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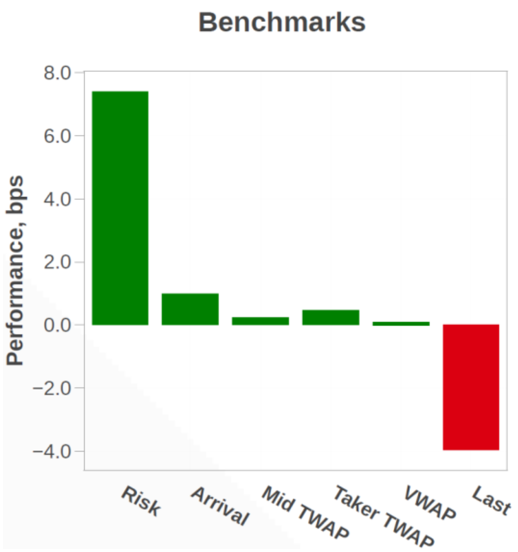
eFX “Explainers” **Algo Execution** Part III

As part of our “Explainers” series, we shed light on the topic of Algo Execution aka Execution Algorithms. This issue offers insight into evaluating algo performance and recent developments in the algo space.

Measuring Success: How to Evaluate FX Algo Order Performance

- Performance evaluation focuses on assessing quality of an algo execution and not just the final price. This is where **Transaction Cost Analysis (TCA)** comes into play. TCA helps to evaluate an algo’s execution price against several reference prices or **benchmarks**. As an example, below shows the TCA for an actual 240mio USDCNH Liquidity Seeking (LS) order:

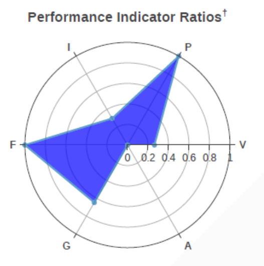


Key reference benchmarks include:

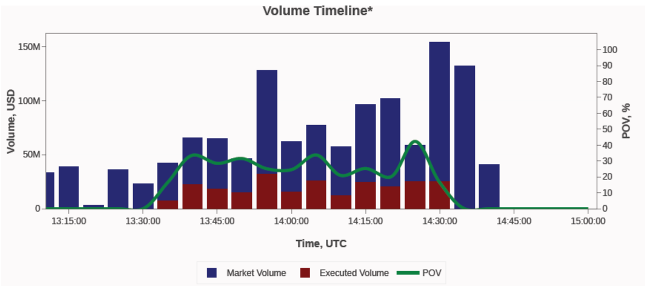
- **Risk Transfer Price (RTP)**: Comparison with quoted price from the Liquidity Provider (LP) or against extrapolated market liquidity.
- **Arrival Mid Price**: Relative to primary market top-of-book mid-price at the start of execution.
- **Mid TWAP**: Time-weighted average primary market top-of-book mid-price over the period of execution.
- **Taker TWAP**: Time-weighted average top-of-book taker price over the period of execution.
- **VWAP**: Volume-weighted average price of primary market trades over the period of execution.
- **Last Mid Price**: Comparison against primary mid-price immediately after order end time.

- TCA reports also include key aggregated metrics on child orders like **fill ratio,** proportion of **aggressive (IOC) vs. passive (GTC)** orders, **market impact** and percentage of **internalisation** – for example, see below stats for the same USDCNH LS order:

Execution Performance			
Fill Ratio IOC (F)	1.00	Fill Ratio GTC (G)	0.65
Aggressive Proportion (A)	0.00	Passive Proportion (P)	1.00
Internal Proportion (I)	0.30	External Proportion	0.70
Aggregate POV (External)	0.20	Aggregate POV (All)	0.26
Market Impact (bps)	-4.94	Fill MTM (bps)	+0.05



- Another important measure is **Percentage of Volume** (POV), which measures the share of market volume that the order represents during a specific time bucket. Evaluating POV along with impact helps to assess if the algo was being too aggressive. The chart below shows the algo executed volume versus market volume for the 240mio USDCNH order – the POV ranges from 5-50% for each time bucket.

