

Financial Conduct Authority



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This review is historical. See [What we publish](#) for more information and current views.

Thematic Review

TR16/5

UK equity market dark pools – Role, promotion and oversight in wholesale markets



July 2016

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Abbreviations used in this paper

AML	Anti-Money Laundering
BCN	Broker Crossing Network
COBS	Conduct of Business Rules (FCA Handbook)
DMA	Direct Market Access
EBBO	European Best Bid Offer
ELP	Electronic Liquidity Provider
ESMA	European Securities and Markets Authority
EU	European Union
FIX	Financial Information eXchange code
HFT	High Frequency Trading (Trader)
KYC	Know Your Client
MAR	Market Abuse Regulation
MiFID	Markets in Financial Instruments Directive
MiFIR	Markets in Financial Instruments Regulation
MTF	Multilateral Trading Facility
NBBO	National Best Bid Offer
NMS	National Market System (USA)
OTC	Over the Counter
PBBO	Primary Best Bid Offer
RIE	Recognised Investment Exchange
RTS	Regulatory Technical Standards
SEC	Securities and Exchange Commission (USA)

SI	Systematic Internaliser
SM&CR	Senior Managers & Certification Regime
SMF	Senior Management Function
SOR	Smart Order Router
SYSC	Systems and Controls (FCA Handbook)
TCA	Transaction Cost Analysis
TR	Thematic Review

Preface

We have surveyed the UK equity marketplace, focusing on dark pools and broker crossing networks (BCNs) by examining promotional activity and the identification and management of conflicts of interest by dark pool operators. For the purposes of this report, a 'dark pool' is defined as a trading venue with no pre-trade transparency in that all orders are hidden as to price and volume and are anonymous. In this report we also reflect on wider market developments, particularly those of the dark pool user community. The findings and key messages in this report are most pertinent to wholesale market participants, including asset managers, the operators of BCNs and dark multilateral trading facilities (MTFs), and other firms operating trading venues and exchanges. The report may also be of interest to institutional and individual investors.

The UK market and its regulation, has some key differences from other national markets and regions. For example, the US and UK vary significantly in terms of market structure and the approach to best execution obligations. In the US, Regulation NMS focuses solely on price while in Europe, the rules have many factors of which price is only one. Therefore, conclusions drawn about operations in other markets may not be applicable or have not been evident in our review of the UK market.

With the exception of less-liquid stocks and the trading of large blocks of shares where telephone-based, high-touch activity may be prevalent, the UK wholesale equity market is dominated by electronic computer-based trading at ultra-fast speeds. The value of information and the speed of order execution remain consistent drivers of market innovation. However, when carrying out regulated activities, firms' adherence to our principles and regulations, including best execution, remains mandatory regardless of processing speed or the size or relative sophistication of the trading operation and infrastructure used.

Upcoming MiFID II regulations will have a significant impact on the wholesale markets, including a direct impact on BCNs, which represent a sizeable component of market liquidity. Whether and how firms may choose to restructure their existing businesses, including dark pools, remains uncertain pending the finalisation of MiFID II rules.¹ What is clear is that the market is well aware of the potential significance of the structural changes proposed and the need for system upgrades to meet evolving reporting obligations. The Financial Conduct Authority (FCA) will continue its supervisory oversight of trading, including dark markets, and may undertake further analytical work in this area.

Finally, business models and operating processes have been evolving rapidly in response to technological, regulatory and infrastructure changes. This is true across a wide range of products and markets. It is important for market participants to remain alert to new conduct risks that can arise, including those that relate to conflicts of interest and the operation of fair and orderly markets. Management should ask challenging questions of itself, as well as of staff: about whether or how effectively it is achieving its intended conduct outcomes today; and about the steps it should take to look ahead.

¹ Much financial regulation currently applicable in the UK derives from EU legislation. This regulation will remain applicable until any changes are made, which will be a matter for Government and Parliament. Firms must continue to abide by their obligations under UK law, including those derived from EU law and continue with implementation plans for legislation that is still to come into effect. The longer term impacts of the referendum decision to leave the EU on the overall regulatory framework for the UK will depend, in part, on the relationship that the UK seeks with the EU in the future.

1. Summary

Objectives of this review

- 1.1** The soundness, integrity and, ultimately, the level of effective competition within financial markets rely upon participants behaving appropriately and taking the steps necessary to ensure that they are acting in the best interests of their clients.
- 1.2** Equity market dark pools have existed for well over a decade, and are subject to a regulatory framework in the UK that places clear requirements on users and operators of these services. However, dark pools have recently gained increased public attention in respect of price transparency, perceived unfairness and the potential exploitation of some dark pool users by dark pool operators or other more technologically advanced dark pool users. Part of the adverse publicity may reflect a lack of familiarity with regulation, how the markets involved actually function and the assumption that all dark pools are the same. This review explores and seeks to address specific concerns that have been raised in relation to dark pools in the UK equity market.
- 1.3** We examined (a) the promotion undertaken by dark pool operators, where we sought to assess actual delivery versus promises and/or promotional materials proffered; and (b) the quality of the identification, management and disclosure of conflicts of interest by pool operators. In the course of our work, we also reviewed relevant governance, oversight and controls. While not a primary focus, we also comment on the possible impact on firms' best execution obligations², where relevant, and on some of the infrastructure related to trading in dark pools including smart order routing, crossing logic and technological resilience. We did not focus attention on specific transactions or trading strategies. We were mindful of the risk of market abuse in relation to operator monitoring and controls or user activity but this was not the focus of our review and as such we did not conduct historical transaction testing.
- 1.4** This report sets out our observations and findings, in addition to some key messages from our thematic work. We met with a number of firms that use dark pools³ (e.g. asset managers), as well as firms that operate (e.g. investment banks) or provide access to dark pools (e.g. aggregators), in order to understand better the relevant dynamics across the market and the responsibilities on each side of a trade.
- 1.5** High frequency trading (HFT) is often linked to dark pools in equity markets. We comment briefly but note that HFT activity takes place on both lit and dark markets, and extends well

² We examined best execution in our Thematic Review in 2014 (TR14/13), which included practices where firms internalise client orders. Firms that both execute orders on behalf of clients and operate dark pools should continue to consider the findings in TR14/13, alongside the key messages in this report.

³ In this report, we use the term 'users' to refer primarily to asset managers, insurers and hedge funds while recognising that the user community is much broader (i.e. any type of wholesale organisation that participates as a trader in a dark pool including banks, brokers, HFTs and electronic liquidity providers (ELPs)); and we use the term 'operators' to mean providers of any type of dark venue, including MTFs or banks that provide access to an internal crossing network.

beyond equity markets. Retail investors may have all or part of an order processed by a broker in a dark pool, but we note that no operators provide retail clients with direct access to a UK dark pool.

- 1.6** We recognise that there is continuing innovation and technological development in equity markets and note that further, wide-ranging regulatory changes expected in the next few years will have a significant impact on the trading environment. In tandem, new forms of conduct risk are emerging, which include new risks around conflicts of interest and infrastructure, giving rise to continuing managerial and regulatory challenges.
- 1.7** Our 'Business Plan 2016/17' included the 'Wholesale financial markets' as one of its priority themes. This report reflects one of the work streams underpinning the 'Wholesale financial markets' priority theme.
- 1.8** We are keen to ensure that there are clean, effective and competitive wholesale financial markets. These are vital to the UK's economic prosperity, and more globally they provide access to financing for firms and governments and investment opportunities for retail and institutional investors. Their effectiveness relies on them being, and being perceived to be, fair, appropriately transparent, and efficient.

Brief market context

- 1.9** Public perception of dark pools partly reflects the confluence of three major trends in financial services related to equity trading. Leaving aside for a moment the impact of regulatory change, these trends are:
 - a.** the significant fragmentation of the equity market and the technology required to bring multiple pools of liquidity together (in other words, change across the whole landscape of equity market trading)
 - b.** technological advances in processing speeds and infrastructure where heavy investment can potentially create a competitive advantage and
 - c.** the emergence of proprietary trading strategies exploitive of ultra-fast processing links with trading venues some of which strategies have attracted adverse public comment.
- 1.10** The equity market has indeed been transformed over the past few decades, moving from primarily telephone contact between buyer and seller to trading conducted electronically, where the entire process of executing orders may be fully automated. The mass adoption of algorithmic trading in the early 2000s meant that computers could split up large orders (parent orders) into many small orders (child orders) and execute them according to a pre-defined strategy, often in a more efficient and accurate manner than human traders could previously do. The growth of electronic trading has generally resulted in higher execution speeds and lower costs across the equity market.
- 1.11** The increase in automated trading, together with the widespread use of computer algorithms, has led to new avenues of competition among both trading venue operators and their users to achieve technological advantage. Public concern has arisen variously over technological advantage being in the hands of a few firms or traders, the emergence of new kinds of trading strategies and the risk of market manipulation or abuse at ultra-fast speeds making detection more difficult.

