FX Algorithms

A useful addition to your execution toolkit

STUDY SUMMARY

Virtu's proprietary FX transaction cost data (TCA) was used to examine the suitability of FX algos versus competitive bids. The study reveals that FX algo trade cost distribution was much wider in comparison to trades executed electronically via RFS/RFQ in a multi-dealer platform (i.e., competitively bid trades) across all deal sizes. However, in deals over US$10-$50 million, the competitive bids reached an inflection point and became more expensive—a potential competitive advantage in the use-case for FX algos. Conversely, as shown in Figure 5, our data also revealed that the majority of algo orders were smaller than US$25 million. As the institutional community increases their use of FX algos, we anticipate that the order size will increase.

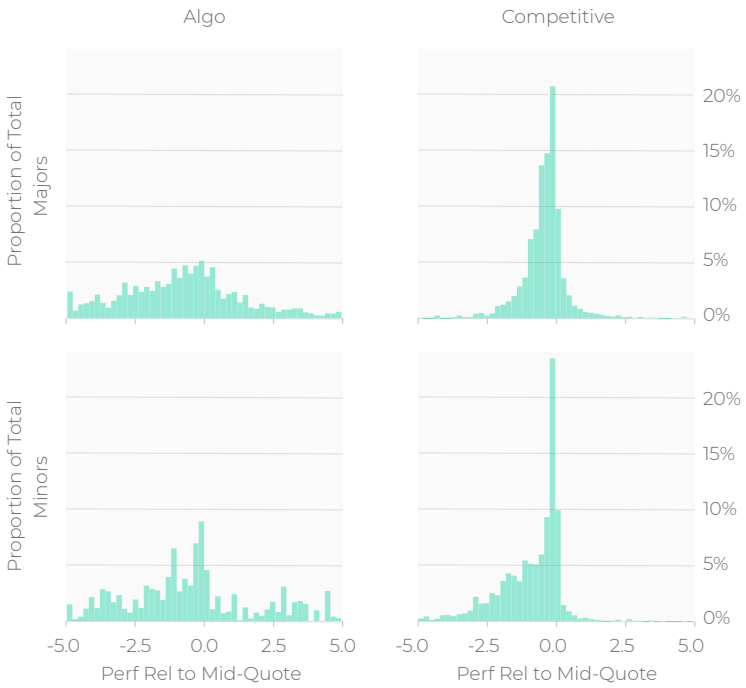
INTRODUCTION

Over the last decade, FX algos were relegated to the execution periphery—used by only a handful of large institutions. Now becoming mainstream, it is estimated that 20% of US institutional traders utilize FX algos to complete some of their FX executions. Correspondingly, we see the same widespread adoption trend across our FX TCA client base (a mix of large active clients, mid-size and smaller firms).

The goal of this analysis is to help determine the best use-case of FX algos by answering the following questions: Is there is an optimal time to use an FX algo? What is the expected cost of completing a trade competitively versus via an FX algo? Does performance vary by size or currency pair?

Figure 1. FX Trades Over US$10m Cost Relative to the Mid-Quote[2]

Major and Minor Currencies: FX Algo and Competitive Bid Compared



We compared the cost relative to the mid-quote of trading 11 liquid-currency pairs competitively versus using FX algos.

Source: Virtu Analytics, 2019

To answer these questions, we compared the cost relative to the mid-quote of trading 11 liquid-currency pairs competitively versus using FX algos. Our analysis determined:

1. Competitive spot prices are priced very close to the mid-quote.
For the most liquid pairs—EUR/USD, and USD/JPY—the median performance was within -0.5 bps of the prevailing mid-quote for orders up to US$25m.

2. FX algo performance varied substantially.
For orders over US$10m in the majors, about 65% of FX algo trades underperformed the mid-quote, while 10% underperformed the mid-quote by -10 bps or more. For the minor pairs, 95% of all FX algo orders underperformed the mid-quote, about 10% underperforming by -10 bps or more.