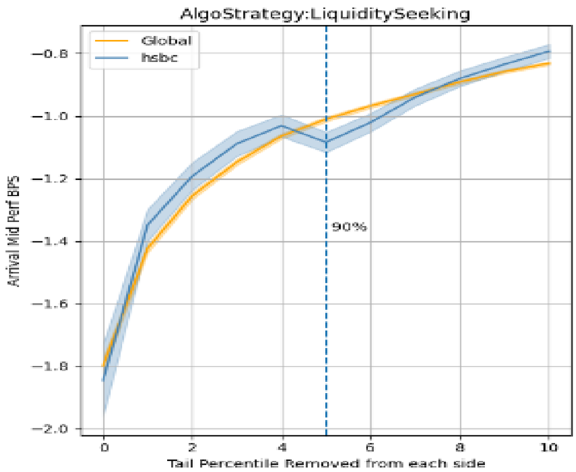


- HSBC has differentiated against many peers by offering some of these metrics as part of pre-trade and real-time analytics via **multi-dealer platform integration** which particularly appeals to our institutional clients.
- While TCA from algo providers offers insights into execution performance against standard benchmarks, the need for independent assessment has led to the rise of third-party providers, most notably:
  - **BestX:** Focusses on pre-trade and post-trade analytics, which enable clients to run "what-if" scenarios (pre-trade) to select the best algo/provider for a specific trade. Additionally, they provide detailed, normalised post-trade reports comparing performance across different providers.
  - **TradeFeedr:** Focusses on facilitating sharing of data between client and algo provider. This enables both parties to analyse their bilateral trading relationship and allows the client to compare algo performance across different providers.

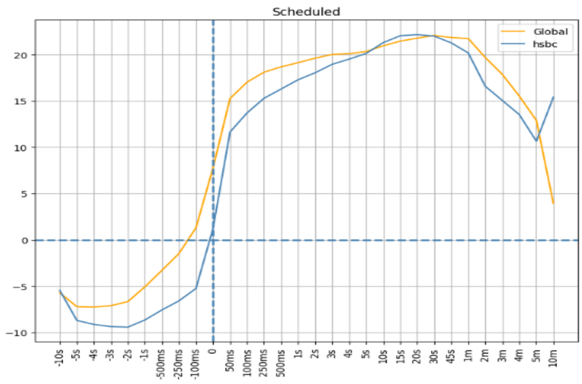
Third-party analytics is particularly useful in **evaluating standardised metrics** across multiple algo providers and assessing their offerings by order type, size bucket, currency pair etc.

Key Performance Metrics Commonly used to Compare Algo Providers

- **Slippage Against Reference Benchmarks:** Evaluating whether aggregate performance is positive or negative relative to arrival, TWAP, VWAP, and other benchmarks. This can then be aggregated by algo provider, order type (e.g. Implementation Shortfall, Liquidity Seeking etc.), currency pair and size bucket, allowing for a comparison of providers' algo offerings. The chart below shows Tradefeedr's assessment of slippage (relative to arrival mid-price) of Liquidity Seeking orders amongst all algo providers where HSBC slippage profile is in-line/slightly better versus overall.



- **Market Impact:** Assessing how child orders generated by LPs affect future market prices. **Mark-out analysis** is commonly used, measuring the spread paid on child orders and their impact over time in $/m – below shows an example where HSBC pays a spread of $2 vs. $6 overall for all child orders for TWAP algos and impact stays lower. This can be further evaluated distinguishing between aggressive orders (IOCs) and passive orders (GTCs) child order types for optimising liquidity curation and adverse selection.



- **Reversion:** Tracking price movement immediately after an order is completed (30s to 2mins). High reversion may indicate significant temporary price movement caused by high impact on execution and potential information leakage. This can be further assessed at order type and algo provider level as a **cost/signaling risk** considering execution speed, reversal magnitude and volume weighted impact.
- **Fill Rate & Rejection Rate:** Measuring the percentage of child orders filled or rejected across internal and external venues, reflecting a provider's effectiveness in liquidity curation.

Algo Execution or Risk Transfer?