- 1.12** A rapidly changing technological environment can prompt firms to change their processes and modify their business models (to gain the commercial benefits), which can yield new challenges in the identification and management of conflicts of interest. This gives rise to the continuing need for management to ask itself dynamic questions about how it is organised and whether it is effectively achieving the intended outcomes for its clients. Further background on market developments is provided in Annex 1 and on pertinent regulatory developments in Annex 2.

What we did

- 1.13** We began by conducting a wide-ranging desktop review of practitioner and academic research, and of marketing materials produced by pool operators since 2014. We also engaged in a limited number of informal discussions with various service providers and market participants to inform the scope of this review. We then requested detailed information from a sample of users and operators of dark pools.
- 1.14** After reviewing this information, we met buy-side investors who are significant users of dark pools. From our discussions, we sought to understand their user experience as the markets have evolved, the role of dark pools in their trading activities, and specific issues that they thought worthy of note. We then met with operators of dark trading venues – primarily focusing on BCNs, but we also met with MTFs – to evaluate the products and services they provided, the governance structure and the identification, management and disclosure of conflicts of interest, both structural and operational.⁴
- 1.15** The review was intentionally designed with a broad scope to understand and evaluate dark pool trading in the UK wholesale equity market rather than a detailed or intensive examination of trading activity over a period of time or involving specific trading counterparties. We did not undertake any form of transaction specific or quantitative analysis. We do make some observations that arise from our discussions with users; however, our purpose was not to conduct the same depth of review and subsequent comment on good and poor practice as was undertaken on the pool operators.

Findings

- 1.16** We summarise our observations and findings below and provide details in later sections of this report, including examples of good and poor practice. Overall, we found that users welcomed the additional liquidity, lower risk of information leakage and the potentially beneficial impact on pricing and costs that dark pools offered. Operators have clearly responded to public concern and regulatory interventions by addressing business model design, promotional materials now in use, and the management of conflicts of interests around dark pools.⁵ While we did not observe a failure to comply with regulatory requirements, we did identify a number of areas where improvement is required. Banks have generally made significant strides in addressing promotion and management of conflicts of interests around dark pools, although some have room for improvement, for example, in platform design and comprehensiveness of monitoring. Meanwhile, it was apparent that some users could take steps to improve their own

⁴ Structural conflict due to venue design (e.g. order routing to a sponsored BCN before a sponsored MTF) or operational (ensuring internal staff do not see and misuse private BCN data).

⁵ Conflicts can arise between operator and client and/or between different clients or client types (e.g. institutional clients vs. ELPs vs. aggressive traders).

understanding of the various pools via better due diligence and the monitoring of their use of dark pools to ensure intended results are achieved.

- 1.17** In later sections of this report, we provide a number of questions that senior management of users and operators could well pose to themselves and their staff about dark pools. These questions arise directly from our observations on specific issues or identified gaps. Taken together, they represent a subset rather than a comprehensive list of questions that a firm could pose in the course of governance and oversight. A number of pertinent questions follow each section and a full list of these questions is included as Annex 3.

The dark pool user community

- 1.18** Our user sample was diverse in scale and technical capability. Nearly all were active participants in most if not every one of the dark pools in our review. The lack of pre-trade price transparency (i.e. not knowing the price before dealing) was not, and has never been, a particular concern for them. The most sophisticated users in our sample executed a greater proportion of their trading in dark pools. Wariness or reluctance to use the pools was rarely observed.

- 1.19** Access to (or exit from) a dark pool was generally easy to achieve with no additional costs for the majority of users. However, the level of due diligence undertaken by users before joining or agreeing to participate in a dark pool was not consistently thorough. We noted, for example, that some users had not fully understood operational details for some of the pools before commencing trading. Also, users were not always aware if their pre-agreed trading preferences were maintained when trades were routed onward by the broker to third-party pool operators. Where due diligence by users is insufficiently thorough or the operation of a dark pool is not fully understood, it may bring into question the user's compliance where they owe best execution obligations to an underlying client. We also observed that users universally stated that brochures and basic promotional materials prepared by pool operators were not a significant factor in exploratory or due diligence work related to dark pools, as attention quickly focused on more technical discussions between experts. We thought this was appropriate.

- 1.20** The more sophisticated users were quickly able to spot execution or processing issues and seek remedy, while others did not consistently check (if at all) that they had obtained the benefit expected from using a dark pool for an order. Users were very interested in gaining a better understanding of precisely how orders were routed internally by a BCN operator, and then externally once orders were routed onward including to other dark pools and/or back to the originating operator's pool. Users also wanted more informative data on the participants in a pool, their categorisation and operational statistics (e.g. message-to-order ratios, resting times).

The dark pool operators

- 1.21** Dark pool operators provide a range of widely different operating models depending upon venue type (e.g. MTF vs. BCN) and technological capability. Operating strategies for BCNs ranged from very basic models with open membership and the presence of aggressive traders (similar to lit markets) to sophisticated offerings with tightly controlled membership and closely monitored activity. Controls and procedures around marketing materials have improved following significant management attention prompted by regulatory allegations, fines or settlements in the US and elsewhere.

- 1.22** Dark pools are typically accessed via electronic trading platforms of significant technological complexity designed to ensure capacity, resilience and fast processing speed, as well as algorithmic support for trading. Nearly all trading activity is now capable of being processed in millisecond (or faster) timeframes, but monitoring and oversight capability lags well behind.

- 1.23** Monitoring of activity, controls and client preferences and reporting thereon to clients, with a few exceptions, was weak among BCN operators. The classification of clients by type, activity or order flow, if done at all, was not always performed in a consistent manner. Users reported that some operators remained out of step by not providing data reports at the millisecond clock-speed level (at least) and this made analysis including market abuse oversight difficult.
- 1.24** Considering the potential for conflicts of interests, structural controls around some BCNs to ensure fair access, such as uniform gateways or speed bumps, were sometimes inadequate. A few operators allowed direct access through their internal quantitative strategies desk to their own BCN pool and this requires tighter control as we observed that restrictions around latency differentials were not uniformly addressed. Most banks almost invariably route orders to their own BCN as an initial step, sometimes in parallel with parts of an order being sent to other venues. This may well be justifiable, but the onus is on operators to regularly test and validate any presumption against best execution standards. Users may find themselves interacting unexpectedly with internal desks of an operator even before interacting with its dark pool, and this needs to be disclosed to and understood by users. Technical infrastructure and the manner of access to a pool may give rise for some to latency advantages or constraints which needs to be clearly explained. Some operators had insufficiently robust controls around confidentiality of information, especially following IT interventions/upgrades. Furthermore, users/clients were not always informed in a timely manner – or at all in some cases – about significant software changes, which could have posed additional risk to users.
- 1.25** Conflicts of interest between the operator and a user of a BCN, or between different users, were not always adequately managed and lines of defence were not always as robust as we would expect considering the importance and complexity of the electronic trading platforms involved.
- 1.26** Our review focused on matters largely within the managerial control of individual firms rather than industry-wide infrastructural issues. Nevertheless, we note the continuing pace of technological development, the potential impact on the wider industry as a whole, and the need to be mindful of emerging risks to fair and orderly markets and best execution.

Key messages

- 1.27** Dark pools can provide benefits to users in terms of additional market liquidity, price improvement and reduced overall trade costs. However, while some users and operators have invested heavily in infrastructure and/or updated policies and processes, a range of deficiencies were still apparent. We would draw attention to the following key messages arising from our review:
- 1.** Operators need to provide clear detail as to the design and operation of a dark pool – particularly how it interacts with other activities on the operator’s wider electronic trading platform. As no two pools are exactly alike, operators should ensure that disclosure or distributed materials on the services, key features and/or options offered by an internal crossing network are comprehensive, clear, fair and not misleading, and engage in discussions with users/clients to ensure that these materials are understood.
 - 2.** Operators should improve the monitoring of their pool(s) – in particular, operational integrity (accuracy of reference pricing, capacity, stability), best execution (where applicable)⁶, client preferences, and unwanted trading activity. The review and reporting on trading activity

⁶ MTFs do not have best execution obligations.

in a pool should reflect the relative sophistication and complexity of the features offered. The onus is on the operator to have adequate controls and oversight to ensure that all services, features and/or options made available to users consistently operate as designed and intended.

