ICMA
International Capital Market Association

Evolutionary Change:

The future of electronic trading of cash bonds in Europe

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Executive summary

Bond market trading is going through unprecedented change today and will continue to do so over the coming years. The traditional bond trading model, mostly reliant on market-makers and voice broking is being eroded. This is partly due to a natural evolution of bond trading driven by technological progress and the drive for cost efficiencies, resulting in an increasing electronification of markets and regulatory pressures undermining broker-dealers' capacity to hold, finance, or hedge trading positions. The upcoming implementation of Europe's new trading rules under MiFID II will accelerate the market structure transformation.

The focus of this paper is the 'possible' future evolution of electronic trading in European bond markets (a glossary is available at the back of this paper for reference to some of the more technical electronic trading terminology). There are signs of this new 'electronic' landscape to come but no one can predict exactly how the secondary cash bond markets will look in 5, 7 or 10 years. We can only take an educated guess, based on personal market practitioner experience in the asset classes that have gone through the transition to a functioning automated and/or electronic market structure.

What is certain is that bond trading must adapt and innovate in order to endure. This will involve all facets of trading including people, technology and a re-direction of business strategy. The change will affect the entire market place: sell-sides and buy-sides but also trading platforms and ancillary trading technology providers. The bond trading eco-system will see new (and possibly disruptive) entrants, innovative incumbents and adaptive trading protocols and venues emerge. Although often referred to as an 'equitisation' of fixed income, the changes will take a different path to equities. Many believe this transformative pathway will be a painful one as regulation and technology are already proving disruptive influences on the established market structures. However, it is also supposed that this next stage of evolution in the cash bond markets will create opportunities through innovation for its cannier participants.

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Background

Traditionally, fixed income markets have been a combination of voice market making and intermediation (using inter-dealer brokers and hybrid voice-electronic systems to source liquidity), organised largely around banks (broker-dealers) and a relationship-based network of clients. The model has primarily been:

- Broker-dealer to client
  - Bank to asset manager, insurance company, or pension fund manager (the 'Buy-side')
- Broker-dealer to dealer
  - Bank to bank or bank to inter-dealer broker (IDB)
- But not client to client
  - Asset manager to asset manager

The market practice has typically been based on market-makers, which are mostly broker-dealers who provide two-way pricing to their clients in a range of bonds, regardless of their ability to find an opposite seller or buyer at the same time, not least since the simultaneous 'coincidence of want' is highly improbable in bond markets. Where clients are sellers of a bond, the market-maker will show a bid and take the bond onto their own book, which they will hedge and look to sell, either to another client or another broker-dealer, at a later time. Where clients are buyers of a bond, the market-maker will show an offer and sell the bond, which they will cover via the repo market if it leads to a short-sell, hedge and look to buy back in the market at a later time.

In addition, a successful broker-dealer requires three interdependent components in today's environment in order to offer viable market making to counterparties:

- Ability to hold inventory on balance sheet
- A liquid repo market in order to fund long positions or cover short sales
- The capacity to hedge in the derivatives markets

This has been made more difficult due to prudential capital adequacy and leverage rules causing balance sheets and derivatives markets to become far more expensive. As regulatory pressures reduce the capacity for broker-dealers to hold, finance or hedge trading positions, the traditional source of bond market liquidity is being eroded.

Lastly it is important to note that the market structure in fixed income for dealer-to-client has always been identified as 'quote-driven' (versus 'order-driven' in equities). Prices are only offered in response to a counterparty request for quote (RFQ). Because this is unidirectional, details of price formation (including actual volume and size) are not shared with the public. Therefore, quotes and trade prices for an individual bond can contrast widely depending on the broker-dealer.

However, we know that change is afoot. For trading desks, the priority is in achieving the flexibility necessary to access bond liquidity across multiple counterparties and trading platforms while using a variety of protocols. The stage is set for a business model that has more in common with equities electronic trading than ever before.

Evolutionary change

As previously noted, the ability of broker-dealers to provide liquidity as market-makers has greatly reduced. The 'trigger events' for these changes are electronification and automation of bond trading and regulatory pressures.

No one knows for sure yet the percentage split of impact on fixed income markets these evolutionary 'trigger events' have created. However, in regard to regulations, Basel III's impact on market making and MiFID II's (see MiFID II box below) transformational impact on trading practices are the leading contributors to the continued altering state of the market. Technology is the 'forcing mechanism' speeding up this change in fixed income trading. Technology is starting to create a more efficient, rationalised model of trading and some say 'smarter'. However, before this optimised model of fixed income electronic trading is realised, a journey of natural selection has to be undertaken. Like equities, fixed income trading will have its successes and failures or as Darwin puts it: 'survival of the fittest'.

Equities Story

– Why did the equities model change?

In equities, the buy-side wanted to increase efficiency, reduce trade failures and gain more control over their execution. This then led them to look at efficiencies in how they executed.

The buy-side started to investigate if the manner of execution could become more efficient. Buy-side blotters in equities in the early days generally had an 80/20% - liquid/illiquid split. This meant 80% of the orders (order driven market) were easy to trade and available (which is defined as 'liquid') and the 20% were large or tricky to trade and needed sell-side assistance and balance sheet or 'risk' as it was usually referred to. So the market began to see new efficient initiatives such as Direct Market Access (DMA) and algorithms ('algos' complex computer programs following a defined set of instructions) to route easy-to-trade orders via broker networks straight to the exchanges or agency only execution platforms. Direct Market Access and algos allowed clients to directly access execution venues, using the broker-dealer's membership as well as their 'pipes and plumbing'.

- Early equities – Phone driven with on-screen IOIs (Indications of Interest) but no real-time electronic execution. Combination of agency, proprietary and principal trading. Open to abuse as brokers did not have to stand by their IOIs ('phishing' quite prevalent) and priorities between proprietary trades and client trades often became blurred.
- Evolved equities trading - Proprietary trading is restricted (due to regulations such as the Volcker rule affecting American firms), principal trading has diminished as equities has become liquid enough to create order book markets and therefore the demand for risk has more or less disappeared, technologically savvy execution with an audit trail, much more (firmer realistic) pre-trade and post-trade information available to market participants.

Bond Story

– Is fixed income trading ready for change?

Yes and no. Technology is advancing automation in fixed income trading but fixed income markets are significantly different to equities. The fixed income evolutionary path will be different to equities. The equities market is more about 'electronic' trading with characteristics of speed and artificial intelligence (algorithmic and high frequency trading). Whereas fixed income trading is more about 'automation', with desired characteristics of efficiency, optimisation and sourcing.