- When deciding how to execute FX trades, clients face a critical choice between two distinct approaches:
  - **Risk Transfer Price (RTP):** This allows clients to transfer the entire risk of the trade to a LP at a single, firm price, offering **immediate execution** and eliminating their exposure to market risk.

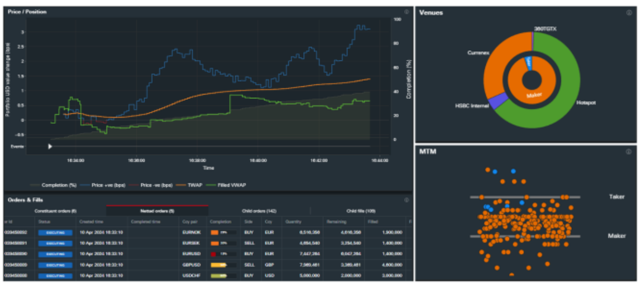
- **Algo Execution:** Alternatively, clients can use algo orders with pre-defined parameters to execute trades over time, maintaining control while managing their own market risk.

- The decision between these two methods hinges on the client's objectives, risk tolerance, and the specific characteristics of the trade. **Understanding the implications of each choice is crucial for optimising execution outcomes**.

- As discussed previously in Part I of this series, key factors to consider include:
  - **Time risk:** RTP ensures certainty of price and instantaneous execution for the full size, whereas Algo Execution exposes the client to market volatility / price movement until the order is fully filled.
  - **Costs:** RTP typically involves higher spread cost due to immediate risk transfer of the large size, while Algo Execution aims to achieve lower aggregated spreads due to trading smaller child orders. However, given the time risk, overall slippage on algo orders could be higher in some cases vs. the RTP price.
  - **Order Rejection Risk:** RTP carries the risk of quote rejection before execution, whereas Algo Execution is more likely to result in partial fills (execution of full size of the order may not be completed) and increase in slippage.
  - **Market Impact:** Generally, not relevant for RTP if full size is traded but may face dealer-induced impact from hedging, while Algo Execution aims to minimise market impact through incremental execution.

Recent Developments in FX Algo Space

- **New Order Types**
  - **Portfolio/Basket Algo**: Relatively new execution tool designed to **reduce slippage** across basket of currency pairs. It employs a risk parameter to balance risk and transaction costs, along with preferred execution styles. The algorithm guarantees execution under normal conditions if within the user's time window and market constraints. It adapts schedules based on net currency risk, market changes, offering a guideline for execution timelines, with analytics available via HSBC's Evolve platform.



  - **Floating Principal Orders:** Enables algo clients to place interest to HSBC market making franchise in an anonymous manner, allowing them to show their interest by pegging orders to a reference mid. This additional liquidity benefits both the algo client and the HSBC franchise.

    This enables clients to reduce cost of execution through passively matching with offsetting interest from HSBC and helps avoid challenges relating to technology, infrastructure and credit. Clients gain indirect access to **HSBC's franchise liquidity**, both internal and external, while maintaining full anonymity. Orders are submitted passively, giving clients control over how far from mid their orders are placed. Low latency infrastructure and co-location further minimise the risk of adverse selection and signaling risk, ensuring efficient and fair execution – the markout chart below shows minimal post execution impact (below chart is for all HSBC orders where internal exchange was used as a liquidity source).

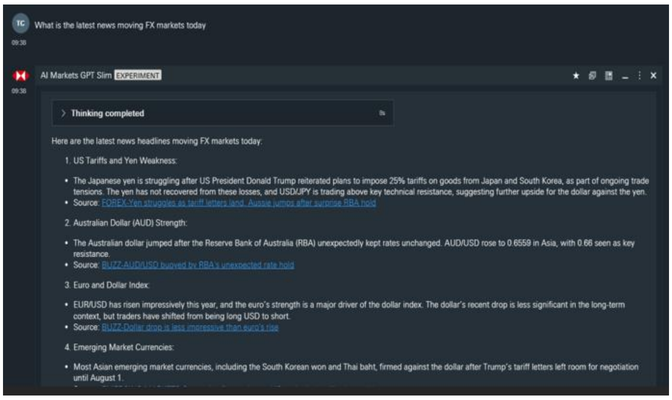
- **SOR Optimisation**: Recent advancements focus on tactical optimisation of order allocation across venues to minimise execution costs, incorporating internal liquidity from providers and dynamically adapting to market conditions, including liquidity fragmentation, microstructure nuances, and venue types. Bespoke configurations allow tailored strategies, such as avoiding certain venues for GTC orders (to avoid signaling risk) and using non-last-look venues only, alongside protections against adverse selection and enhancing execution efficiency.