Interestingly, 10% of all FX algo orders in the majors over US$10m in size outperformed the mid-quote by 3 bps. For the minors, 10% of orders over US$10m outperformed the mid-quote by 0.4 bps.

3. FX algos become cost-competitive when trading in size.
Our analysis shows that execution costs for competitive bids rose linearly with order size until a certain tipping point. At that point, varying from US$10m to US$50m with the currency pair, competitive orders costs started increasing more rapidly—providing an opportunity for algo execution.

4. Patience may pay off for FX algo traders.
Adopting aggressive limits, traders could benefit from the opportunities to capture the spread in FX algo trading. For traders using FX algos for operational purposes, i.e.: to fund a trade in the equity market, FX market volatility makes those opportunities harder to capture.

Source:
[1] Press release: Algos Advance on FX published by Greenwich Associates, October 22, 2019.
[2] For Jan 2019 forward, mid-quote prices used Virtu's new FX benchmarks, offering millisecond timestamp precision and enhanced breadth of coverage.

METHODOLOGY

Virtu's FX TCA services over 100 clients, globally. For the purposes of this study, we compared the performance of our clients' liquid-currency pair execution for the 12-month period of September 2018 to August 2019. To create a suitable universe of orders, we limited the analysis to an aggregate of our largest clients—we did not want a client's creditworthiness to affect the execution prices. In addition, we limited our analytical scope to include only trades executed electronically, either via an RFS/RFQ on a multi-dealer platform or via an FX algo. Accordingly, the study does not include voice, portfolio and other trades with a manual component. We also eliminated swaps.

Using the resultant data-set we analyzed performance for the 11 currency pairs:

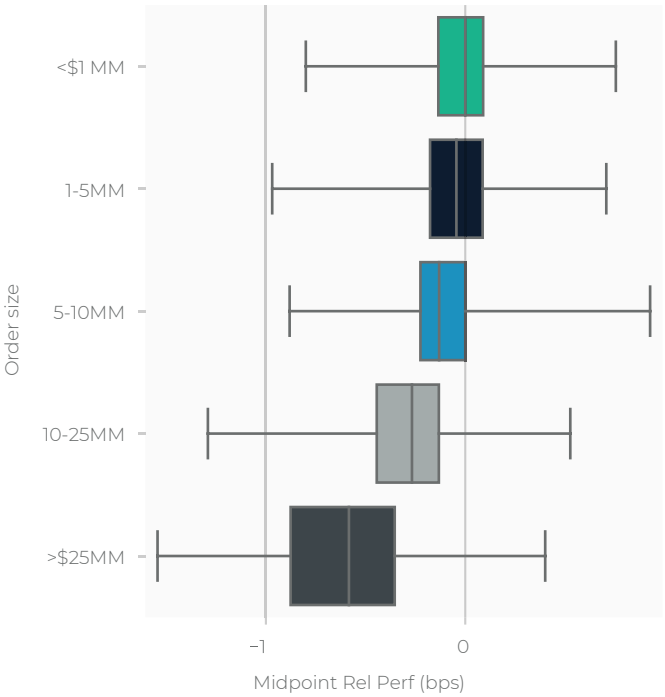
- AUD/USD
- EUR/USD
- GBP/USD
- NZD/USD
- USD/CAD
- USD/CHF
- USD/HKD
- USD/JPY
- USD/MXN
- USD/SEK
- USD/ZAR

Approximately 90% of the orders were competitively bid and 10% were FX algo orders.

In the first phase of analysis, we evaluated the performance of competitive trades. In figures 2-4, we plot the distribution of performance relative to the mid-quote at the order start for three currency pairs. In each chart, we sub-divide orders into five size categories: <US$1m to >US$25m. The following box-and-whiskers plot (aka boxplot) chart the distribution and results from the 5th percentile to the 95th percentile performance. From the left, the first end-point is the 5th percentile performance (worst performing), the box starts at the 25th percentile and ends at the 75th percentile while the right-most end is the 95th percentile cost. The middle is the median value.