So, what is the percentage split of liquid versus Illiquid in cash bonds with the buy-side today? As it turns out, it is the reverse picture to equities. We are seeing somewhere in the neighbourhood of 70/30 % (70% illiquid/ 30% percent liquid). The percentage that requires focus is the **70%**. These illiquid trades need strategies that will have the least amount of information leakage and market impact possible. This combination negatively impacts price in the market and damages best possible result for the underlying client. So for least amount of market impact, a buy-side will split his orders into categories, split between time sensitive (where immediacy is key), non-time sensitive, illiquid and liquid.

- **Time sensitive – illiquid:** requires strategies or protocols that involve some form of bi-lateral negotiation such as voice OTC, OTC market making or RFQs. There is a sense of immediacy and due to illiquidity, possible market impact.
- **Time sensitive – liquid:** requires multi-lateral low-touch protocols such as all to all, continuous auction with no worry about market impact as information leakage is not important.
- **Non-time sensitive – illiquid:** requires protocols that are a combination of multi-lateral and bi-lateral, with an anonymous twist. The order can sit and wait for the other side or at the very least the best price. The order interacts anonymously with other participants but there is a negotiation phase before execution. There is no market impact as there is zero chance of information leakage.
- **Non-time sensitive – liquid:** requires trading multi-lateral protocols that are low-touch, such as CLOBS or Smart Order Routing (SOR) technology to multiple CLOBs.

The key element to point out when comparing and contrasting equities to fixed income is that equities are about electronic trading (speed) whereas fixed income is more about the 'automation' of trading (optimisation).

Fixed income and equities similarities:

- Technology – Order Management Systems/Execution Management Systems, FIX Protocol, phone driven with on-screen IOIs (Indications of Interest).
- Buy-side control – Informed decisions with buy-side having more input to price formation. Performance measurement on every stage of the trade including pre and post. Understanding of how execution contributed to fund performance.
- Regulations – Causing a fundamental shift in market structure. Creation of transparency based rules and ideally, increased efficiency in the market.

Fixed income and equities divergence:

Equities:

- Equity Instruments – 6,810 shares admitted to trading on regulated markets in the EU, on average trade 400 times per day.
- Commission based.
- Order driven with Straight Through Processing (STP), using FIX protocol enabling full end-to-end trading with audit trail.
- DMA to exchanges using bank's pipes and plumbing.
- Heavy use of algorithmic trading for electronic statistical and rules based trading in an agency environment.

Bonds:

- Over 150,000 debt securities (contained in Xtrakter's Computer Updated International Database [CUPID]), on average trade 1.5 times per day.[1]
- Quote driven relying on RFQs.
- Different characteristics – each bond can have a different maturity, coupon and rating.
- Heavy use of OTC Markets with market making and balance sheet usage.
- Heavy use of IDBs.

A further note with more in-depth comparison of equities and fixed income markets can be found in the annex, including a look at the impact of MiFID I on equities and MiFID II on both equities and fixed income.

[1] (Biais and Declercq - Academic Study, 2007 and ICMA published article 2009)

MiFID II – Catalyst for change

Background:

Generally speaking, MiFID II concerns the framework of trading venues and structure in which instruments are traded. MiFIR on the other hand, concentrates on regulating trading venues and structuring its operations. So, 'who' the market structures are, 'what' they trade and then 'how' they trade. Regarding trading, the most important obligations are the key pre- and post-trade transparency regulations and Best Execution obligations.

Other MiFID II themes:

- Investor protection:
  Information disclosure obligations shaping the relationship between broker-dealers and investors.
- Conduct of business:
  Alignment of regulation across the EU. Plus, an individual firm's obligation to know one's client.
- Organisational requirements:
  All organised trading will take place either on regulated trading venues RMs, MTFs, OTFs* or by SI*.
  *new to fixed income trading.

MiFID II comes into effect on 3 January 2018 (currently recommended by the Commission). It is also the biggest regulatory 'trigger event' generating change in fixed income trading today.

Key objectives of MiFID II/R and the transparency requirements:

- Move OTC trading onto trading venues, such as OTFs, through a trading obligation for fixed income instruments. Systematic Internalisers will also become more relevant for bond trading.
- Increase transparency and create a price discovery mechanism, by expanding pre- and post-trade transparency requirements to fixed income instruments.
- Preserve liquidity in already challenged markets through:
  - pre-trade waivers and post-trade deferrals; and
  - tailored approach to calibration of transparency requirements for different types of trading systems.
- Increase available data (so that market participants are informed as to the true level of potential transactions).

The new fixed income trading 'eco-system':

Regulated Market (RM)

A multilateral system operated and/or managed by a market operator, which brings together or facilitates the bringing together of multiple third-party buying and selling interests in financial instruments. In addition, RMs will be subject to enhanced governance requirements including numerical limits on directorships, diversity obligations, and mandatory nomination committees.

Multilateral Trading Facility (MTF)

A multilateral system, operated by an investment firm or a market operator, which brings together multiple third-party buying and selling interests in financial instruments.

Organized Trading Facility (OTF)

A multilateral system which is not an RM or an MTF and in which multiple third-party buying and selling instruments in bonds (also including: structured finance products, and derivatives). Unlike RMs and MTFs, operators of OTFs will have discretion as to how to execute orders, subject to pre-trade transparency and best execution obligations.

Systematic Internaliser (SI)

An investment firm that deals on its own account by executing client orders outside a trading venue. Purpose is to ensure that the internalization of order flow by investment firms does not undermine the efficiency of price formation on RMs, MTFs and OTFs (in short, SIs extend transparency obligations into the OTC space).

- RMs and MTFs are not allowed to execute client orders against proprietary capital, or to engage in matched principal trading.
- OTFs may deal on own account other than matched principal trading, only with regard to illiquid sovereign debt instruments.
- MTFs, OTFs, and SIs cannot exist within the same legal entity, nor connect to enable orders or quotes to interact.

Transparency

Transparency is the cornerstone of the EU's regulation of financial markets. The aim is to improve the functioning of financial markets by making them more efficient and resilient. The view from the industry is that these new transparency proposals must not damage the orderly functioning of the market environment.