- **Liquidity Curation**: As discussed in part II for this series, LPs have increasingly focused on optimising their liquidity curation strategies by carefully considering key factors such as fill ratios, round trip times, and markout analysis. This shift reflects advancements in technology, data analytics, and market practices that enable LPs to make more informed and strategic decisions about where and how to source liquidity. The emphasis on high fill ratio and low round trip times reflects improvements in infrastructure and the adoption of new technologies (in server architecture and networking solutions) that allow for low latency and faster processing.

- **New Markets:** Algo providers – including HSBC – have long supported USD-Asia NDF pairs and are now expanding to include other pairs including USDBRL. They offer solutions for non-standard tenors and ensuring that their algorithms interact directly with the liquidity from OTC and major futures exchanges like B3.

The Future Trajectory: What's Next for FX Algos?

- **AI and Machine Learning:** The evolution of machine learning models has enabled algos to transition from static, rule-based systems to dynamic, adaptive frameworks capable of responding to shifting market and risk conditions. This trend is expected to persist, with predictive analytics increasingly incorporating historical performance and simulations to provide insights into expected liquidity, impact, and volatility. Also, the rise of generative AI (GenAI) and large language models (LLMs) has further enhanced automation of routine tasks and innovation in algorithmic strategies, leveraging both structured and unstructured news. HSBC continues to advance in this space with AI Markets, an award-winning, digital services offering, that uses purpose-built natural language processing (NLP) to enrich the way institutional investors interact with global markets. Example below shows interaction over AI Markets.



- **Simulation and Back-testing:** In the future, clients will make use of more insights into algo performance through simulation, back-testing, along with advanced pre-trade analytics offered by LPs. These insights could be bolstered by custom strategies leveraging existing or new machine learning models, enabling clients to run simulations using historical and real-time market data while adjusting key parameters such as aggressiveness, routing, pacing, and sizing.

- **Latency and Process Improvement:** Focus appears to be shifting from microsecond speed advantages to end-to-end process automation – like pre-trade decision support tools, more automation in post-trade allocation and creating a seamless workflow – this could mean more capex being moved from colo to campus/cloud infrastructure for process automation and advanced analytics using ML and GenAI.

- **Curation of Liquidity:** Market venues could start offering advanced techniques to customise liquidity pools for specific order types, and algos could be configured to dynamically avoid venues with high impact and seeking out natural interest to minimise impact.

- **Advanced Analytics and TCA:** The strong trend in need for analytics is likely to continue with more advanced real-time analytics that provide feedback during the execution of an order and use of GenAI for generating custom stats and charts using data from multiple sources. We are also likely to see more predictive pre-trade tools to accurately forecast costs, incorporating headlines sentiment and data releases as part of overall algo offering.

- **Expansion into New Markets:** Continued push into NDFs, and onshore markets (e.g., INR, KRW, CLP), along with entry into FX Swaps, requiring algos that can navigate different regulatory and liquidity environments.

- **The Rise of Multi-LP Algos:** Platforms could offer clients a suite of algos from multiple different providers through a single connection, allowing for true "best-of-breed" execution without the high cost of integrating with each provider individually along with providing standardised TCA and other analytics, and even switching providers during execution.

Future Growth Drivers

- Regulatory changes, the pursuit of cost reduction, the demand for increased transparency, and the rising complexity of market structures are the primary forces propelling the growth of FX algo trading. These drivers have created a powerful feedback loop: as more participants adopt algos to solve these challenges, the market becomes even more electronic, complex, and data-driven, further accelerating the growth of algorithmic execution.

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