3. Operators should do more to identify and manage conflicts of interest, including both client vs. client and operator vs. client. The mitigation steps taken such as membership controls, order queue prioritisation, order type restrictions, structural controls (e.g. speed bumps) and policies and procedures can be strengthened and independent assessments can be regularly refreshed. This is especially important as many operators offer access to a dark pool as a standard component of a wider brokerage agreement and as an integral component of an electronic trading platform.
 4. Users should be clear about their rationale for using or not using dark pools (why, how and when). It is very important that users conduct adequate due diligence to thoroughly understand the operating model of a pool before commencing trading activity and be able to monitor ongoing activity and outcomes directly attributable to their use of a dark pool.
 5. Operators should improve governance and the strength of the second line of defence, which was weaker than expected. Some firms had made good use of recently upgraded best execution infrastructure for oversight of dark pools. However, the second line of defence should have sufficient expertise to thoroughly understand the complexities of the electronic platform including the dark pools, and to enable robust challenge, guidance and support.
 6. Users and operators should remain alert as markets evolve. Infrastructure changes at the firm or industry level, the emergence of new participants and the shift of technological advantage among participants can give rise to significant new risks. Vigilance regarding a potential adverse impact on fair and orderly markets and best execution (where applicable) remains an important responsibility for all firms.
 7. Users and operators should carefully consider the new MiFID II rules and the impact on existing and planned business models. Continuing attention should be paid to the ongoing detailed discussions on systematic internalisers and the rules that will apply, particularly in regard to matched principal trading. Much financial regulation currently applicable in the UK derives from EU legislation. This regulation will remain applicable until any changes are made, which will be a matter for Government and Parliament. Firms must continue to abide by their obligations under UK law, including those derived from EU law and continue with implementation plans for legislation that is still to come into effect. The longer term impacts of the referendum decision to leave the EU on the overall regulatory framework for the UK will depend, in part, on the relationship that the UK seeks with the EU in the future.
- 1.28** Where best execution obligations are applicable, they are an important market conduct safeguard and no users or relevant operators are exempted from these rules through the use of order routing, algorithms, or trading at ultra-fast speeds, whether on lit or dark markets, internal networks or other third-party venues. We encourage operators of electronic trading platforms including dark pools and smart order router service providers to engage with users and provide requested information on how orders are actually routed and executed, as well as statistical information on activity within their respective pool(s) – ideally with reference to, at least, millisecond clock speeds.

Who this document affects

- 1.29** This document is relevant to all participant firms, stakeholders and commentators in the market for UK equities. The observations and findings in this report should be considered by operators as to the products and services they provide, the monitoring activity undertaken, and the identification and management of conflicts of interest that can arise. This document is also relevant to users of dark pools as they assess whether they fully understand the sub-markets⁷ in which they are active. Investors and other stakeholders may also find it of interest.

Next steps

What we will do

- 1.30** We will be writing to all the users and operators who participated in our thematic sample. We will remind users to be clear about understanding the operational detail of the pools they are active in, meeting best execution obligations as applicable, and other issues we raise in this report. For operators, we will be providing more detailed individual feedback on our findings and requesting those firms to take action where required. Under business-as-usual supervision, we will continue to monitor users, operators and market activity as it relates to dark pools and other sub-markets. As part of our continuing supervisory work, we are also actively monitoring the arrangements that investment managers have in place to ensure best execution and the changes that they have put in place following our 2014 Thematic Review of Best Execution.

What firms need to do

- 1.31** We encourage both dark pool users and operators to consider our findings and key messages and to assess their own activity in the context of the current regulatory environment. This can be done with reference to the questions we have highlighted in this report, as well as the descriptions of good and poor practice that we have observed. Firms must ensure that they comply and are able to demonstrate adherence to relevant FCA Handbook⁸ requirements when undertaking activity involving dark trading systems or venues. Of particular note is the widened scope of the Market Abuse Regulation (MAR) now in force, in terms of the instruments, venues and behaviours caught. MAR also enhances requirements around the detection and reporting of suspicions.
- 1.32** We also encourage all firms to continue to prepare for forthcoming regulatory changes. Proposed regulations under MiFID II will have a significant impact on the market especially, on BCNs. Users of crossing systems or dark venues will need to review the evolving landscape of execution services and venues and revise their execution strategies and policies accordingly in order to ensure they continue to act in the best interests of their clients. Operators of BCNs will need to make commercial decisions as to their future operating models and make appropriate changes to their business and operational controls as necessary in line with relevant regulatory requirements.
- 1.33** All firms should make changes to strive for best practice across their full range of activities, rather than just in selected markets. When steps are taken to strengthen operations and infrastructure in one market, consideration should be given to extending this effort to other markets as resources allow. We also encourage firms to consider how the lessons that can be learned from the changes in the UK equity markets can be applied in an effort to stay abreast of rapid change in other products and markets.

⁷ In this report, we refer to dark pools as a sub-market.

⁸ The FCA's Handbook of rules and guidance can be found here: www.handbook.fca.org.uk/.

2. User community and our observations

- 2.1** We began this review with visits primarily to firms that are active users of dark pools; this included large asset management firms, insurance companies, hedge funds and HFTs. We also included some visits to technical service providers. We selected firms that we could identify from our UK market data as executing significant order flow in dark pools, as well as some smaller firms. The purpose of the visits was to hear first-hand about their experiences, often as longer-term users, to understand the various management considerations related to dealing with these sub-markets, and to observe how they conducted their interaction with dark pools and engagement with the operators.

Users by scale and sophistication

- 2.2** The UK community of active dark pool users is diverse in scale, technological sophistication, and range of trading strategies. Larger hedge funds and asset managers were typically able to allocate more resources to sophisticated technology. However, even the most advanced technology platform we observed was scheduled for substantial replacement, with the upgrade reflecting the continuing competitive drive for performance advantage. Firms with larger asset portfolios were typically more heavily invested and technologically sophisticated. However, we note that some large firms had adopted an alternative approach combined with more traditional trading strategies choosing to make minimal use, if not entirely shun the use, of dark pools.
- 2.3** We observed that many users accessed all or nearly all the MTF venues and BCN dark pools available. Some users were also able to conduct detailed analyses of the attributes of each venue or pool and their respective suitability for a particular trading strategy or objective. These users would often give specific instructions to their broker regarding which pool(s) to use if any, and in which sequence. An alternative approach is for users to employ a dark aggregation brokerage service that makes the pool selection decisions and routes orders accordingly.
- 2.4** We also observed significant differences in the tools and systems that users have at their disposal to measure the quality of execution and to observe how their trades impact on the market. While some users have built sophisticated in-house systems to analyse, for example, executions for price reversion⁹ and spread capture¹⁰, others with more limited in-house analytical tools may be more dependent on reports from third-party transaction cost analysis (TCA) providers. One firm had recently reviewed its requirements and substantially reduced the number of pools it plans to use reflecting its view of the performance, trader experience and governance of the pools it was no longer intending to use.

⁹ Price reversion – the tendency of a share price to return toward a pre-existing level following a succession of buy or sell orders and related messaging.

¹⁰ Spread capture – is the amount saved by buying or selling within the quoted spread. For example, an execution at mid-point would represent 50% spread capture for both the buyer and the seller.

