price Driven Algorithms)

6.0 Momentum/Value

The two strategies trade at a targeted percentage of the current volumes on primary exchanges and MTFs, and dynamically adjust this participation rate to stock price variations benchmarked to a reference price.

The reference price can be automatically defined by the strategy or entered by the user. The **Value** Strategy will increase the participation rate when the stock price moves favorably and decrease it when the stock price moves away from the reference price.

The **Momentum** Strategy adopts the opposite behaviour.

---

**CHARACTERISTICS**

Momentum/Value is to be favoured in the following cases

- The Value Strategy suits mean-reverting trading belief.
- The Momentum strategy suits trend-following belief.

---

**Main Parameters**

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Start / End time</strong></td>
</tr>
<tr>
<td><strong>Trading style</strong></td>
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</table>

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**Optional Parameters**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price limit</strong></td>
</tr>
<tr>
<td><strong>Would price</strong></td>
</tr>
<tr>
<td><strong>Reference price</strong></td>
</tr>
</tbody>
</table>
Natixis Algorithmic Trading Strategies (Price Driven Algorithms)

6.0 Momentum/Value

Momentum/Value Parameters

![Parameters: Momentum](image)

- **Quantity**: 
- **Trading Style**: NEUTRAL
- **Start Time**: 09:00:00
- **End Time**: 18:00:00
- **Reference Price**: 
- **Limit Price**: 
- **Would Price**: 

[OK] [Cancel]
Natixis Algorithmic Trading Strategies (Price Driven Algorithms)

7.0 Hunt

The Hunt strategy provides the opportunity to execute an order on the primary exchange and MTFs while never being placed in the market and thus to minimize information leakage.

**CHARACTERISTICS**

Hunt is to be favoured in the following cases

- Suitable for illiquid instruments.
- To execute an order at a limit price without being visible to the market.

**Main Parameters**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start / End time</strong> By default, start time is at reception of the order, potentially including market open if received before the opening auction. End Time will apply if the order has not been completed before.</td>
</tr>
<tr>
<td><strong>Price limit</strong> The strategy reacts to liquidity offered at the price limit or better.</td>
</tr>
</tbody>
</table>

**Optional Parameters**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum quantity</strong> The strategy will react to favorable price only if available liquidity is above the Minimum Quantity so as to reduce information leakage for small quantities.</td>
</tr>
</tbody>
</table>

**Hunt Parameters**

```
Parameters : Hunt

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td></td>
</tr>
<tr>
<td>Start Time</td>
<td>06:00</td>
</tr>
<tr>
<td>End Time</td>
<td>18:00</td>
</tr>
<tr>
<td>Limit Price</td>
<td></td>
</tr>
<tr>
<td>Minimum Qty</td>
<td></td>
</tr>
</tbody>
</table>
```

OK | Cancel
Natixis Algorithmic Trading Strategies (Price Driven Algorithms)

8.0 Implementation Shortfall

The objective of Implementation Shortfall is to minimize the execution cost of an order. The aim is to try trading off the real time market impact cost of the order and the opportunity cost of delayed execution. The strategy will increase the targeted participation rate when the stock price moves favorably and decrease it when the stock price moves adversely.

The strategy is designed to trade on primary exchanges and MTFs, requiring minimum input from the user.

**CHARACTERISTICS**

Implementation Shortfall is to be favoured in the following cases

- Order benchmarked to the current stock price (bid-offer mid price) with decent liquidity.
- Orders where you want to control market impact** while benefiting from favorable conditions (as regards price and volume variations).