Pre-Trade Transparency:

- Applies to RMs, MTFs, OTFs and SIs
- Operators must make publicly available, on a continuous basis during trading hours, actionable indications of interest (IOIs); i.e. current bid and offer prices, and depth of trading interest. Including:
- RFQ systems and voice trading systems
- SIs, where they make quotes public, will trade at quote with all clients of SI, subject to commercial policy (e.g. transparency limits and size thresholds.)
- Waivers:
  Pre-trade transparency requirements can be waived for:
- Financial instruments for which there is not a liquid market
- Orders that are large in scale (LIS) compared to normal market size
- Orders on RFQ or voice trading systems that are equal to or larger that the relevant size specific to the instrument (SSTI)

Post-Trade Transparency:

- Applies to RMs, MTFs, OTFs, and investment firms trading OTC.
- Investment firms trading outside a trading venue and market operators and investment firms operating a trading venue must make publicly available trade details, including price and quantity.
- Post-trade information must be available as close to real time as possible (15 minutes from execution, up until Jan 2020 and within 5 minutes thereafter).
- There are no permanent waivers for post-trade reporting, but reporting can be deferred for up to 48 hours in the case where:
  - The transaction is in a security for which there is not a liquid market; or
  - The size of the transaction is equal to or exceeds the relevant large is scale size (LIS)
- Under certain circumstances (NCA dependent), reporting can be further deferred (including aggregation and omission of size), for an extended deferral period of up to 4 weeks.

Who reports post-trade publicly when?

- If executing on a venue – venue reports
  e.g. Bloomberg
- If executing with an SI – SI reports
  e.g. Citi
- If executing via OTC – OTC "Seller" reports
  e.g. AXA, Citi

Best Execution

MiFID's Best Execution Policy is playing a large role in MiFID II. Through MiFID's best execution policy, firms will 'evidence' best execution and 'best possible result for the client'.

Best Execution – reporting criteria:

- Provide the public with relevant data on execution quality to help them determine the best way to execute client orders.
- Execution venues including regulated markets, MTFs, SIs, OTFs, market-maker or other liquidity providers must publish in a machine-readable electronic format, quarterly.
- The data will be segregated according to trading systems, trading modes and trading platforms.

Best Execution – quality of execution – Top 5 venues:

- Investment firms (including buy-side firms) will evaluate the quality of their execution practices by identifying and publishing the top 5 execution venues, in terms of trading volumes where those firms executed client orders in the preceding year.
- Information published will be split between retail client flow and professional client flow.
- In a separate report, investment firms will summarise and make public the top 5 execution venues where they executed securities financing transactions (including repos).
- Investment firms shall publish for each class of financial instruments, a summary of the analysis & conclusions based on the quality of execution on the execution venues.

MiFID II – potential unforeseen impacts:

- 48 hours post trade deferral may not be considered enough time to hedge or trade out of an illiquid or large trade. It could expose market-makers in these instruments to unwarranted market risk.
- 48 hours is too short a time period for the buy-side to trade out of a large illiquid trade. The 48-hour post trade deferral may allow predatory traders to view the publicly available holdings data and 'game' the buy-side (trade against them).
- The application of deferrals may not be consistent across all jurisdictions, this could impact liquidity and pricing, depending on a counterparty's location. It could also create arbitrage opportunities.
- The foundations of MiFID II are based on data capture. In order for bond markets to function under MiFID II, the data needs to be correct.

The Commission recognises the industry (banks, buy-sides and regulators) challenges of building IT systems for data capture. Key reason for the Commission delaying MiFID II by one year to 3 January 2018.

Darwin's 'survival of the fittest'

In order to endure, bond trading must adapt and innovate. This will involve all facets of trading including people, technology and a re-direction of business strategy. The bond trading eco-system will see new possibly disruptive entrants, innovative incumbents and adaptive trading protocols and venues.

Many market participants agree that 80% of revenues come from 20 to 30% of clients. This fact is more in focus now than ever before. Broker-dealers are identifying priority clients and assessing the clients by opportunities to cross-sell rather than single-product (or region) sales strategies. e. g. clients need to be a 'client' for more than one business line such as derivatives, emerging markets, equities or possibly even a revenue producer in other global regions. Hence for many the old market-making model is disappearing.

This is having a knock-on effect. Banks are restructuring and redirecting their strategies. They are becoming agency brokers, niche players or getting out of certain areas of the bond business altogether, as evidenced in many of today's news headlines.

Some wonder if the traditional notion of capital commitment through monetising the bid-ask spread is becoming a less appropriate method of bond trading, suggesting the market could move to a more commission based model. With a commission based model, overheads relating to regulatory change (e.g. IT costs) might be passed on to clients more easily through commission rates (which are more standardised).

Buy-sides as well as sell-sides are re-structuring and redirecting their business strategies. The costs involved in meeting regulatory requirements are escalating dramatically. The industry's view is that, when MiFID II comes into effect, many smaller buy-side firms will not have the resources to build the IT facilities required by the law. A further risk is that they may be de-selected as clients by broker-dealers. So, what are market participants doing? The smart ones are adapting to the future (by modifying portfolio construction based on expected liquidity, reviewing broker coverage and service levels and lastly reviewing regulatory impacts on trading).

I. Strategy re-direction: firms re-shaping business strategies due to lack of returns in fixed income.

Niche brokers are already starting to appear. They are the smaller sell-side dealers consolidating their businesses, relying on reduced trading and sales teams while using electronic trading platforms to reach more investors. These participants are becoming the new specialists in certain sectors or segments within the bond markets, particularly credit. They are combining electronic trading and sourcing with a directed balance sheet.

The new entrants or indeed incumbents who will be here in the next 5 to 10 years will be innovative and most likely use technology based solutions to face market challenges.

II. New Entrants:

New entrants will not be hindered by the fragmented IT legacy of large incumbents, so they may be more agile in solving challenges for the industry. These tools, solutions and new business ventures will use advanced technology. Descriptions of how and why some of these new entrants might emerge successfully onto the electronic trading landscape are below:

Order Management Systems and Execution Management Systems (OMS/EMS) - Provides straight through processing (STP) connecting internal systems across the institution. The benefits are: smooth, efficient, seamless integration interconnecting risk management, credit checking, and position management - ensuring trades are within risk limits and meeting client obligations. Basically, OMSs and EMSs connect the front office to the back office, achieving efficiencies, cost-reduction and risk-mitigation. They also use FIX messaging technology (buy-side/sell-side communication protocol which enables dealers to send out orders and support multiple protocols such as RFQs, RFS and indicative pricing with other market participants. FIX also distributes liquidity to platforms and interacts with the trading infrastructures of other market participants.

Transaction Cost Analysis (TCA) – TCA lets a firm analyse the cost of a decision to trade over a specified time period with respect to various benchmarks. Traditionally, TCA is heavily used on the equities buy-side desks. Fixed income TCA has been viewed as one of the most difficult areas to offer performance measurement, due to a lack of available market transparency and data. There is a split between vendor-provided TCA and internally built solutions, in what little is available in fixed income markets today. In the coming years, with the data that will be generated from MiFID II, TCA for fixed income will grow.