Value and purpose of dark pools

- 2.5** Historically, dark pools enabled institutional investors to execute large block orders anonymously, off-exchange, in a way that gave them access to the other side of the trade while minimising market impact (i.e. alerting others that a big buyer or seller was in the market looking to trade). This has clearly evolved.
- 2.6** Individual users, large and small, could have a mix of orders with differing objectives underway at any point in time and spread across a number of dark and lit markets. Trading tactics might focus variously on absolute speed of completion, price improvement and/or minimal information leakage. Depending on the order size or investment objectives, a firm might route orders to a single pool or to multiple dark or lit venues simultaneously. Breaking up a single order (the parent) into a large number of smaller (child) orders, once the preserve of more sophisticated traders, is now common practice and built into the vast majority of automated trading activity.
- 2.7** The users we visited consistently described the primary attractions of dark pools as the opportunity to access additional sources of liquidity, increased potential for bid-offer spread capture and reduced risk of information leakage about an order or a trading strategy.¹¹ Users differentiated dark pool operators by the respective scale, order routing capability or suitability for a particular trading strategy or objective. In general, users believed that the proliferation of dark pools has given participants the ability to execute more effectively and at better prices than if all trading took place in lit markets. Users also acknowledged the beneficial diversity that has evolved with the existence of numerous pools with distinct attributes.
- 2.8** ‘Lack of transparency’ on these dark pool sub-markets has often been mooted as a source of concern; users we visited held strong and uniform views on this issue. They had no concerns regarding the lack of pre-trade price transparency on dark pools. Considering prices in the dark pools are derived from other transparent markets, the level of risk of a price being outside a best bid-offer range was low, outliers were relatively easy to spot, and pool operators were generally responsive to related trade queries should an outlier event occur. However, they acknowledged that price transparency and indeed price formation could be an issue if dark markets that made use of prices derived from other lit markets became disproportionately large compared to those lit markets. In this circumstance, prices on a small number of trades in a relatively illiquid market could potentially drive the prices on a much larger number of trades in a more liquid market. Dark market volumes were considered to be too small, at present, to pose an imminent threat; this, of course, needs to be monitored. Overall, users observed that the benefits, in terms of additional liquidity and potential price improvement, far outweighed the risks from their individual perspectives.
- 2.9** It is clear that users are acutely aware of the data trail left by their order-related activity across all markets. Achieving trade completion with minimum impact on the price is therefore a key goal and the ability to access dark liquidity is seen as increasingly important in achieving this objective.
- 2.10** We would note that users should have a clear rationale for utilising dark pools or other sub-markets. The performance and continued use of dark pools in fulfilling user needs should be kept under regular review. Proceeding to have orders executed on a particular pool should be based upon thorough due diligence and a clear understanding of the attributes of each pool, including how those features address trading needs and ultimately benefit customers.

¹¹ Information leakage, as used in this paper, is related to sensitive knowledge about intentions to buy or sell a share.

2.11 While the existence of dark pools can be beneficial, users should determine carefully why and how they make use of these sub-markets and their capability for doing so. This is consistent with users' obligations to ensure they act in line with the best interest of their clients when placing orders with other entities for execution resulting from their decisions to deal on their behalf and to take all reasonable steps to gain the best possible result for their clients based on the execution factors.¹² We suggest below a few questions that senior management might consider and take steps to ensure they have been thought through by operational staff.

Questions that pool users might ask themselves include:

- Q1: Would the use of dark pools be beneficial for our client-focused objectives or obligations; for example, will use of dark pools help us to deliver our best execution duties where owed?**
- Q2: Is our strategic approach to trading activity in dark pools clear and understood?**
- Q3: Do we have the resources to assess, participate, monitor and manage our involvement in the range and number of dark pools proposed or currently utilised?**
- Q4: Are sufficient preparations in place for changes to our business that may be required as a result of MiFID II, either to our own obligations (for example, in reporting and best execution requirements where relevant), or due to wider changes in the market, which may impact the execution venues that will be available to us and how they operate?**

Pool sign-up and due diligence standards

- 2.12** Users were each asked to outline the history of their use of dark pools, how they were introduced to individual venues, and the internal decision-making process they used to determine whether to make use of a particular pool. In particular, we inquired about the use of brochures and other promotional materials. We also looked at the detailed contractual terms agreed for a sample of users.
- 2.13** The selection and use of a dark pool most often arose from pre-existing relationships with the operator of the pool. While experience varied, the consistent response was that brochures and slide presentation materials were, at most, a minor consideration in the decision-making process.
- 2.14** In their due diligence process, users considered a number of factors, including: the reputation of the operator, the volume of daily trading activity, the characterisation of existing participants, order routing and matching rules, connection arrangements, and resulting speed of access or latency¹³ issues and technical infrastructure requirements (if any). Statistical information analysing the volume of orders, messages and available order types were also considered. Discussions

¹² COBS 11.2.30R, COBS 11.2.31R, and COBS 11.2.32R, as applicable.

¹³ Latency refers to communication speed and, specifically, the lapse of time before a sent message is received. Low latency can best be thought of as high efficiency with minimum waiting time relating to messages.

between interested parties would progress to meetings between technical specialists from the user and the pool operator to review and agree technical details and contractual terms.

- 2.15** MTFs have similar membership requirements to regulated markets and traditionally it is banks and brokers that take membership and facilitate access to those venues for their clients. Most users of dark pools also utilised the broker's membership of MTFs and regulated markets to access those venues via a suite of algorithms offered by the broker or via direct market access (DMA) channels. We note that some dark MTFs are aimed purely at buy-side institutions.

MTFs (multilateral trading facilities)

- 2.16** MTFs must ensure that access to their facilities is subject to criteria designed to protect the orderly functioning of the market and the interests of investors. Members and participants must be fit and proper, have a sufficient level of trading ability and competence, have (where applicable) adequate organisational arrangements, and have sufficient resources for the role they are to perform. MTFs are required to ensure fair and orderly trading and efficient execution of orders; they must have transparent and non-discriminatory rules and procedures and soundly managed technical systems, including effective contingency arrangements to cope with system disruptions. Contractual terms underpin utilisation of these venues.

- 2.17** MTFs are required to set objective, non-discretionary criteria for their access requirements and have transparent rulebooks describing how they operate. The majority also require their members to have access to a Clearing House, either directly or via another firm that is a member of a Clearing House.

BCNs (broker crossing networks)

- 2.18** For BCNs, actual venue operation and agreed terms are formalised in user contracts, which are broadly similar in scope across the industry. Major banks typically offered access to their BCN as an integral part of their broking relationship. Users could therefore initiate their participation with very modest outlay (if any).¹⁴ For some operators, the use of their BCN was included in general contractual terms for a brokerage account and a client could opt out entirely or select some restrictions or preferences¹⁵ for any trading that was directed to a BCN.

- 2.19** Following on from our observation that each pool has distinct attributes and that no two pools are precisely the same, it is an important due diligence objective for users to be absolutely clear on how each pool operates¹⁶, rather than just relying on general knowledge of how several pools work and making assumptions. In addition, contractual terms in a highly standardised broker agreement may afford no protection for misunderstandings related to dark pool processes.

Due diligence standards

- 2.20** We observed that users did not always undertake adequate due diligence or discuss the technical or strategic rationale prior to utilising a dark pool. We also observed that new users made assumptions about the similarity of one pool versus another and failed to complete robust due diligence and cross-pool comparisons. We believe that such due diligence and understanding of particular pools or venues is essential in order for a user who is transmitting orders on behalf of underlying clients to meet their own best execution obligations, including ensuring that their execution policy enables it to comply with their duty to achieve the best possible result for its clients.¹⁷ The user must be able to satisfy itself that any entities to which they transmit orders

¹⁴ Outlay is modest versus purchase and installation of substantial new technological infrastructure.

¹⁵ Preferences are at the discretion of the user or client and include such parameters as: the time of day trades are launched, resting times and the counterparty type with whom an order can be matched (e.g. no HFT or ELP or principal flow from the pool operator).

¹⁶ We note the recent industry initiative to use standardised questionnaires to seek pool information.

¹⁷ COBS 11.2.32R

have execution arrangements in place that will enable them to act consistent with their own policy and execution factors.

- 2.21** We are aware of successful industry discussions to develop a questionnaire that can be used to obtain information from operators on a consistent basis. This is a good initiative that may form a part of, but not be a substitute for, the due diligence required by users before signing up to use a pool.
- 2.22** It is important that users make appropriate choices when deciding to sign up to participate in one or more dark pools. Failure to complete adequate due diligence may lead to inappropriate choices and ultimately result in unsatisfactory trading outcomes for clients which could mean that a firm is not meeting its best execution obligations and acting in its client's best interests.