Note: Unlike other asset classes, the distribution of FX trading costs is uniform. As a result, the weighted mean cost of all trades is approximately equal to the median cost.

Figure 2: EUR/USD
Performance Relative to Mid Point for Competitive Deals by Order Size



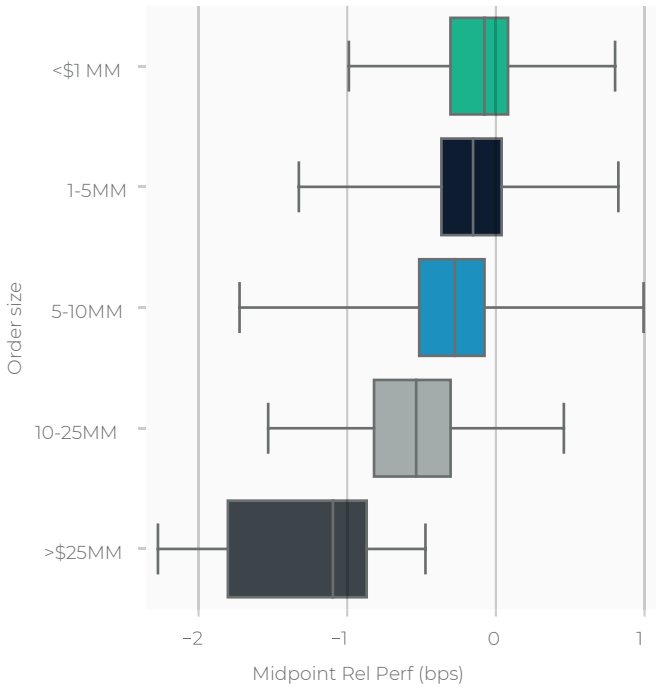
The competitive bid inflection point:

US$50m

The realized costs for competitive deals rise uniformly with a slight bump in the cost for the largest trades.

The linear pattern increases in costs until an inflection point and may represent a counterparty's willingness to absorb the trade's risk. Further in-depth analysis, not presented here, reveals that this inflection point becomes most evident with orders of greater than US$50 million for EUR/USD.

Figure 3: GBP/USD
Performance Relative to Mid Point for Competitive Deals by Order Size



The competitive bid inflection point:

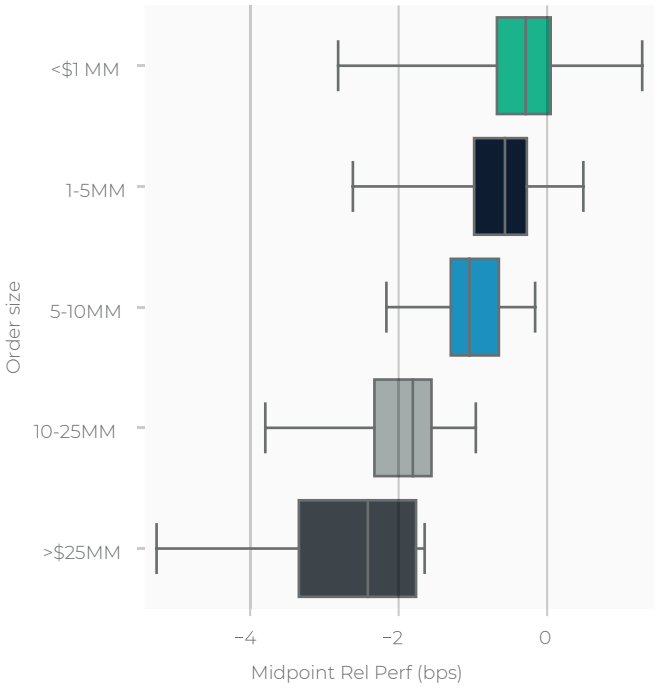
US$25m

We see a very similar pattern of costs that are marginally higher.