* Participation limit – excluded from limit & would price
** to specific benchmark

**Main Parameters**

<table>
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<td>Reference price</td>
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Natixis Algorithmic Trading Strategies (Price Driven Algorithms)

8.0 Implementation Shortfall

Implementation Shortfall Parameters
**Natixis Equity Markets Global Execution Services**

**Natixis Execution Algorithms in a Nutshell**

**Variety**
8 algorithms, 1 SOR, a range of order types

**Simplicity**
Automatic setting of most parameters

**Flexibility**
In-house developments mean fast customisation

**Accessibility**
Direct access on clients’ gateways via FIX

**Performance**
Daily analysis and backtests

**Defragmentation**
Multi-venue trading and benchmarks

**Volume Driven Algorithms**
Used to control the execution rate. Better suited for long duration orders – from 30 min to 1 day

**Price Driven Algorithms**
Can execute 100% of an order very rapidly if market conditions are compatible with order parameters

---

**Strategy Objective**

**VWAP target orders.**

**Usage**

- VWAP target orders.
- Passive strategy in order to minimize market impact on liquid securities.
- Liquid securities with low volume variance.
- Market volume with a high volume variance.
- Limit price
- Percentage of volume
- Trading style: conservative, neutral, aggressive

**Typical Order/Example**

- Buy 100,000 shares over the day including open and closing auctions with a volume limit of 20%.
- Buy 150,000 shares above the limit condition not met.
- As soon as the limit is reached, the volume delay is spread over a short period of time.

**Main Behaviour**

- Volume and price delay
- When a volume or price limit is set, trades are suspended as long as the limit condition is not met.
- As soon as the limit is reached, the volume delay is spread over a short period of time.
- Volume profile calculation
- A profile for 3,500 securities is generated at least every day based on historical data using proprietary models.
- Confidence level indicators are generated in order to analyse each security volume profile variance.

---

**Steps**

1. **STEPS**
   - To reduce impact on liquid stocks and improve performance compared to a constant participation rate.
   - Large orders targeting the arrival price while monitoring the impact cost.
   - Particularly suited to illiquid stocks.
   - Orders with flexibility on the participation rate to step up and down at user defined price levels.
   - Orders where information leakage would be very detrimental.

2. **MOMENTUM / VALUE**
   - Momentum strategy aims to minimize the spread between the execution price and the arrival price while assuming that the stock price will follow a mean reverting behavior.
   - The algorithm will automatically define in real time the participation rate balancing the impact risk and the market risk.
   - In a favorable price move, the algorithm will substantially decrease the participation rate in order to benefit from the favorable trend.

3. **HUNT**
   - Orders targeting the arrival price while assuming a belief on the stock price's trend.
   - Trading style: conservative, neutral, aggressive
   - Would
   - Percentage of volume: available for intraday and auctions
   - Limit price
   - Percentage of volume: market parameter
   - Limit price
   - Trading style: conservative, neutral, aggressive

4. **IMPLEMENTATION SHORTFALL**
   - Aims to target the VWAP (Volume Weighted Average Price) over a defined period not exceeding the day.
   - Aims to execute trades at a user predefined participation rate based on real-time volume until the order is completed.
   - Aims to execute trades targeting the closing price while monitoring the market impact on the closing auction by increasing the order before the auction if needed.
   - Aims to execute trades at multiple user predefined participation rates subject to market price benchmark.
   - Aims to execute all liquidity proposed at a better price than the limit price while not being visible in the market.

---

**Performance Diagram**

- Market volume
- Algo volume
- Stock price
- Algo Participation

**Price**

- Limit price
- Percentage of volume
- Trading style: conservative, neutral, aggressive

**Model monitoring**

- Initial controls are implemented to validate the consistency in participation rates and price levels.
- Execution strategy
- Similar behaviour to the Participate strategy with several levels of participation rate.
- Similar behaviour to the Participate strategy with several levels of participation rate.

**Price change**

- Price delay
- Historical volume are used to define the start time and volume placed at the closing auction.
- Although minimum input is required, several execution strategies for trading before the closing auction are proposed.
- Execution strategy
- Similar behaviour to the Participate strategy with several levels of participation rate.

---

**In-house developments mean fast customisation**

**Multi-venue trading and benchmarks**

**Direct access on clients’ gateways via FIX**

**Fast customisation**

**Price driven algorithms**

- Dynamic triggering as mid-point or price within the spread can be defined in order to reduce information leakage to the market.

---

**Volume profile calculation**

- A profile for 3,500 securities is generated at least every day based on historical data using proprietary models.
- Confidence level indicators are generated in order to analyse each security volume profile variance.
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