Update on algorithmic trading in bond markets

Andrew Millward
Head of EMEA Macro Trading

Prepared for the ECB BMCG Meeting 20 November 2019
How bond market algorithms differ from those developed for other markets

Andrew Millward, Morgan Stanley
How bond market algorithms differ from those developed for other markets

The design of market-making algorithms is dictated by the particular market structure of each asset class.

### PRICE FORMATION

1. **Defining fair value**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **FX**   | Data driven | • Aggregation of market data feeds across regions and venues  
|          |           | • Where is the latest and most relevant information?  
|          |           | • How fast can you ingest, digest and react to market changes?  |
| **EGBs** | Model driven | • Utilize futures price and reference price (i.e., TW composite)  
|          |           | • How do you define relationships between correlated instruments?  |

2. **Building a price around the fair value mid**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **FX**   | Low information environment | • Often trade on stream with limited pre-trade information  
|          |           | • Send best possible price  |
| **EGBs** | Complex information set | • Win the inquiry; then win the trade  
|          |           | • Ability to build a price using historical data and RFQ-specific information  |

### INVENTORY AND RISK MANAGEMENT

3. **Hedging instruments & hold times**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **FX**   | Same-security hedging | • Hedge with the same instrument  
|          |           | • Close position at will in the market  
|          |           | • Short hold times  |
| **EGBs** | More instrument fungibility | • Most risk is lower-order; hedge duration but left with spread, curve or basis risk  
|          |           | • Holding periods are longer  
|          |           | • No guarantee of finding a price in the same security  |
How algorithms can affect the market functioning and what could be done to mitigate those risks

Andrew Millward, Morgan Stanley
Impacts of algorithmic pricing on trading and execution behavior

Algorithmic pricing has many beneficial consequences for the liquidity landscape and buy-side execution, including benefits for voice trading

1. Market making desks are able to disseminate prices to a wide audience quickly and efficiently

2. Algorithmic execution incentivizes clients to break down trades into smaller clips, allowing for automated execution, limiting market impact and minimizing information leakage

3. More data available to both buy and sell side, enabling data-driven counterparty selection, pre and post-trade analysis

4. Algorithmic pricing and automated responses gives voice traders more capacity to allow for focus on complex situations or large risk transfer

5. Market makers are able to provide faster and more consistent responses to inquiries
Challenges introduced by increased algorithmic pricing

The impacts of a market structure evolution depend on the ways in which clients and market makers adapt to the changes

Challenges for market makers in an increasingly automated market making environment:

- Increasing reliance on technology and stability of ECNs/exchanges/venues
  - For connectivity to hedging sources
  - To perform real-time reconciliation of trades
  - Introduces need to monitor outages, connectivity, latency, limits

- A shift in execution methods will impact the type of pre-trade information exchanged
  - There is different information value in large block trades vs. smaller electronic clips
  - There is different information value for in-comp RFQs vs. trades on bilateral streams
  - The counterparties in a bilateral out-of-comp trade both benefit, with limited information leakage / market impact

- Necessitates a cultural shift on the trading floor
  - Different skill sets become very valuable
  - Flow sales must adapt to a changing method of execution and dealer measurement from their clients

- Client expectations for fast and consistent responses can be difficult to fulfill in volatile market conditions
  - In an increasingly electronic environment, the absence of automated pricing or electronic liquidity during periods of high volatility can be disruptive to a client's regular workflow
## Steps for risk mitigation

Algorithmic trading requires a focus on operational resiliency of the plant and strict controls

<table>
<thead>
<tr>
<th></th>
<th>Plant capacity</th>
<th>Ensuring sufficient capacity for a material increase in volume, volatility or market failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Outage management</td>
<td>Minimize risks that system failures prevent access to the markets; minimize duration of any incidents</td>
</tr>
<tr>
<td>3</td>
<td>E-Trading governance</td>
<td>Sufficient oversight and management to minimize operational risks, oversee client enablement processes, technology incident reviews, etc</td>
</tr>
<tr>
<td>4</td>
<td>Algo governance</td>
<td>Strategic governance framework to review new models or material changes to existing algorithms</td>
</tr>
<tr>
<td>5</td>
<td>Risk controls</td>
<td>Multi-layered overlapping controls designed to manage market impact, counterparty risk, market risk, low latency controls / kill switches</td>
</tr>
</tbody>
</table>

Algorithmic market makers must strike a balance between protecting the book from risk events while also consistently providing prices to clients
Possible impact on bond market functioning

- “Flash crashes” have historically occurred in substantially electronic markets where there is a temporary supply/demand imbalance in thin liquidity conditions, and mechanical rules-based strategies are triggered.

- In the European bond markets, a significant move in Futures prices would be a catalyst for algorithmic pricing to be temporarily turned off or widened:
  - Market makers would have difficulty hedging if there is volatility or lack of liquidity in the futures market.
  - However, liquidity would still be available to clients, albeit with more conservative and likely manual pricing.

While turning off algorithmic pricing in periods of market stress could temporarily disrupt the EGB market, the biggest impact is to the client experience.
The information in this material was prepared by sales, trading, or other non-research personnel of Morgan Stanley for institutional investors. This is not a research report, and unless otherwise indicated, the views herein (if any) are the author’s and may differ from those of our Research Department or others in the Firm. This material is not impartial and is not independent of the interests of our trading and other activities, which may conflict with your interests. We may deal in any of the markets, issuers, or instruments mentioned herein before or after providing this information, as principal, market maker, or liquidity provider, and may also seek to advise issuers or others, we may also provide investment banking services to companies mentioned herein and may offer or sell their securities or other financial instruments or financial products for the account of such companies. Morgan Stanley, its affiliates, and/or employees may have a position in and hold, or take a long or short position in, any or all of the securities or instruments mentioned herein. Morgan Stanley, its affiliates, and/or employees may conduct business with, provide a facility for transactions to be effected for, or act as agent or principal for, any issuer of any of the securities or instruments mentioned herein or any buyer or seller in respect of securities or instruments so mentioned. Morgan Stanley, its affiliates, and/or employees may have sold or transferred, directly or indirectly, to or for the benefit of any resident of Japan pursuant to an exemption from the registration requirements of and otherwise in compliance with the Financial Instruments Exchange Law and other relevant laws and regulations of Japan. As used in this paragraph, “resident of Japan” means any person resident in Japan, including any corporation or other entity organized or engaged in business under the laws of Japan. If you reside in Japan, please contact Morgan Stanley MUFG Securities Co., Ltd. for further details at +813-6836-5001. This information is distributed by Morgan Stanley Australia Limited A.B.N. 67 003 734 576, holder of Australian financial services license No. 333742, which accepts responsibility for its contents, and arranges for it to be provided to potential clients. In Australia, this report, and any access to it, is intended only for “wholesale clients” within the meaning of the Australian Corporations Act. For additional information and important disclosures see http://www.morganstanley.com/disclosures. The trademarks and service marks contained herein are the property of their respective owners. Third-party data providers make no warranties or representations of any kind relating to the accuracy, completeness, or timeliness of the data they provide and shall not have liability for any damages of any kind relating to such data. This material may not be reproduced without the prior written consent of Morgan Stanley. © 2019 Morgan Stanley