Questions that pool users might ask themselves include:

- Q5:** Is the contractual basis for our use of various dark pools sound and consistent?
- Q6:** Have we obtained clear, positive verification of crossing logic, internal and onward routing, pre- and post-trade price checking, and other operating procedures, whenever requested?
- Q7:** Are we conducting our own price checks that are sufficiently frequent, detailed and accurately time-stamped?
- Q8:** If the pool offers different types of access/connectivity, what are the latency implications?
- Q9:** Is the operator fully capturing and monitoring our trading preferences including interaction with the operator's principal/proprietary flow or with certain liquidity providers?
- Q10:** Do we have a process for the regular review and refresh of our trading preferences?
- Q11:** Does the operator provide access rights to order flow in the dark pool to internal teams?
- Q12:** Do we have adequate assurances that direct connections do not give any participants or external liquidity providers an undisclosed latency advantage?
- Q13:** Does the dark pool operator's principal/proprietary flow access the pool in the same way as we, and all other users, do?

Q14: How well do we understand how the operator determines routing priority to external pools?

Q15: Is the report pack provided to us by the operator adequate for our purposes?

User monitoring of own dark pool activity and best execution

- 2.23** The ability of users to effectively monitor and understand the actual operation and activity ex-post within dark pools was generally quite limited across our sample. All but the most advanced users felt they would benefit from receiving much more information from operators about the activity in the pools. This would include information on the types of participants active in each pool, as well as, more importantly, details such as order sizes, resting times, order-to-trade ratios and routing priorities.
- 2.24** Users were also interested in a better understanding of how the operators monitored trading activity in their pools, noting that it would be useful to help them select suitable pools depending on their trading strategies. Some users said they had found it hard to obtain this level of information from operators.
- 2.25** In general, users felt that the category into which a dark pool participant falls (e.g. ELP or institutional) is far less important than information on actual trading activity. The users we met did not think that ELP or HFT flow was necessarily undesirable and may be a useful source of liquidity so long as, once again, the operators had sufficient controls and monitoring in place to manage unwanted activity.
- 2.26** It is now a common practice to measure both explicit transaction costs, such as trading commissions and exchange fees, as well as implicit costs such as market impact (i.e. the price changing for the worse over the course of order execution). Indeed, execution benchmarks such as implementation shortfall are now commonplace, as well as more traditional references such as volume weighted average price (VWAP) and the closing price. This is driven by firms seeking to minimise information leakage around their trading activity. In addition, the trading environment has experienced significant fragmentation, both in terms of the number of trading venues and average order size (i.e. after splitting a 'parent' order into many smaller 'child' orders). This clearly poses challenges for market users in analysing transaction data and demonstrating strategic success for a multi-stage order.
- 2.27** We also observed various types of internal execution price targets being used, such as a particular internal fund manager's maximum or minimum price target. While we understand these targets may be consistent with the objectives of the funds or portfolios being managed, it is important that these internally set targets do not supersede the requirement to achieve best execution for their clients.
- 2.28** Poor execution outcomes should be identified and remedied quickly. For example, an order that is priced outside the range of the applicable 'Best Bid/Offer' should be raised with the dark pool operator quickly. We observed that while some firms would screen results comparing prices with market data feeds and identifying outliers as a matter of course, other firms either did not do so or had adopted an insufficiently robust and/or timely approach. Time-stamped data at the millisecond level was usually provided, but not by all operators. Some operators would proactively identify outliers, bring them to the attention of users, and initiate immediate remedy; other operators, as we will note in the next section, relied on users to identify problems.

- 2.29** In general, the number of escalated complaints that users had about dark pools was very low, with users expressing general contentment with the service that operators provided (this was later corroborated in discussion with operators). However, most users said they would not hesitate to switch off a venue if they became discontented with the service or the quality of execution. It is important to note, however, that the most sophisticated users in our review (that are able to perform real-time venue specific analysis) were far more likely to complain about poor executions and claim recompense from dark pool operators. Users commented that venue disconnects arising from technical issues and system outages including delayed data feeds was considered to be within normal operational risk parameters (all participants have data feed issues from time to time) and were not necessarily indicative of poor-quality services or a focus of complaints.
- 2.30** While attention has more often focused on banks and brokers to ensure that transactions are executed in accordance with regulatory rules, it is essential that buy-side institutions meet their own best execution obligations. This includes the need to monitor on a regular basis the effectiveness of their own execution policy and the execution performance of the broker(s) they route orders to on behalf of their own clients.¹⁸ There is clearly a need for users to improve their own capability and tools to monitor transaction activity in order to ensure that execution errors are quickly remedied and that best execution obligations are met. During this review, we did observe sophisticated systems in place at some user firms that are capable of providing very detailed analysis in a timely manner.

Questions that pool users might ask themselves include:

- Q16: Does our governance and oversight process enable adequate analysis of our performance in dark pools?**
- Q17: Do we have adequate statistics on activity in the pool (e.g. amount of our order flow crossed with the pool operator's principal flow/proprietary business or ELPs)?**
- Q18: Are the agreed order-routing preferences being monitored and adhered to?**
- Q19: Does the operator monitor for execution performance and unwanted trading activity?**
- Q20: Do we periodically question the efficacy of controls that an operator has promised?**
- Q21: Do our transaction instructions typically result in significant information leakage that adversely affects achieved prices on a single order or on a larger-scale strategic order?**
- Q22: Have reasonable thresholds or price targets been set for monitoring overall execution performance?**

¹⁸ COBS 11.2.32(4)R.

- Q23:** Are we making good tactical decisions about order processing such as our design (if applicable) and use of algorithms, order routing and order types?
- Q24:** Who is raising operational mistakes in dark pool trading, the operator or ourselves?
- Q25:** Does our overall approach to trade processing comply with best execution standards? How can we evidence this?

3. Dark pool venue operators and our findings

- 3.1** The 2007 implementation of MiFID introduced additional trading possibilities for equity markets. This facilitated parties other than a recognised investment exchange (RIE) to establish separate trading venues, namely MTFs and the creation of Systematic Internalisers (SIs) – the latter being a separate process or execution channel at an investment bank rather than at a wholly separate venue. In addition, some investment banks established internal BCNs which, once again, are an internal process or execution channel rather than a separate entity or venue. MTFs can be operated by RIEs or Investment Firms. The business model of some Investment Firms is solely to operate an MTF while others operate an MTF alongside the carrying out of other MIFID investment services and activities.
- 3.2** All pool operators (both MTFs and BCNs) have responsibilities to monitor for market abuse, the integrity of their operational platform, and those particular features which they have promoted as attributes of their pool. Where a broker (i.e. a BCN) is acting in an agency capacity and a user transmits an order to them for execution, the broker will owe best execution obligations, including where they route orders to their own BCN or an affiliated dark MTF.¹⁹ This was a key message we set out in our Thematic Review 14/13, published in July 2014, and remains relevant for many of the areas discussed below.
- 3.3** An operator of a dark pool must also carefully consider our overarching senior management arrangement, systems and controls requirements (set out in our SYSC Handbook). These include requirements relating to identifying and managing conflicts of interest, establishing and maintaining systems and controls, and having robust compliance and internal audit arrangements as appropriate to the nature, scale, and complexity of their business and activities.²⁰
- 3.4** The findings below relate to the operators of dark pools. We draw attention to the issues that can arise and some questions that management at those operators might pose in pursuit of best practice. We also note how the same questions or close variations thereof could well be posed with regard to other products and other markets as they too rapidly evolve.

Venue models

- 3.5** Dark pools are often a component of an operator's wider electronic trading platform and the whole platform has been a focus of innovation. This has given rise to a number of quite different operating models, as firms look to create a unique and differentiated offering. The spectrum of BCN offerings is especially wide with differentiating attributes including restrictions on counterparty types, execution sequencing (e.g. BCN first), activity monitoring, and the ability to apply client preferences in order routing and execution.

¹⁹ COBS 11.2.1R-11.2.29R.

²⁰ SYSC 3, 4, 6 and 8, as well as Principles 2, 3 and 8, are particularly relevant in this context.

