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Update on Algorithmic Trading

ECB Bond Market Contact Group, 20th November 2019

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1. Execution Strategies in Fixed Income

Where have automated strategies evolved?

January 2016 status

EMEA	Dealer-to-Client		Dealer-to-Dealer
Matching	RFQs		Central Limit Order Book (CLOB) <i>price-driven</i>
Main Venues	Tradeweb, Bloomberg, BondVision		Brokertec, MTS Markets
	<u>Client Side</u>	<u>Dealer Side</u>	
Participant Types	Institutional clients mainly asset managers	Dealers mainly	Dealers only
Trade match automation	High touch, all manual	Some auto-response	Low touch, mostly automated
Degree of Automation	Automation focused on increased efficiency: - Order Management Systems - Trading tools e.g. bid lists - Post-trade processing of tickets	Automation focused on inquiry handling: - Certainty in mids - Auto-responding - Auto-hedging - Others e.g. risk, credit	Automation focused on Speed: - Data feeds - Trading APIs - Fibre optic networks - Some co-location
Speed	Low Speed	Moderate Speed	High Speed

Since January 2016

Significant evolution

Moderate evolution

Moderate evolution

Buyside automated execution strategies

Buyside executions strategies → All Venue-developed

Auto-select Winning Dealer

- First generation execution strategy with basic “trade at best price” auto-selection
- **Evolution:** Tie-break logic allowing clients to pre-determine order of dealer preference (UST)

List Trades

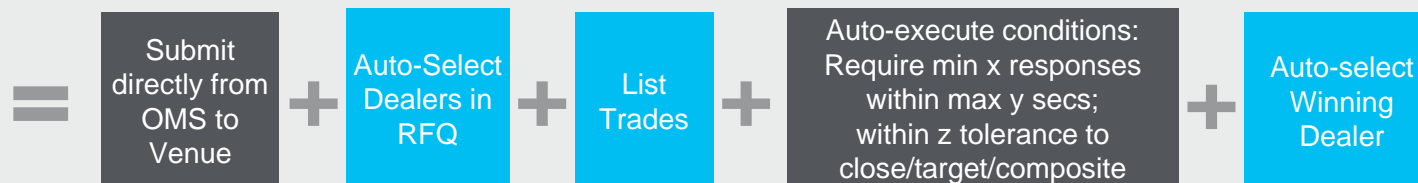
- Execution strategy allowing clients to group multiple in-comp inquiries e.g. eod re-balancing
- **Evolution:**
 - Formed basis for Swaps Compression Trading and ETF Portfolio Trading
 - Increased use led to multiple other execution strategies mentioned below

Auto-Select Dealers in an RFQ

- Execution strategy allowing clients to pre-determine order of dealer preference in an RFQ / List RFQs; earliest strategy was “static” by issuer and/or on “rotation” from a pre-set broker list
- **Evolution** Added a dynamic element by combining with a preferred weighting of:
 - Best prices in stack; Axe indications from dealers; Historical dealer performance

Auto-execute

- **Evolution** Most sophisticated and most game-changing algorithmic execution strategy for clients
 - “No touch” direct RFQ submission from client OMS to Venue with auto-execution
 - Utilises existing execution strategies and adds two more to create one combined strategy



Process Trades

- **Evolution**
 - “Execution Strategy” allowing clients to add efficiency to their voice flows
 - MIFID2 assistance tool for reporting, best ex audit trail, record-keeping

Sellside automated execution strategies

Sellside Execution Strategies → All Proprietary Solutions

Market Making

- Earliest algorithmic strategy allowing dealers to fulfil quoting obligations on various D2D Bond/Swap TVs
- **Evolution** Has been moderately evolving, mostly around accuracy and speed
 - Increased data available providing further confidence in price generation
 - More sophisticated technology available to address latency
 - D2C Market Making

D2C Auto-response

- Earliest execution strategy allowing dealers to focus on risk trades and increase hit rates in small tickets
- **Evolution** As e-trading grew, increased size and extended to less liquid instruments, even corporates