Data analysis tools (of any kind): Unstructured data such as voice, e-mail or chat creates problems for evidencing best execution. Deep trading history along with sophisticated data processing tools will increase the level of granularity and allow an almost forensic approach to data analysis. This will enable better price formation for both the sell-side and buy-side. Moreover, the buy-side will benefit with better evidencing and accountability to end investors. Again, due to the reams of data that will be produced for MiFID II compliance, any tools that analyse data for optimised performance measurement will rise to the top.

Algorithmic trading in fixed income – Algorithmic, or 'algo' trading (complex computer-based programs following defined set of instructions) is usually thought of in terms of equities trading. However, algo traders from equities now see an opportunity to leverage their existing investment in fixed income trading. As more technology is introduced into fixed income trading and it gets easier to acquire datasets (MiFID II data) for back-testing, fixed income traders will use algos for low touch trading in order to assist with the consequences of regulations, such as margin compression due to increased costs. The growth of algorithmic trading will primarily be seen in certain liquid fixed income products, such as government bonds (we are seeing this already today). However, it is expected that algos will become more attractive for other fixed income instruments as data becomes available under MiFID II.

'False positives' (FPs) IT tools – Technology tools that identify false positives (bonds that are labelled as liquid but in fact are illiquid – an incorrect liquidity classification). FPs are a key quirk that is a side effect of MiFID II liquidity calibrations. This is probably one of the biggest issues raised by MiFID II. The sell-side is concerned about false positives as it affects their market making capabilities and the buy-side is concerned as it can impact perceived portfolio liquidity. Therefore, any tool that can accurately identify them will be highly valued.

Liquidity Ratings – Several banks and buy-sides already do this to an extent today. In the future, it will become more commonplace and standardised. The likelihood is that rating agencies might take this up in order to truly standardise liquidity ratings.

Regulatory tech services – Any technology based service or consultancy firm that can assist with keeping market participants (buy-side, sell-side and platforms) on the right side of compliance and best execution will do well in the years ahead. The successful providers will identify for firms the necessary data to meet regulatory obligations while managing downstream IT implications of regulations.

Internaliser engines - Firms that operate multiple trading desks, across different time-zones or subsidiaries will require an advanced technology system that provides the ability to internalise order flow automatically, thus, executing trades in-house in order to save brokerage fees.

Information Networks (INs) - Sourcing and aggregating liquidity: IN firms provide an aggregation layer, providing the trader with two key sets of functionality: (1) a global view of liquidity and (2) a choice of trading protocols and execution mechanisms from which to select. The trader uses this layer to obtain an accurate, timely view of available liquidity across markets. INs use a high degree of technology embedded in buy-side and sell-side's internal systems. Examples include Algomi and B2Scan.

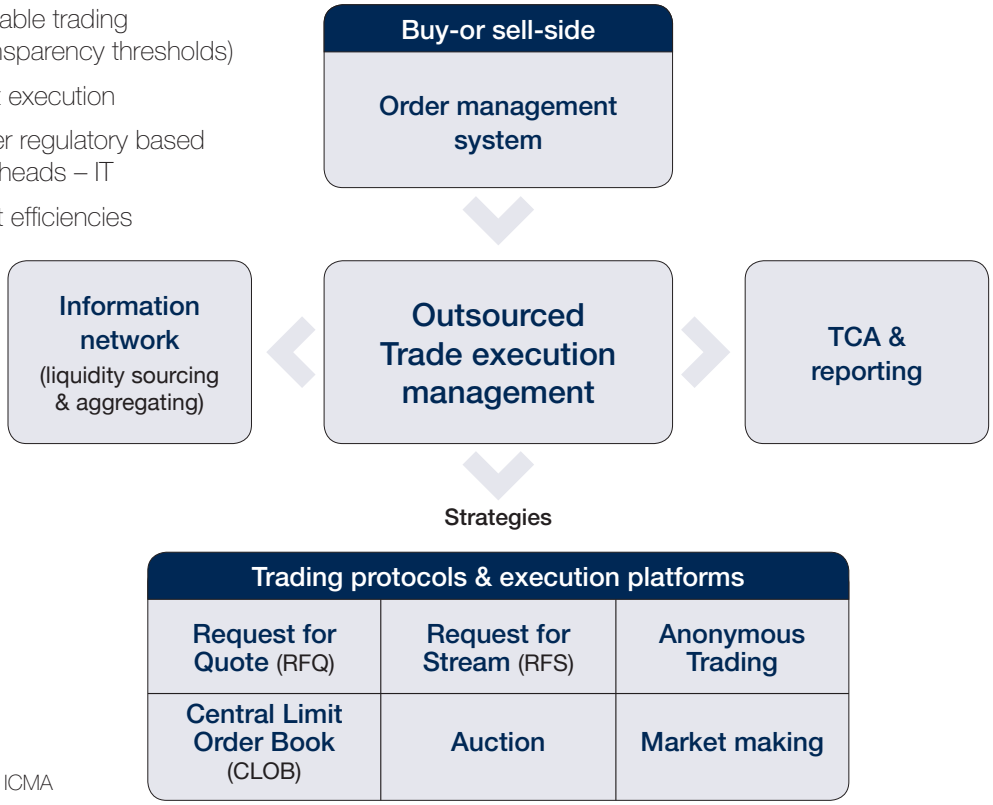
Consortium owned networks between buy-side and sell-sides – Collaborative efforts between the buy-side and sell-side where market participants are coming together to attempt to create liquidity in the bond markets. The hope is to enable greater transparency of trading interests across the marketplace between buyers and sellers of bonds. The relationship is made up of banks and asset managers. An example is Neptune.

These collaborative based firms use open standard technology allowing sell-sides participating to send pre-trade indications to their clients (asset managers) across the network to the asset managers directly connected. Consortium networks provide flexibility of connectivity options. The buy-side can receive pre-trade indications from multiple banks in a standard format using a single connection (i.e. FIX protocol).

Diagram: Outsourced trading scenario

Potential benefits:

- ✔ Scalable trading (Transparency thresholds)
- ✔ Best execution
- ✔ Other regulatory based overheads – IT
- ✔ Cost efficiencies



Source: ICMA

III. Innovative incumbents:

Price-maker hedge funds – Hedge funds are not new entrants but they will adapt to the new landscape. While traditional buy-sides will most likely not step in as 'price makers' on Central Limit Order Books (CLOBs) or other agency-only trading venues, hedge funds may step in (providing it suits their trading strategies) and provide larger illiquid pricing, bolstering liquidity. This is because hedge funds do not have the same legal structure and mandates that asset managers do.