- 3.6** During our firm visits, we observed platforms that differed significantly in terms of scale and complexity. Pool operators should note that as pool complexity increases, so too does the risk of a misinterpretation or misunderstanding by a user as to how a pool functions. In turn, the need is therefore greater for clear documentation and transparency around each pool and its operation, as well as robust controls and monitoring to ensure performance is actually as expected. Equally, for less sophisticated pools with fewer bespoke features, such as granular client profiling or restrictions on certain counterparty interaction, the requirement for strong governance structures and effective systems and controls still applies – as does the need for clear descriptions of potential crossing outcomes. In all cases, the risks related to pool attributes should be clear.
- 3.7** During the review, we observed that users and operators used terms such as ‘toxicity’ and ‘aggressive high-frequency trading’ to describe certain behavioural characteristics. It should be noted that these terms are not consistently used across the industry and therefore this puts a greater onus on operators to define such terms and clearly communicate when using them in reference to pool operations. In particular, when defining ‘natural’ order flow, some operators might include significant internal hedging or unwinds related to equity derivatives and Delta One²¹ business or other principal positions, while others might not.
- 3.8** Where firms purport to be able to identify and protect against unwanted activity, and indeed use this as a unique selling point for their dark pools, they must ensure that they have in place appropriate and clearly defined metrics and controls in order to be able to effectively monitor and take action against firms that exhibit unwanted types of activity.

Marketing material for dark pools and electronic trading

- 3.9** It was apparent from our visits that fines and settlements relating to dark pools in other jurisdictions had provided operators with the impetus to check and update their marketing materials to ensure accuracy and controlled distribution to the correct audiences. Through these efforts, some firms had uncovered examples of high-level brochures where language or terms had been too generic, out of date, not regionally specific, or inaccurate. Generally, these deficiencies were immediately addressed.
- 3.10** Governance and processes to produce and distribute marketing materials varied across the industry and we saw much room for further improvement. While we acknowledge the improvements made to date, operators must ensure that any client communications are clear, fair and not misleading.
- 3.11** Operators must pay due regard to the information needs of its clients, or potential clients, and ensure that they communicate in a way that is clear, fair and not misleading.²² Given the complexity of some dark pools and electronic trading platforms to which they are connected, clear descriptions and explanatory materials are important for ensuring good outcomes for pool users, and more widely for market integrity.

²¹ Delta One business is defined for the purpose of this report as a product with a one-to-one valuation relationship with an underlying security or list of securities and a delta of one, meaning no optionality in the pricing relationship, such that a change in price in the underlying is matched by the same change in the price of the product.

²² Principle 7 and COBS 4.2.1R as applicable to BCNs.

Questions that operators might ask themselves include:

- Q26:** Do our marketing materials clearly and consistently explain the way in which a platform functions: for example, the nature and sequence of order internalisation?
- Q27:** Have we tested with clients whether there are pool features or complexity that would warrant expanded explanation or disclosure on our part?
- Q28:** Are controls adequate to ensure that materials are distributed only in the jurisdiction for which they were designed?
- Q29:** Have we articulated to clients, in a balanced manner, not only the advantages of features, but also the potential disadvantages, as well as alternative choices?
- Q30:** Do we have a clear, documented internal governance process for the review and approval of marketing material, which includes legal and compliance oversight?

Good and poor practice findings

Good practice

- Inclusion of compliance and legal staff in the drafting of promotional materials.
- Storage of marketing materials in a central repository with new versions subjected to formal approval.
- Region-specific materials that reflected the sub-structural nuances of the local market.
- Periodic review of materials to ensure conformity to market changes.
- Widespread distribution of order execution policy (some operators put this on their website).
- Provision of step-through analysis of the operating processes for a particular pool.

Poor practice

- Use of imprecise language that is not fully reflective of actual operations.
- Weak controls around regional approval of materials and their distribution.

Client onboarding

Due diligence

- 3.12** In the onboarding process, the degree of due diligence on the new members or participants varied across our sample of operator firms. Some relied heavily on their standard diligence process for new clients (e.g. AML, KYC), while others extended the due diligence process to consider the clients' expected trading activity. This additional level of due diligence sought to attain a better understanding of the trading strategies that their new clients were likely to employ and the messaging and order volumes they were likely to generate. The extended approach appeared to enable better recognition of the risks that different client types may pose to the fair and orderly operation of the pools and to other participants.

Client type

- 3.13** Most operators performed some degree of profiling and analysis to determine client and order-flow type; this ranged from very minimal (e.g. are you an electronic liquidity provider?) to very detailed analysis of planned trading activity, use of algorithms and actual performance. The determination of client and order flow type can become stale and we observed that a refresh was not always done in a systematic manner.
- 3.14** The definition of client type was not based on consistent definitions across the industry (e.g. one entity was classed as an ELP at one firm and as a 'direct market access/institutional client' at another). This meant that the same flaw affected categorisation of clients into groupings. We noted that some more sophisticated users were indifferent to the added value of such schemes but, more generally, they were considered helpful. We expect operators to ensure the terms and definitions they use are clear and not misleading for the users to whom they are presented.

User preferences

- 3.15** BCN operators generally offer their users the ability to restrict the counterparties or counterparty types against whom their orders are allowed to execute. Most commonly, users could choose to restrict or totally avoid interaction with HFTs or ELPs or with a BCN operator's principal trading flow.²³ While operators noted that the number of clients making use of these restrictions was relatively small, we found that the collection, storage and processing of these preferences was difficult to audit and systematically weak across the industry.
- 3.16** We observed that the collection of preference information was at times haphazard, being collected at different stages in the process, or by different teams, possibly in duplicate and perhaps not stored in a single, central record. Preferences might then be modified by e-mail or a telephone discussion by one or more teams, and clients may be allowed to make frequent changes. It is important that there is a clear process for when and how changes can be made to ensure adequate data capture and management. We noted that there was often not a clear policy to refresh and reconfirm preferences with each client in a systematic manner (e.g. annually).
- 3.17** We also observed that preferences might be stored in a number of systems that did not cross-reference each other, making the accurate application of client preferences difficult and possibly allowing matching or routing outcomes that are not aligned with recorded client wishes.

²³ The rationale for restrictions by users is to insulate them from aggressive price positioning by HFT or ELP participants, which could be to the user's detriment. It also reduces the visibility of a trade and unwanted information linkage. Users with 'natural' trade flow can prefer to deal with other users offering a similar 'natural' trade flow.

3.18 Users are sensitive to who is in the pool with them; as such, operators must ensure that information of this nature is communicated and explained clearly²⁴ (also see section 3.5 Monitoring of activity in the pool below). Operators that allow clients to select matching or other preferences as a service feature need to be able to provide effective monitoring and oversight thereof. Actual delivery against clearly understood expectations supports fair and orderly markets.

Questions that operators might ask themselves include:

- Q31: Do user questions indicate adequate understanding by them of how the pool operates?**
- Q32: Are the strategies that a prospective client is likely to employ on the platform understood and considered to be acceptable for the other participants in the pool?**
- Q33: Do our standard contracts adequately cater for the features or complexity of the pool?**
- Q34: Is there sufficient capacity to accommodate the range of activity a new client may generate?**
- Q35: Is client classification criteria clear, understood, consistently applied and regularly reviewed?**
- Q36: Can initial client preferences be captured and centrally stored as a 'golden source', and are subsequent update requests similarly controlled?**

Good and poor practice findings

Good practice

- Detailed and focused due diligence on proposed activity in the pool by prospective clients.
- Onboarding discussions focused on clients' trading style, strategies, activity volumes and goals.
- Central storage for client preferences used as a 'golden source' for such data.
- Design of risk limits bespoke to particular clients, as well as client types.
- Phasing of risk limits in over the course of the day to help avoid end-of-day over-limit events.
- Dynamic reassessment of client strategies and revision of risk limits to reflect changing strategies evidenced by daily monitoring.

²⁴ Principle 7 and COBS 4.2.1R as applicable to BCNs.

Poor practice

- Generic due diligence that did not appropriately identify the risks posed by a client on an electronic trading platform.
- Stale assessments of client classifications and risk profiles with refresh not scheduled.
- Collection of preference information from clients in an inconsistent and uncontrolled manner.
- Storage of preferences across multiple systems which did not reference each other.
- Non-systematic checking that preferences were accurate and up to date.

Operational design and integrity

3.19 Operating an electronic trading platform is a significant design and technological undertaking. Here we examine hard-wired design and stability matters specific to dark pools, reserving judgement-based or behavioural activity within the pools to the next section.

Order routing

3.20 Order routing was not a primary focus of this study because it is not a direct component of a dark pool. However, it is a substantial topic in itself and elements of the routing process warrant close attention in any review of computer-assisted trading infrastructure. An order router, in its simplest form, directs an order for execution to a venue. A smart order router (SOR) performs a similar function, but involves processing a potentially significant number of dynamic instructions before determining the next order execution step or sequence of steps. An algorithm may be used to rapidly assess market conditions and other variables prior to initiating those instructions and may therefore be dependent on data feeds and other platform infrastructure.