Auto-hedging

- Rapidly growing execution strategy allowing dealers to deploy a hedge with more certainty, less basis risk and less market impact
- **Evolution** Increased use of “smarter hedge” algorithms to optimise macro risk exposure and cost outlay

D2C Algo Trading

- Rapidly growing execution strategy allowing dealers to fully automate and separately manage “algo size” client RFQs through a “no touch” process
- **Evolution** Extended scope significantly: 0% in Jan 2016 to >40% EG e-tickets
 - Utilises existing execution strategies and increased reliability/logic in indicative price streams



Large Order Management

- **Evolution** Leveraging current technology/data to suggest execution and risk management of large orders
 - Ability to view multiple liquidity sources simultaneously, not possible by one trader
 - Ability to substantially reduce information leakage and market impact

What can we expect next?

Dealers

- Expect continued emphasis on speed and latency in D2D markets
- Expect smarter quoting to achieve required outcomes e.g. balance sheet reductions
- Expect increased algo % at market makers, in some cases to 100%
- Will there be more price makers in less liquid segments such as credit?

Clients

- Expect speed and automation efforts to increase
- Expect Hedge Funds to increase use of systematic trading strategies
- Expect emphasis on automation of voice flows
- Will there be *in-house/off-Venue* implementation of current execution strategies?
 - Increasingly utilising “EMS-style” functionality evidenced through increased demand for direct pipes containing dealer streamed pricing and axe indications
- Could future execution strategies include “smart selection of *Venue*”?
 - Currently client’s *Venue* choice is sticky – TVx for Rates, TVy for Credit

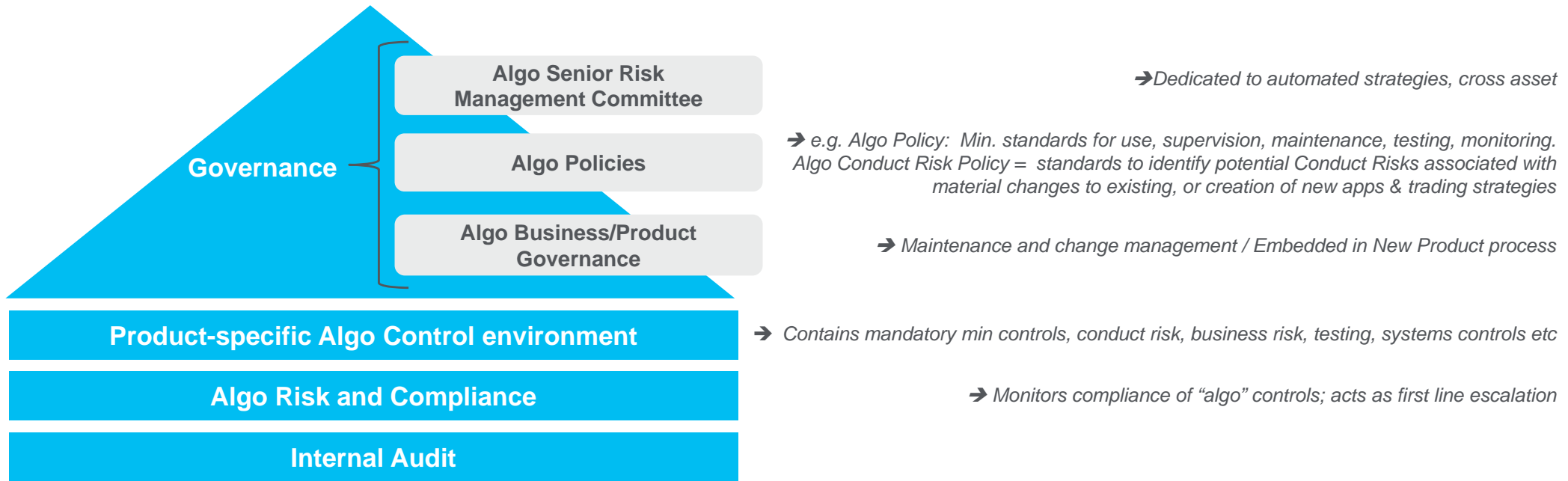
D2C Trading Venues

- Expect increased use of and demand for firm pricing (growing share of UST market)
- Expect some form of laddered pricing to be introduced alongside greater use of firm pricing capability
- Will this result in the creation of an executable order book?