Independent market making firms – Independent market-makers will start to emerge focusing on market making in specialised instruments or sectors. Less expensive, improved and widely used technology will help to facilitate these market making firms as advanced technology is lowering the barrier to entry. An example is XTX Markets.

Niche trading – Banks will also develop specialised expertise and be known for trading and making markets in certain asset classes or regions. This will particularly be the case for emerging markets as this sector can in certain circumstances, return greater yield. Technology can also connect clients to regional experts around the globe.

Multi-asset trading – As banks and buy-sides review their bottom lines more, it will become obvious that some IT and skill-sets can be shared. It is too expensive to have totally separate infrastructures carrying out trades that would ultimately benefit from sharing of knowledge between asset classes. There are a few multi-asset trading desks today on the buy-side but we will see more emerging in the next 5 to 10 years, also on the sell-side.

'Super trading desks' or 'outsourced trading' - Large regional sell-sides and buy-sides will create centralised super-desks where they have the market making capabilities and global reach or indeed the economies of scale to access bank balance sheets. We are already seeing signs of larger buy-side desks offering trading services to smaller firms to provide the benefits of economies of scale, such as BNP Paribas Dealing Services.

The level of spend for anything related to connectivity such as platform access, compliance, legal, risk and IT may be so great that tier 2 and 3 asset managers and smaller sell-sides may investigate alternatives. Outsourced trading may become a very viable option. This is already in use today, albeit in the early stages. However, it should develop more fully in the coming years and become a centralised source for regulatory management (although

regulatory obligations cannot be outsourced) and scalable trading. In some operations it may end up a multi-asset offering. In addition, the outsourced provider will be able to evidence best execution to regulators and trade report to the public for their clients. Further offerings the outsource provider could provide their clients (using TCA), is the ability to report back on broker performance measurement.

It is expected that a greater degree of access to and response from market-makers will create higher levels of liquidity and overall should improve portfolio performance, through enhanced trading performance. In addition, due to economies of scale, these 'super trading desks' will more frequently hit MiFID II's Large in Scale (LIS) waivers and deferrals (regulatory thresholds requiring forced transparency for both pre- and post-trade activity) due to trade combining. It is important to note that this outsourced 'serviced' trading could be set up for routine routing of business, ad-hoc requests or it could even be an independent firm offering a centralised consolidated service.

Lastly, outsourced trading desks of the future can contend with a diverse set of protocols and apply them based on targeted trading strategies and the universe of market structure in high or low liquidity situations: RFQs, RFS (request for streaming), exchange traded or CLOBs, OTC market making, anonymous trading and all potentially global or local.

IV. Adaptive trading protocols and venues

One thing is certain, electronic trading (including trading venues and protocols) is at the core of senior management planning for market structure redesign. Traditional trading protocols and platforms will also evolve and adapt to the new world of electronic trading in cash bonds. MiFID II, particularly in combination with other regulations will be the biggest driver for radical change in market structure. Some are predicting the disappearance of protocols we have practiced for years such as OTC voice-based broking. However, most believe this is not the case. Current platforms and protocols will still exist but the usage weightings will shift and over time shift quite dramatically. Further down the line, today's platforms and protocols will be joined by new innovative platforms and protocols.

The platforms and protocols are split between the categories below. Something to note is that OTFs and SIs will join the 'multi-lateral' category of platforms and protocols once MiFID II comes into effect on 3 January 2018.

i. Bi-lateral: RFQ, RFS, OTC including market-making[2]

ii. Multi-lateral: CLOBs, RMs, MTFs and post MiFID II; SIs & OTFs, crossing platforms: anonymous or semi-lit and finally auctions time-based bid/offer multi-lateral trading

In all probability there will be a staged approach to how protocols and platforms evolve in the coming years. It does not seem unfeasible that the initial introduction of MiFID II could prompt a reversion to off-venue trading as the market tries to ascertain the implication of a more 'lit' (transparent) market. Progressively, it is expected that as the market gets used to the new MiFID II trading landscape more electronic protocols and platforms will be used. For example, there may be an increase in buy-side to buy-side electronically traded volumes for large or illiquid trades.

All electronic platform and protocol usage will increase, to some degree or other. Even bi-lateral protocols will take on more electronic characteristics. For example, the market is already seeing a rise in automated RFQs - where buy-side traders seek quotes from brokers in a more controlled, auditable environment versus what is offered via traditional voice-broking (pure OTC).

While agency only and multi-lateral trading will increase it is a matter of 'horses for courses'. Not all of the multi-lateral protocols and platforms are suited to all types of trades. Set out below is a discussion and some examples of how they are used and may possibly evolve.

All to All – This is the true definition of multi-lateral trading (connecting dealers, investors and other market participants on a centralised all- to- all platform). CLOBs are an example of 'all to all' with built in electronic limits (while CLOBs are the most prominent examples of "All-to-All" one could say at times, anonymous trading protocols and platforms, hybrid RFQ protocols and even auctions could be described as "All-to-All").

CLOBs (Central Limit Order Books) will increase but only in retail sized flow. This is due to the buy-side not having the mandate to make prices and post on platforms. Also, no one (buy or sell-side) will want to leave a large/illiquid price available to be picked off on a CLOB. However, CLOBs may end up assisting price discovery as a 'reference price' (even though the average trade size will be small).

Interestingly, many believe the volume of these sized trades will increase as it did in equities.

[2] acronyms are defined in the glossary

RFQs (bi-lateral, one to one) – Only protocols that can create believable and consistent pricing will have the best chance of success. The price has to be an 'acceptable' current price in order to trade and be competitive. While there will be an increase in multi-lateral trading, bi-lateral RFQs will not disappear. A trusted conversation between a buy-side and sell-side trader about the nuances of a trade will always be valued.

The downside to RFQs from a buy-side perspective is that once the information is discussed about a potential trade it can be acted upon. This 'information leakage' can lead to market impact (the price going against them). Hence, the rise of electronic-crossing platforms (anonymous trading platforms).

OTC market making – While market making may be more selective in the future, it will always be necessary, particularly, when a buy-side trader requires size.

The risk for the buy-side is they cannot get a market-maker to make a ready 'executionable' price on a particular bond, at the time they need it. The sell-side is becoming more discerning as to which clients they offer balance-sheet.