3.21 Throughout our visits, we assessed how operators managed the conflict between routing a client's order in the best interests of the client and operating a dark pool. While the manner in which an order is routed depends to some degree on the execution strategy chosen by the client, we observed that bank operators consistently route orders to their own BCN pool before routing elsewhere. Banks justified this to clients as delivering optimised execution with lower cost and a reduction of information leakage. This is acceptable provided that operators adhere to best execution obligations, avoid positive or negative venue discrimination (including the frequency of return visits to their own pool)²⁵, manage resting times, and support and evidence all of the above by actively monitoring trade activity.²⁶

3.22 We observed different configurations with respect to how, and in which sequence, operators' central risk books interacted with natural client orders and their own dark pools. Most firms defined 'natural' order flow in its most common form as flow arising from buy-side asset managers and excluding any flow from an operating bank's principal trading and derivative

²⁵ COBS 11.2.12R and 11.2.13G.

²⁶ This will be necessary to ensure an operator can meet COBS 11.2.27R and 11.2.29R where executing orders on behalf of clients.

hedging. Some operators include all or part of client-driven hedging activity in its BCN pool. We are concerned that this might not be fully understood by users; as such, steps should be taken to assess and clarify for users how and when this might be the case, and to ensure that users are not harmed as a result of any conflict of interest.

- 3.23** We observed instances where an operator allowed orders to interact with its central risk book and allowed matching with client flows before routing onward to the BCN or other pools or venues. This generates heightened potential for conflicts of interest (e.g. the operator benefits from managing its own risk or inventory by dealing before routing orders onward). In such circumstances, operators should adequately manage the conflict, ensuring that clients are clearly made aware and that trades are completed in accordance with best execution requirements.
- 3.24** Some operators engaged in double posting where an order is sent to two pools simultaneously hoping to execute in one and preferably cancel in the other just in time. To the extent that operator algorithms double post or use contingent orders, operators should ensure that this is done in the best interests of their client. During our review we observed examples where operators executed both child orders resulting in duplicate executions of a single child order. In some cases these duplicate executions were taken on as a small principal position and subsequently unwound by the electronic execution desk resulting in a de minimus profit or loss to the operator. In other examples, the duplicate child order would be allocated to the client provided the parent order had not been fully executed. In such cases where executions are made otherwise than in accordance with the original intention of the relevant algorithm, care needs to be taken to ensure that this practice is not contrary to the best interests of the client.
- 3.25** Some operators who send orders first to their own BCN pool also forward the order automatically, partially executed or otherwise, to another operator's BCN under a Reciprocal Access Agreement. Router technology can stipulate basic order instructions, but may not necessarily preserve specific client preferences (e.g. regarding the type of flow or counterparty the order can be crossed with). Our observation was that users were not clear under which onward routing circumstances to third-party dark pools their user preferences were preserved, and were generally not able to monitor or verify if a preference was honoured. This is a significant point as users will assume that their preferences are robustly preserved. Preferences could be interpreted as client instructions that the operator must observe for best execution purposes.²⁷
- 3.26** Because there are so many input variables, routing output may not always be predicted or anticipated (e.g. a surge in volume following a particular set of market circumstances). Unexpected results could also occur, for example, due to partial or total failure of one or more data feeds that affect routing decisions. Additionally, a software release, even after thorough testing, may fail to perform as intended, with unwelcome results. Accordingly, carefully designed metrics around order routing performance activity and regular monitoring is needed. In fact, there were a limited number of firms that were able to monitor algorithms and SORs in real time with regard to discretionary aspects of orders.
- 3.27** Firms can often retain significant discretion over algorithmic orders, even where certain specific parameters have been input by clients (for instance, firm specific instructions in relation to the SORs). Operators' algorithms and SORs should therefore be sufficiently dynamic to be able to adjust to altering order execution parameters and have processes in place to achieve best execution on any execution factors not specifically instructed by the client.²⁸ Some operators may choose to never route orders to a particular venue in accordance with criteria of their own choosing. This requires monitoring and oversight by a senior governance forum where adequacy of disclosure to the client should be considered.

²⁷ COBS 11.2.19R.

²⁸ TR14/13 also discussed client instructions and use of algorithms, and provided examples of good and poor practices (pages 20–22).

- 3.28** Operators (and users) must also be mindful that the routing logic that they apply should not be based on static information. Any biases must be continually validated through assessing the quality of execution received and continuing to feed new data into the assumptions that drive the routing of their execution strategies. Operators also need a controlled and systematic approach to ensuring that technical changes – including system upgrades to the electronic platform – do not have an unintended detrimental impact on the way the platform operates (i.e. a material change to order routing).
- 3.29** Where it is applicable, firms should establish clear ownership and accountability for delivery of best execution, including appropriate front office engagement, together with senior management oversight. Following on from our Thematic Review ‘Best Execution and Payment for Order Flow’ (TR14/13) in 2014, it was apparent that some firms were more advanced in the development and implementation of best execution governance frameworks. Programmes ranged from system updates to wholly new processes and systems, sometimes including new committees and escalation processes for oversight.
- 3.30** If best execution is owed to a client’s order, the rules apply regardless of how the relevant orders are received and the complexity or the number of steps that are taken for the order to be executed. In TR14/13, we also outlined the importance of being clear about which aspects of an order were subject to specific instructions and which relied on the operator’s own discretion. Firms that execute orders internally through connected parties must be able to evidence whether this delivered best execution and/or whether it generated conflicts of interest. We found some firms were unable to provide sufficiently robust evidence that they had evaluated whether a related venue was the best venue choice and whether the corresponding conflicts of interest that arose had been appropriately managed.
- Fairness of access**
- 3.31** All members of an MTF must receive fair and equal treatment with regard to access in terms of latency and priority in an order queue. MTFs are required to publish rulebooks outlining membership criteria. BCNs may be more restrictive in their criteria for allowing member participation, but the criteria must still be clear.
- 3.32** Where bank operators allow their own trading desks to access a BCN or MTF, they must ensure that they do not have a favourable advantage over other third-party participants to the pool or venue. This is a regulatory requirement under our conflicts of interest rules (SYSC 10), which indicates that firms must identify and manage conflicts where the firm may gain an advantage and potential financial gain at the expense of their clients.²⁹ One way in which some operators achieved this was by channelling all internal desk orders through the same infrastructure as applicable to other pool participants. We were concerned, however, that some operators allowed access by their own traders in a manner which may provide an unfair advantage; this may not have been policed in a sufficiently robust manner, potentially breaching requirements in SYSC 10.
- 3.33** Operators may allow several access channels to operate in parallel, for example, low-touch algorithmic orders processed by an SOR in parallel with DMA orders that are placed directly into the pool. Speed bumps have been introduced by some operators to ensure that all participants have equalised access in terms of messaging speed. These should be monitored to ensure that, following changes to the platform of any kind, the speed bump does not inadvertently introduce a benefit for a participant or a class of participants, since firms must also identify and

²⁹ SYSC 10.1.3(2)R, SYSC 10.1.4R and 10.1.7R.

take steps to manage potential conflicts between one client of the firm and another client (or groups of clients) that could lead to material risk of damage to a client.³⁰

Matching criteria and crossing logic

3.34 Executions within a BCN dark pool are crossed at levels that are based on external reference prices. Many operators add additional categories to their crossing logic priorities, including order size, client categorisation and behavioural profiling. When operators employ additional crossing categories, this should be clearly communicated to the participant members of the pool and should be policed with effective controls and monitoring to ensure that these criteria are adhered to; compliance with the best execution and client order handling obligations should also be demonstrated.³¹ We observed significant variations in actual matching logic across the MTF and BCN landscape and note that details of the prioritisation logic may not always be fully understood by users.

3.35 While we note that firms were weak in policing client preferences as described earlier, we were pleased to see a significant investment by some firms in implementing other live crossing restriction infrastructure that was clearly designed to avoid poor outcomes for clients. Examples included restrictions on crossing that would set a new, substantially higher or lower price levels, limiting the ability to execute far outside of primary market bid/offer levels and preventing executions in a crossed market.