The GBP/USD inflection point at >US$25m is more pronounced..

Source: Virtu Analytics, 2019
[3] Box and Whiskers or Boxplot: In descriptive statistics, a box plot or boxplot is a method for graphically depicting groups of numerical data through their quartiles.

Figure 4: USD/MXN
Performance Relative to Mid Point for Competitive Deals by Order Size



The competitive bid inflection point:

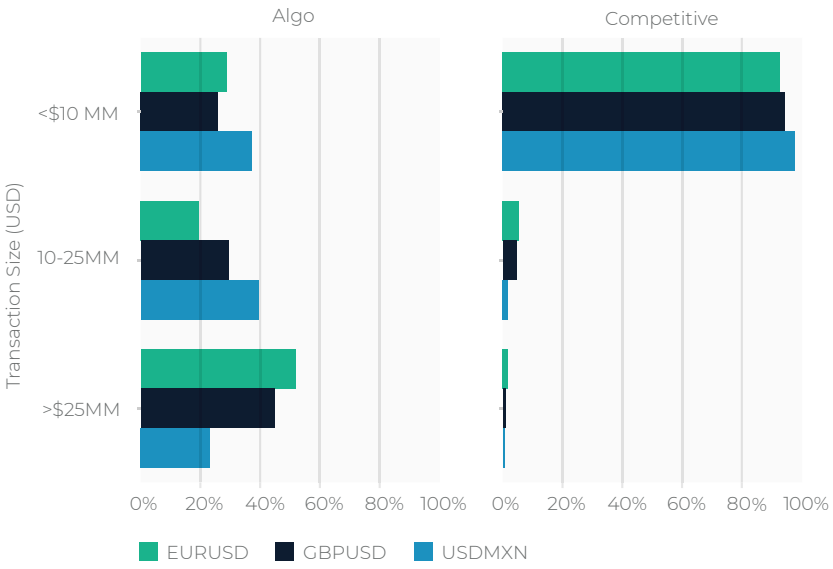
~US$10m

USD/MXN depicts results for a liquid minor currency pair.

HOW DOES COMPETITIVELY BID DEAL PERFORMANCE COMPARE TO FX ALGO PERFORMANCE?

We anticipated that the sample FX algo executions would be large-in-size, with little activity below US$25m. As depicted in Figure 5, for the three currency pairs, the size of the FX algo deals splits evenly into three categories: <US$10m, US$10-25m and US$25m+ . USD/MXN algo trades are slightly smaller, while the EUR/USD algo trades were larger.

Figure 5: Proportion of EUR/USD, GBP/USD and USD/MXN
Orders by Order Type and Size



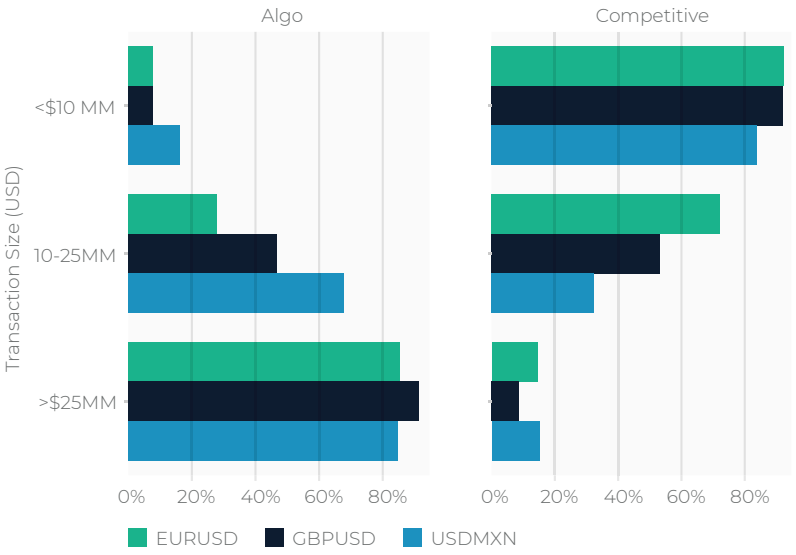
On the right- side of the chart, we have plotted the distribution of competitive deals for the three currencies. As expected, the number of competitive deals skews heavily to the smaller sizes for all three currencies.