Anonymous trading platforms (multi-lateral) – Anonymity is attractive to market participants who want to complete large transactions without drawing attention to their trades, since such attention could impact market prices. These trading venues are anonymous and/or semi-lit and can be buy-side to buy-side or buy-side to sell-side. Price formation is in the dark (non-transparent) as the anonymity protects participants.

The anonymous trading venues, particularly buy-side to buy-side will follow the equities model and become successful. However, similar to equities there will only be one or two successful platforms as most believe there will be somewhere between only 6 to 10% of all trades carried out on these platforms (percentage results based on voting carried out at a trading-based conference held in late 2015).

The success risk for these trading venues or platforms is that a trading venue can match a buyer and a seller in the dark but they need to have an idea of a mid-price to trade successfully.

SIs – The rationale for the SI regime is to move 'dark', off-venue trading, on to 'lit' venues by creating a level playing field and greater price transparency between OTC and venues. (Basically, SIs prevent activity moving off 'lit' venues onto dark – this 'lights up' the more active OTC markets). The key requirement of an SI, compared to a non-SI, is that it is subject to similar pre-trade transparency obligations as a RM, MTF, or OTF, as this is expected to aid price formation for investors.

MiFID I introduced the SI regime but for equities only. MiFID II extends the SI regime to fixed income. The SI regime under MiFID II requires an investment firm which, on an organised, frequent and systematic, and substantial basis, deals on its own account by executing client orders outside a RM, MTF, or OTF.

SIs for bonds are required to publish firm quotes to clients on request (in standard market size) for liquid bonds. However, SIs are able to limit the number of transactions a client may enter into, and the clients to whom the quotes are provided, so long as its commercial policy is set in a non-discriminatory way. Thus, SIs are able to manage their trading activity and associated costs and risks.

From a market-making perspective there are no obvious benefits to an SI, as there is no guarantee of competitive pricing. The purpose of the SI regime is not to provide pricing or liquidity; rather it is to provide transparency in the OTC market. It could be possible that some investors, as part of their best execution policy, may require quotes from SIs for specific instruments when trading OTC. In addition, whether a bond has a certain number of registered SIs, could be a component of an investor's internal liquidity scoring.

MTFs – In MiFID II, requirements for MTFs have been aligned with those of RMs in order to create a more level playing field. Most agency trading platforms will be classified as MTFs.

OTFs – Alongside MTFs, this will be a third type of multilateral system (in addition to Regulated Markets) in which multiple buying and selling interests can interact in a way which results in contracts. OTFs do not apply to equities. They will come into force with MiFID II.

The execution of orders on an OTF is carried out on a discretionary basis. There are two different levels of discretion for the operator of an OTF: (i) when deciding to place or retract an order on the OTF, and (ii) when deciding not to match a specific client order with another order available in the system at a given time, provided it is in compliance with specific instructions received from a client and best execution obligations.

An OTF will not be permitted to trade against its proprietary capital and this ban also applies to the capital of any entity that is part of the OTF operator's corporate group.

Most believe that post MiFID II, where IDBs execute 'name give-up', will be the only trading venues classified as OTFs.

V. Evolution and staff re-structuring:

While looking at the evolution of trading and market structure, it is often easy to overlook the 'people' who trade. How will they evolve to meet the needs of the future? There is a great deal of staff re-structuring going on inside sell-side firms today. This is due mostly to performance related issues in the fixed income businesses. In several cases, what might have been a solid fixed income business in the past is now not performing or looking likely not to in the near future. Fixed income businesses recently have published declines ranging from 20 to 30 % and in some cases much more. In addition, many industry participants have declared that bank balance sheet availability has reduced by approximately one-third. There is not enough business to support a large staff of bond traders and sales people. In 2015, we routinely witnessed staff downsizing or 're-sizing' as it is often called. This trend looks set to continue as firms react to changing landscape of bond trading.

One of the ways to cut costs and rationalise business is to lay off of older more experienced sales and trading staff. However, this is creating a culture of 'juniorisation' where not only are the trading and sales teams becoming smaller, but banks are relying more on younger, less experienced staff. Buy-sides are complaining about young traders on desks making execution errors and increasingly becoming incapable of making prices or managing positions. There is also a reduction in proactive sales people bringing trade ideas to the buy-side traders.

There are unintended consequences to this trend of 'juniorisation' and disappearance of 'go to' traders and sales people. Now more than ever, investment managers are following 'the knowledge' more than the 'firm name'. The danger to the sell-side is that previously reliable clients are reviewing their broker lists and leaving.

These major moves on the chess board are causing anxiety amongst older experienced sales and trading staff. However, it is not all necessarily doom and gloom. While the sell-side are downsizing, the buy-side is 'up-sizing'. Experienced sales people and traders who were made redundant are now moving to the buy-side to bring 'the knowledge' directly onto asset management desks. Furthermore, many of these redundant 'chess pieces' are now the ones turning up as heads of the various new electronic trading initiatives. It is important for the industry to note, that this 'sell-side to buy-side' chessboard move may help out former sell-side players, but it does not mean these players are bringing traditional capital commitment along with them.

The only possible exception to the 'juniorisation' phenomenon and the demise of voice-brokering is seen in repo trading. In the repo market, older experienced traders are still seen as adding value, and providing something that the inter-bank CLOB cannot: knowledge, flow, colour, experience and discretion.

Lastly, many of the roles that were traditionally carried out in the equities world are now finding their way over to fixed income markets. A few years ago, no one in fixed income trading had ever heard of Market Structure or Market Structure Strategy. Today in fixed income, we can see the evidence of these roles emerging with hiring for 'Global Head of Credit Market Structure Strategy', 'Head of Liquidity Strategy and Market Structure' etc. In these profit challenging times, these roles are proving vital in the decision making around business rationalisation and overall competitiveness.

Conclusion

As in every eco-system, for every action there is a reaction. This is the same for European cash bond markets. The combined impact of regulations and technology is changing the practices and behaviour of European bond market trading and the toolkit to operate within. In the coming years, there will be successes and failures with the platforms and protocols. Some may disappear and some may merge or be taken over. What is clear is that a flexible and scalable model is emerging. One that allows participants to choose a strategy and venue based on the characteristics of the trade. There is no crystal ball that can predict exactly the future structure and practices of European cash bond electronic trading. However, we do know a successful landscape will be an adaptive landscape.

Glossary

1. Algos or Algorithmic Trading

Algorithmic trading is the process of using computers programmed to follow a defined set of instructions (most often based on timing, price, quantity or any mathematical model). Algos are frequently used to place buy and sell orders when the defined conditions are met. Algorithmic trading is systematic as it rules out emotional human impacts on trading activities.