2. Execution Strategies - Risk Management

Fixed Income Execution Strategies – Risk Management

- **Unprecedented emphasis** on risk management of algorithmic trading strategies compared to Jan-2016
 - External requirements: MIFID2, NCA-specific (e.g. FCA/PRA, BAFIN...)
 - Regulatory objective has been to
 - Mandate transparency of all “black boxes” and their intentions
 - Make firms accountable for the risk management of algos – risk assessment, risk controls, change procedures
- **Typical Dealer Framework for automated strategies:**



- **Ideal outcome: Deeply embedded within the firm so becomes self-regulating**
 - Undeniably increased awareness e.g. asymmetric last look, spoofing, front-running
 - ...despite criticism that controls are disproportionate for some types of algorithms e.g. RFQ-related
- Will this heightened risk management LOWER the frequency of market disruption/malpractice?

Sellside automated execution strategies: Risk Management Controls

Examples

<u>Automated Strategy</u>	<u>Controls</u>
---------------------------	-----------------

- | | |
|---------------------|---|
| • D2D Market Making | Volatility, Position Limits |
| • Auto-response | Repeat Execution |
| • Auto-hedging | Position Limits; Frequency of Orders; PNL/Risk reconciliation |



Triggers “Kill Switch” halting the relevant algo and any related algos

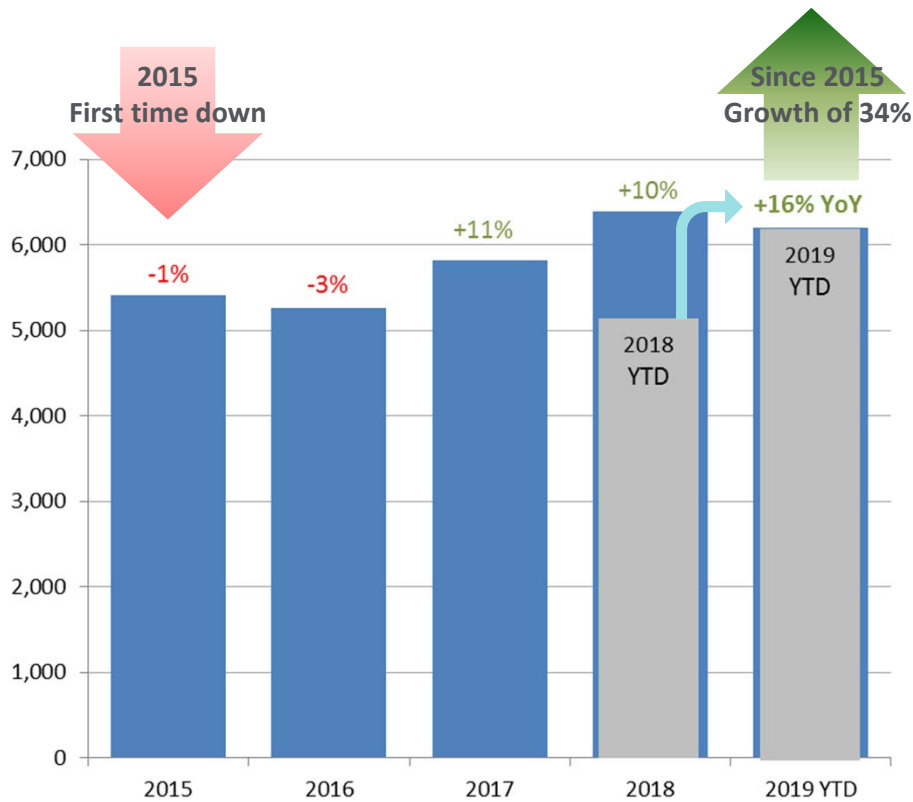
3. Appendices



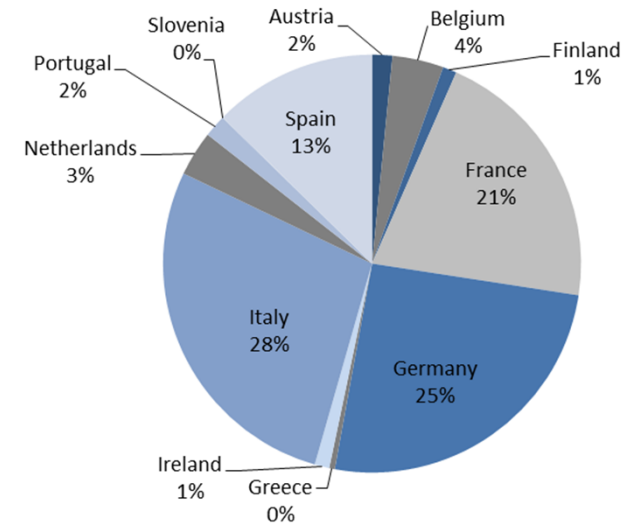
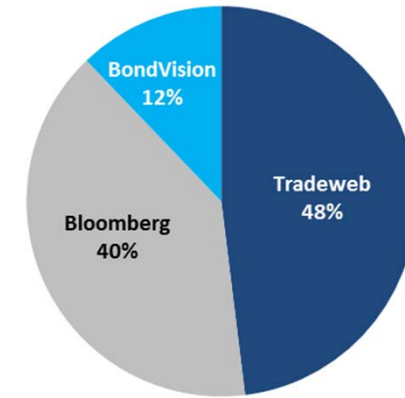
What has changed since Jan 2016?

Electronic trading has grown every year since 2016 and looks set for the largest growth this year*

**Euro Government Client e-Market
Annual Notional Volume (€ Billions)**



Source: Tradeweb, Bloomberg, BondVision