Note: There were tens of thousands of observations for competitive deals. Even a small percentage of the total is robust enough for statistically significant results.

Source: Virtu Analytics, 2019
[4] The smaller than expected size of FX algo orders may be due to our clients' newness to FX algo usage. Some clients use FX algos for operational convenience, as well, even though algos carry a higher brokerage fee.

Figure 6 provides an alternative view of the data, breaking down the sample by percentage executed via competitive bid versus algorithmically for the same deal sizes.

Figure 6: Proportion of EUR/USD, GBP/USD and USD/MXN
Value Traded (USD) by Order Size

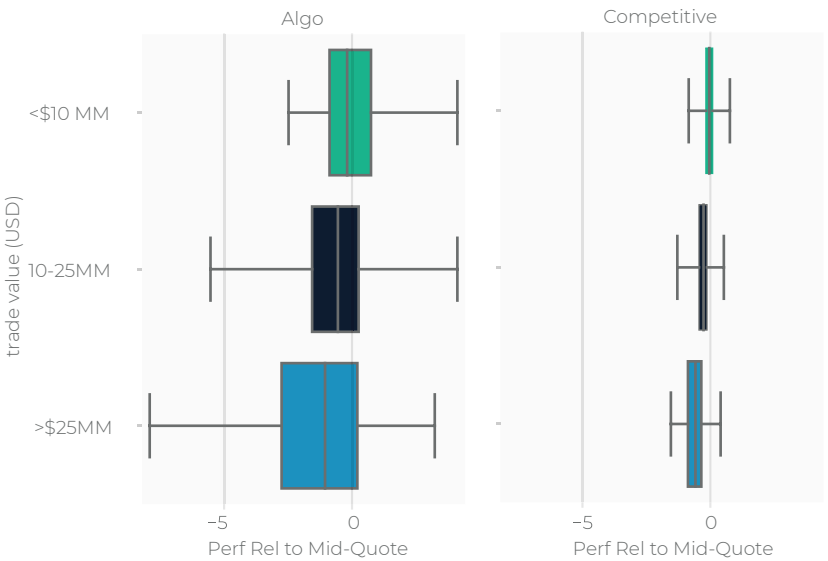


Over 80% of the volume in the smallest FX deal sizes were completed competitively while over 80% of deals of over US$25 million were completed algorithmically. For orders in between, the FX algo usage varies with the currency pair's liquidity–30% of EUR/USD and 70% of USD/MXN orders between US$10m and US$25m were executed algorithmically.

DO FX ALGOS DELIVER GOOD VALUE?

Next, we compared the distribution of costs of competitively bid deals versus algo executed FX deals for these three order sizes. FX algo performance data has a much wider dispersion compared to the competitive deal-bid and, for the largest deals, we begin to observe a negative skew to the results.