2. All-to-All trading

All-to-all trading venues, where multiple parties from the buy-side and sell-side come together to make prices by displaying firm orders to each other, not just "dealer-to-customer" or "dealer-to-dealer".

3. Anonymous trading platform

A platform where bids and offers are visible on the market but do not reveal the identity of the bidder and seller. Anonymous trades allow market participants to execute transactions without the scrutiny and speculation of the market. Anonymity is attractive to market participants who want to complete large transactions without drawing attention to their trades, since such attention could impact market prices.

4. Central Limit Order Book (CLOB)

A central system that contains securities 'limit' orders received from specialists and market-makers. Such a system consolidates limit orders in a central location and bridges the gap in establishing a national market system. A hard CLOB executes orders immediately; a soft CLOB provides data to facilitate trading but does not include automatic executions.

5. 'Dark' trading

Dark trading or dark liquidity pools are private electronic trading venues that operate separately from public exchanges. They don't publish bid and offer prices immediately and don't promptly publish transaction prices. They enable institutional traders to buy and sell large blocks of securities anonymously. This protects the privacy of an investment and reduces market impact and information leakage.

6. Execution Management System (EMS)

Execution management systems (EMSs) are software applications used by institutional traders designed to display market data and provide seamless access to trading destinations for the purpose of transacting orders. Often they contain broker provided and independent algorithms, global market data and technology that is able to help predict certain market conditions. One of the important features of an EMS is that it can manage orders across multiple trading destinations such as MTFs, broker-dealers, crossing networks and electronic information networks.

7. False Positives

False Positive (FP) is a term used in MiFID II to indicate 'inaccurate classification of a bond as liquid, when it is in fact illiquid' (bond liquidity determination). In MiFID II the unintended consequences may be: buy-side or sell-side may not be able to liquidate a position or price may be so disadvantageous that it corrupts performance. Behaviour will change on both the buy-side and sell-side due to perceived liquidity "False Positives".

8. FIX Protocol

Electronic trading IT term for: global messaging standard creating a reduction in connectivity costs relating to links between buy-side and sell-side firms; as well as a reduction in costs due to the efficiency of integration of internal processes and external operations.

9. Information Networks

INs provide market participants with a technology layer for a global and timely view of available liquidity across markets. A high degree of technology embedded in buy-side and sell-side internal systems is required.

10. 'Lit' trading

Lit trading is effectively the opposite of 'dark' trading. Whereas 'dark' venues do not display prices at which participants are willing to trade, lit trading venues or practices do show these various bids and offers in different bonds, making 'lit' trading transparent.

11. MiFID II

The objective of MiFID II is to increase market transparency, efficiency and safety by bringing the majority of non-equity products into a robust regulatory regime and moving a significant part of OTC trading onto regulated platforms.

MiFID II will bring much of the transparency traditional in equity markets to bond trading. Europe will go further with bond transparency rules than just about anywhere in the world, including the US. MiFID II's regulatory regime brings into effect pre-trade transparency for bonds as well as post-trade. This will result in a significant impact on the market structure of bond markets. Bond pre- and post-trade transparency requirements will be calibrated

for different types of bond market trading structures. In addition, pre-trade transparency for bond instruments will also be calibrated for voice trading systems.

12. Multi-lateral Trading Facility (MTF)

A multi-lateral system, operated by an investment firm or a market operator, which brings together multiple third-party buying and selling interests in financial instruments – in the system and in accordance with non-discretionary rules – in a way that results in a contract. The term 'non-discretionary rules' means that the investment firm operating an MTF has no discretion as to how interests may interact.

13. Name Give-Up

'Name give-up broking' identifies and introduces counterparties who have indicated their willingness to trade with each other, and who have reciprocal credit or clearing, and/or where two or more customers' orders match. These counterparties contract directly with each other and/or the relevant clearing house bearing the settlement obligation, and bear the counterparty credit risk themselves. The broker-dealer aims to automate the messaging process where possible.

14. Order Management System (OMS)

An order management system is a software-based electronic system that facilitates and manages the order execution of securities, typically through FIX protocol. Order management systems, are used on both the buy-side and the sell-side, although the functionality provided by buy-side and sell-side OMS's differ slightly. On the buy-side, order management systems support Portfolio Management by translating intended asset allocation changes into marketable orders for the buy-side.

OMS's allow firms to input orders to the system for routing to the pre-established destinations. They also allow firms to change, cancel and update orders. When an order is executed on the sell-side, the sell-side OMS must then update its state and send an execution report to the originating firm. An OMS should also allow firms to access information on orders entered into the system, including detail on all open orders and on previously completed orders.

15. Over-the-counter (OTC)

The phrase 'over-the-counter' can be used to refer to debt securities which are traded via a broker-dealer network versus a MTF or centralised exchange.

16. Organised Trading Facility (OTF)

OTF is a MiFID II term meaning a multi-lateral system which is not an RM or an MTF and in which multiple third-party buying and selling interests in bonds are able to interact in the system in a way that results in a contract in accordance with the provisions of Title II of MiFID II. Unlike RMs and MTFs, operators of OTFs will have discretion as to how to execute orders, subject to pre-transparency and best execution obligations.

17. Regulated Market (RM)

A regulated market is a MiFID term for an operator of a regulated market (market operator) which brings together multiple third-party buying and selling interests in financial instruments in the system, in accordance with non-discretionary rules, in a way that results in a contract.

18. Request for Quote (RFQ)

RFQ (from client to dealer) model has been the standard method of trading in the bond market: clients ask the dealer for a quote and can then choose whether or not to trade. Originally by voice, today RFQs are mostly through multi-dealer platforms.

19. Request for Streaming (RFS)

Request for streaming is: continually updated prices, which may be firm or may be prices where the dealer has the 'last look' before agreeing to trade. The RFS model can function using either voice (telephone) or an electronic connection between trading parties.

20. Systematic Internaliser (SI)

Systematic Internaliser (SI) is an original MiFID term, used in equities. It has an increased scope in MiFID II: an investment firm which, on an organised, frequent and systematic, and substantial basis, deals on its own account by executing client orders outside a RM, MTF, or OTF. MiFID II/R level 2 will set out clearly defined thresholds for becoming an SI, based on trading volumes in respect of 'frequent and systematic' and 'substantial'. Furthermore, the regulation specifies quantifiable definitions for 'frequent and systematic', and 'substantial'.