*Euro Govt Bonds used as example (similar trends seen in Credit, with some nuances as expected)

What has not changed since Jan 2016?

- The fixed income market structure has largely remained intact, whereby majority of bond trading is still:
 - Principal
 - Name give-up
 - Institutional participants
 - Institutional size
 - Voice-negotiation significant, though to a lesser degree
 - Bifurcated Inter-dealer (D2D) and dealer-to-client (D2C) markets
 - Firm price order book in D2D electronic markets
 - Indicative pricing and RFQs in D2C electronic markets
 - Conducted on the same Trading Venues (TVs)

Increased e-trading: cause and effect

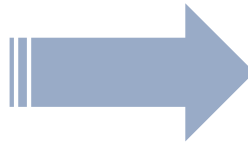
eTrading growth accelerated by:

MiFID2

- Clear Regulatory Objective
- Trading mandates
- Incentives (reporting)
- Easier than voice to record-keep/evidence best ex

Cost Pressures

- Cheaper than voice
- Competition strengthened
- No choice but to increase efficiency



Increased eTrading exposed inefficiencies:

Buyside

- Required more consistent service from sellside:
 - Demanding speed
 - Demanding reliability in pricing, heightened with Hedge Fund use of systematic trading strategies
- Demanded automated tools from Trading Venues

Sellside

- Evident and necessary to:
 - Increase quote rate
 - Decrease time to quote
 - Increase pricing accuracy of “indicative” price streams
 - Decrease slippage
- Competitive pressure esp. in liquid bonds



Result? Increased use of automated execution strategies or “algos”

Note: Evolution in Fixed Income execution reflects the current market structure, merely allowing participants to deploy execution strategies that automate an existing set of processes and rules. So no agency-style TWAP / VWAP references just yet...

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