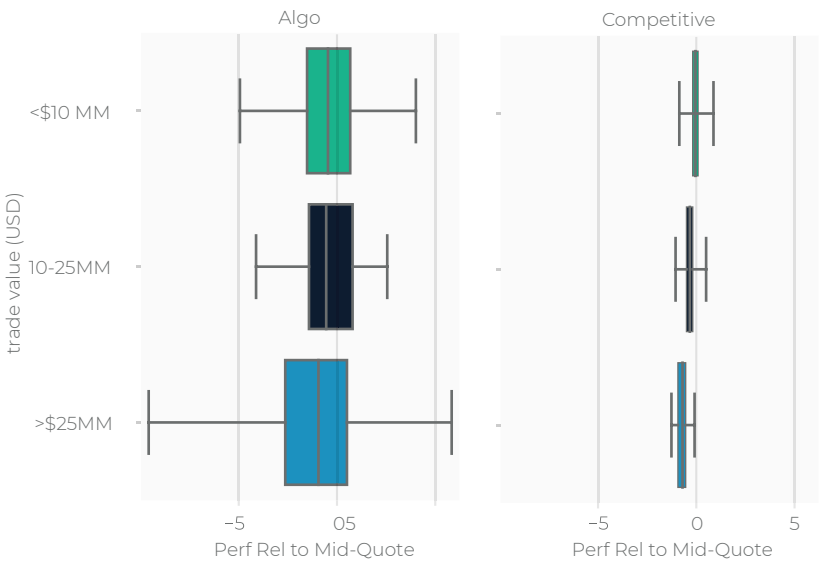
Figure 7: EUR/USD
Performance Relative to Midpoint by Order Type



FX Algo performance data has a much wider dispersion compared to the competitive deal-bid and, for the largest deals, we begin to observe a negative skew to the results.

Source: Virtu Analytics, 2019

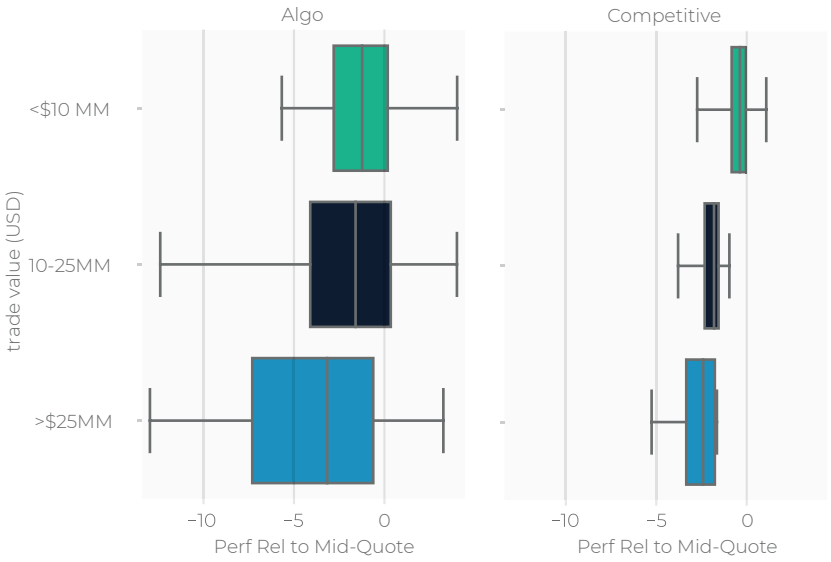
Figure 8: USD/JPY
Performance Relative to Midpoint by Order Type



A similar pattern is observed in the distribution of costs for USD/JPY trades executed algorithmically.

In this case, we see more opportunities for outperformance in the long right tails of the algo cost distribution.

Figure 9: USD/MXN
Performance Relative to Midpoint by Order Type



The USD/MXN algo cost distribution also exhibits a similar pattern with longer negative tails reflecting the pair's higher volatility.

Source: Virtu Analytics, 2019

OTHER CONSIDERATIONS

In reviewing the data for this study, we examined several possible biases. First, we organized the data into half-yearly subsets and found that our conclusions held across all time subsets. Next, we removed one or more clients from our aggregated subset to ensure that our results were consistent across all clients. Last, we examined possible time-of-day biases—was the distribution of trading during the day similar for competitive and algo trades—and determined that it was.

We also examined the distribution of algo performance by algo duration and confirmed, not surprisingly, that the variance in performance rises with time to completion. For algos completed within the first five minutes, the cost distribution is analogous to competitive bids, while orders taking an hour or more to complete had a very wide variance in costs.