21. Transaction Cost Analysis (TCA)

Transaction cost analysis (TCA) is essentially: a rating of the spread between two possible prices – and the difference between those prices is often called "slippage." More particular, TCA refers to implementation shortfall which determines the sum of execution costs and opportunity costs, incurred in cases of adverse market movement

between the time of the trading decision and order execution. The TCA program is designed for performance measurement, telling investment managers whether they are paying too much in trading costs in global fixed-income markets (relatively new in fixed income). TCA has traditionally been found in equities, providing clients with quarterly monitoring of their ongoing trading process.

About the author

Elizabeth Callaghan is a Director in secondary markets at the International Capital Market Association and the lead on MiFID II and all bond market electronic trading related issues and thought leadership.

Liz has over 25 years of experience in fixed income and equities electronic trading (Investment Banks, Brokers and MTFs, including; Lehman Brothers, Deutsche Bank, ICAP and Amias Berman). In the past few years, Liz has focused primarily on market structure & regulatory strategy. She has deep dive knowledge of MiFID II as it relates to bond trading and frequently speaks at conferences on behalf of ICMA on the trading impacts of MiFID II/MiFIR.

Lastly, Liz is a founding member of the European FIX Committee (Original business guidelines & standards for institutional cross-border equities electronic trading between the sell-side and buy-side).

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Annex

Asset Class	Size	Structure	Drivers for Change: Technology & Automation	Drivers for Change: Buy-side Control		Regulation & Political Aims
Equities	• 9000 listed equities • On average -trades 400 times per/day • (Biais and Declercq - Academic Study)	1. Order driven with Straight Thru Processing (STP), using FIX protocol - enabling full end- to-end trading with audit trail. Market structures include: • Direct Market Access (DMA) to exchanges using bank's pipes and plumbing. • Heavy use of algorithmic trading for electronic statistical & rules based trading. • Multi-lateral Agency-only electronic trading platforms. • Electronic Dark Pools (Anonymous Trading Platforms w/scraping technology). • Broker Crossing Networks. • High Frequency Trading (HFT).	1. Order Management Systems (OMS) 2. Execution Management Systems (EMS) 3. FIX Protocol	1. Informed decisions with pre-trade cost expectation 2. Evidence based execution for regulatory obligations 3. Performance measurement: • traders on the desk • broker trading performance • overall contribution to fund performance		• **MiFID I** – Intention: Pan-European level playing-field by de-centralising European exchanges. Carried out by abolishing the "concentration rule", in which member states could require investment firms to route client orders through regulated markets (RMs). Overall goal: Competition and greater efficiency in equities trading while maintaining investor protection. • **MiFID I** – Result: Proliferation of new trading platforms, multilateral trading facilities (MTFs) to compete with incumbent exchanges. • **MiFID I** – Impact: Liquidity fragments across trading venues: 1. New trading venues created pan-European trading through a single central platform. 2. MTFs gained significant share of trading volume away from the primary European exchanges. 3. Fragmentation has caused an increase in the cost of accessing data for market participants 4. Average bid-offer spreads have fallen in aggregate since the implementation of MiFID

Annex

Asset Class	Size	Structure	Drivers for Change: Technology & Automation	Drivers for Change: Buy-side Control		Regulation & Political Aims
Fixed Income	300,000 bonds, on average trades 1.5 times per day (Biais and Declercq - Academic Study)	• Different characteristics – each bond can have a different maturity, interest rate, coupon and rating. • New bond can trade actively for three days and then go off the run to trade sparsely or sometimes to never be heard from again. • Quote Driven, relying on RFQs. • Heavy use of OTC Markets w/Markets Making and balance sheet usage. • Heavy use of IDBs Usage of CLOBs for retail trades only (sub EUR 10,000).	• Advances in technology and decrease in technology costs to facilitate electronic execution. Technology is driving efficiency, efficiency is driving competition and competition is leading to better price discovery for the buy-side.	• Natural evolution – As in equities, Buy-side wants more control and predictability. • Now too expensive for sell-side to provide balance sheet. Has led to a diffusion of liquidity across platforms and increased fragmentation in bond markets. • Due to limited liquidity, greater need to source and aggregate; in order to optimise available liquidity across a fragmented landscape.		• **MiFID II – Intention**: Prevent another 'Liquidity Crisis' as in 2008/09. The EU said: "Never again". MiFID II seeks to enhance the robustness of financial markets. 1. Europe will go further with bond transparency rules than just about anywhere in the world, including the US. 2. Operationally speaking, MiFID II addresses the following components in cash bond markets: market structure, investor protection, trade surveillance, organisational requirements and the most provocative – pre- and post-trade transparency. • **MiFID II – Result: Transparency requirements:** All trading in liquid instruments will require pre- and post-trade transparency subject to certain waivers. • **Pre-trade waivers** are based on size or illiquidity. Large in scale (LIS) protects block trades, and size specific to the instrument (SSTI)* offers protection to individual bond asset classes that are considered illiquid. *SSTI - Applicable only for MTFs, OTFs, RMs or Systematic Internalisers (SIs) For Bond instruments, **post-trade transparency requirements** are: At time of execution, make public information as close to real-time as is technically possible regarding: - price - volume - time of trade • **Post-trade transparency** requirements may be **deferred for publication** in real-time if trade information for large-in –scale transactions, illiquid financial instruments and transactions above a specified size would expose liquidity providers to undue risk. **MiFID II – Impact:** • New pre- and post-trade mandated transparency requirements for bonds are expected to have an impact on: (i) market structure: further fragmenting the markets (ii) Liquidity: an increase in electronic trading/automation (iii) Decrease in market making (iv) Smaller bond trading desks. • In order to calibrate bonds correctly for MiFID II transparency obligations, IT systems have to be enhanced, developed or built from scratch. This is a major undertaking for the industry. Banks, regulators and investors are dependent on data collected to meet MiFID II's commitments. Due to the need for this IT build (ESMA is also building an EU wide database) **MiFID II is delayed by one year, 3 January 2018**. **Basel III (CRD IV in Europe)– Intention**: • In response to the financial crisis unleashed by the collapse of Lehman Brothers, Basel III overhauls European capital requirements through a global regulatory framework. Basel III (CRD IV) aims to sharply deleverage the European banking system to create a more resilient market. **Basel III – Result:** • Regulators require banks to have minimum amounts of capital to ensure that they can cope with losses they incur in their day-to-day activities. **Basel III – Impact:** • Basel capital adequacy and leverage rules have made balance sheet far more expensive. The derivatives market is more expensive - virtually wiped out single name CDS. In addition, Leverage Ratio has made the repo market more expensive and less liquid. Functioning derivatives and repo markets allows market making to thrive. • **General decline in market making:** The smaller amount that dealers hold on their books means they can't unconditionally buy bonds that investors are trying to sell, especially in large blocks.