CONCLUSION

Institutional investors seem to be more comfortable and are increasingly adding FX algos to their execution toolkit. Examining 2019 data, we found that algo trade cost distribution was much wider in comparison to competitive bids across all deal sizes. However, in deals over US$10-$50 million, competitive bids reach an inflection point and become more expensive. This insight may offer a competitive advantage in the use-case for FX algos.

Conversely, our data also revealed that the majority of algo orders were smaller than US$25 million. As the institutional community increases their use of FX algos, we anticipate that the order size will increase. It remains to be seen if the distribution of FX algo costs change over the course of 2020, our goal is to update our findings in early 2021.

Anecdotally, client consensus is that in the short- or long-term duration of out of box FX algos do not deliver on their anticipated value. In response, clients are fine-tuning the FX algo parameters to better align performance with expectation. Accordingly, we expect cost distribution to narrow. For active FX algos users, median performance should outperform competitive deals. Whereas for infrequent FX algo users, it is unclear if the dispersion in algo costs would be worth a possible improvement in price.

ABOUT VIRTU

Virtu is a leading financial services firm that leverages cutting-edge technology to provide execution services and data, analytics and connectivity products to its clients and deliver liquidity to the global markets. Leveraging its global market making expertise and infrastructure, Virtu provides a robust product suite including offerings in execution, liquidity sourcing, analytics and broker- neutral, multi-dealer platforms in workflow technology. Virtu's product offerings allow clients to trade on hundreds of venues across 50+ countries and in multiple asset classes, including global equities, ETFs, foreign exchange, futures, fixed income and myriad other commodities. In addition, Virtu's integrated, multi-asset analytics platform provides a range of pre and post-trade services, data products and compliance tools that clients rely upon to invest, trade and manage risk across global markets.

Questions about this topic?
Contact us at analytics@virtu.com or +1.212.588.4812

© 2020 Virtu Financial, Inc. All rights reserved. Not to be reproduced or retransmitted without permission. These materials are for informational purposes and are not intended to be used to make trading or investment decisions, they are not intended as an offer to sell or the solicitation of an offer to buy any security or financial product, and are not intended as advice (investment, tax or legal). The information contained herein has been taken from trade and statistical services and other sources we believe to be reliable but we do not represent that such information is accurate or complete and it should not be relied upon as such. No guarantee or warranty is made as to the reasonableness of the assumptions or the accuracy of the models or market data.

Securities products and services are offered by the following subsidiaries of Virtu Financial, Inc. In the U.S., Virtu ITG LLC or Virtu Americas LLC, both FINRA and SIPC members; in Canada, Virtu ITG Canada Corp., member Canadian Investor Protection Fund ("CIPF") and Investment Industry Regulatory Organization of Canada ("IIROC"), MATCHNow® is a product offering of TriAct Canada Marketplace LP ("TriAct"), member CIPF and IIROC. TriAct is a wholly owned subsidiary of Virtu ITG Canada Corp.; in Europe, Virtu ITG Europe Limited, registered in Ireland No. 283940 ("VIEL") (VIEL's registered office is Whitaker Court, Whitaker Square, Sir John Rogerson's Quay, Dublin 2, Ireland. VIEL is authorized and regulated by the Central Bank of Ireland), and Virtu Financial Ireland Limited, registered in Ireland No. 471719 ("VFIL") (VFIL's registered office is Whitaker Court, Whitaker Square, Third Floor, Block C, Sir John Rogerson's Quay, Dublin 2, Ireland. VFIL is authorised and regulated by the Central Bank of Ireland); in Asia, Virtu ITG Hong Kong Limited (SFC License No. AHD810), Virtu ITG Singapore Pte Limited (CMS License No. 100138-1), and Virtu ITG Australia Limited (AFS License No. 219582).