3.36 We note that BCN pool operators generally provide preferential execution prioritisation to institutional participants over ELPs. The intent is to counter the technological advantage that ELPs may have, as well as the opportunistic trading activity of some ELPs.

Reference pricing

3.37 Typically, the reference price for orders crossed within a BCN dark pool is based on the best bid and offer on the primary exchange, known as the Primary Best Bid and Offer (PBBO) (i.e. in the UK, the London Stock Exchange). Alternatively, operators may include reference prices from other lit venues to calculate the best bid and offer prices with this typically labelled as the European Best Bid and Offer (EBBO).

3.38 Operators have a certain degree of discretion as to which markets they use to assemble an EBBO and these do differ from one operator to the next. Accordingly, there can be variations as to pricing outcomes between different operators, depending on the aggregate actual activity in the markets being referenced. It should be highlighted that when firms employ an EBBO reference price, the construction of that price should be made transparent and a clear rationale given as to the choice of constituents within the reference price. An assessment of the EBBO should also be included in the firm's review of their order execution policy and order execution arrangements, which must be carried out at least annually.³² Use of an EBBO will no longer be possible under proposed MiFID II changes.

Infrastructure resilience and capacity

3.39 One consequence of computerisation is the dramatic increase in messaging volumes that have swept across the markets. This has the potential to adversely impact both platform resiliency and the orderliness of trading due to the strain on processing capacity and by contributing to an overly optimistic impression of market liquidity. The European Securities & Markets Authority (ESMA) addressed the issue in its 2011 guidelines for systems and controls in an automated trading environment.³³ In these guidelines, it set out, among other things, a requirement for operators

³⁰ SYSC 10.1.3(2)R and 10.1.7R.

³¹ Including COBS 11.2.1R, COBS 11.2.14R and 11.2.29R.

³² COBS 11.2.28R.

³³ MAR 5.1 specifically references these ESMA Guidelines.

of a regulated market or MTF to ensure that they had sufficient capacity to accommodate reasonably foreseeable volumes of messaging and that their platforms were sufficiently scalable to respond to rising message flow and emergency conditions. These guidelines have, since introduction, formed an integral part of FCA supervision activity of these venues.

- 3.40** While the above guidelines are not directly applicable to the operation of a BCN (as they are outside the definition of a regulated market or MTF), it did appear that BCN pool operators had made a genuine effort to ensure their platforms were resilient and scalable and that capacity was monitored appropriately. Despite these efforts, we observed that the capacity of the electronic trading platform overall remains an area where firms could continue to devote attention. Firms must ensure their overall systems and controls are sufficiently robust in light of the nature, scale and complexity of their business, and this should include considering potential business continuity issues and risk controls for its activities, processes and systems.³⁴
- 3.41** The degree to which firms had formal targets for surplus capacity in place varied across the industry and instances of performance degradation were highlighted to us by users and operators alike. Firms that wish to restructure their BCN offering to an MTF under MiFID II should be particularly mindful of capacity targets as they are potentially more onerous under MiFID II than the levels currently in place for BCNs across the industry.

Outsourcing

- 3.42** Some operators have outsourced parts of their trading infrastructure to specialists. We would remind those who have done so that best execution responsibilities (applicable to BCN operators) cannot be outsourced or delegated away to third parties, and other requirements such as fair and orderly trading and market monitoring will continue to apply. In addition, the FCA has issued a guidance consultation³⁵ related to SYSC 8 with regard to outsourcing, which firms should carefully consider to assist them in meeting their obligations.³⁶
- 3.43** Overall, we would note that electronic platforms are complex and multi-faceted businesses combining hardware, policy and process, expert staff and oversight. Operators must ensure careful design and operational integrity when operating a dark pool and potential conflicts of interest must be identified and managed. Given the potential for conflicts of interest to arise and the requirement to achieve best execution, we recommend that firms review the set-up of their internal flows to their dark pools and periodically test for efficacy in relation to fair access (latency differences), client preferences and best execution.

Questions that operators might ask themselves include:

- Q37: Is our routing logic reviewed and updated on a regular basis, including a conflicts of interest assessment, in response to changing market conditions?**
- Q38: Can we be sure that all clients and/or classes of clients have equal access to the pool, especially if some participants access the pool via different infrastructure than others?**
- Q39: Is our matching logic properly explained and understood by all participants?**

³⁴ SYSC 3, 4 and 7.

³⁵ FCA GC15/6, 'Proposed guidance for firms outsourcing to the 'cloud' and other third-party IT services' (November 2015), see: www.ca.org.uk/your-fca/documents/guidance-consultations/gc15-06.

³⁶ Relevant requirements in SYSC 8 include SYSC 8.1.1R, SYSC 8.1.4R and SYSC 8.1.6R to 8.1.11R.

- Q40:** Does our infrastructure allow any access via stripped-down protocols?
- Q41:** Are all price and other data feeds operating at or above our set resiliency thresholds?
- Q42:** Is capacity sufficient to meet user requirements under market stress conditions?
- Q43:** Do clear trading volume threshold breaches trigger additional capacity being brought online?
- Q44:** Do outsourcing arrangements enable adherence to oversight and regulatory reporting needs?
- Q45:** Does the second line of defence have sufficient expertise and resources to provide adequate challenge?
- Q46:** Are user testing processes for the development and updating of algorithms acceptable?

Good and poor practice findings

Good practice

- Dynamic reassessment of routing logic based on market activity (e.g. price volatility, liquidity).
- Monitoring the latency of price feeds performed on a real-time basis.
- A clear process with defined thresholds for identifying and acting on stale prices.
- Performance monitoring based on clear metrics such as: outside EBBO bid offer, spread exceeds five times historic levels, trade represents a new daily high or low, market is locked (bid=offer), or crossed (bid is greater than offer).
- Frequent review of execution quality by a senior best execution committee.
- Clear process and thresholds for triggering suspension of the pool if data feeds materially falter.
- Maintenance of at least 50% headroom above the highest volume experienced on the electronic trading platform.
- Using forecast expected daily volume to ensure ability to quickly scale up systems.
- Integrating the algorithm developers and IT technical implementation staff to help eliminate operational errors with the two units now audit controlled together.

Poor practice

- Slow adjustment (or removal) of a speed bump originally introduced to equalise access to a pool after the need for it was resolved via other technical improvements.
- Allowing access by an in-house trading desk to its BCN via different infrastructure than clients, which gave it a potential latency advantage constrained only by management controls.
- Monitoring of pricing feeds on a post-trade basis only.
- Irregular checking of system prices against reference markets.
- Irregular intra-day monitoring of key data feeds.
- Design of key performance indicators to support operational integrity that could not initially be monitored.

Monitoring of activity in the pool

- 3.44** While monitoring activity in an ultra-fast electronic environment is a significant challenge, it remains a key responsibility for operators. The ability to identify and manage infrastructure problems quickly at the platform level is essential – and this was largely in place.³⁷ The ability to analyse and report on individual client transaction-level trading activity on the same day is beyond the technical capability of most operators; we found that firms may take several days or a week to generate and provide reports. Monitoring and prompt corrective action underpins our requirements and is crucial to the prevention of market abuse and minimising the risk of clients receiving poor outcomes.
- 3.45** All operators should have sufficient monitoring capability to detect market abuse (e.g. trades of unusual size, evident manipulation, gaming). While we did not explicitly test these criteria for comprehensiveness or robustness, the infrastructure for this oversight was evident and firms should ensure that they have the data and the monitoring capability in place to ensure adherence to the requirements of the market abuse rules.
- 3.46** Where operators are executing orders on behalf of a user, they must be able to monitor the effectiveness of their execution arrangements and policy, and be able to correct any deficiencies where appropriate.³⁸ It is noted that discharging their best execution obligations requires firms to execute orders in accordance with any specific instructions from the client.³⁹ Monitoring infrastructure, metrics and oversight should meet these requirements.

³⁷ At the firm level, requirements in SYSC 4 and 7 will be relevant.

³⁸ COBS 11.2.27R.

³⁹ COBS 11.2.19R.

3.47 Some operators differentiate their offering through specific additional features, such as client profiling or order matching preferences. Where such features are offered, operators must have the monitoring capability to enable oversight of those features.

Active profiling

3.48 We observed that firms that actively profile participants regularly assessed categorisation based on active monitoring of trading activity. Segmentation of participants is typically based on a few sub-divisions: for example, activity described as basic natural order flow (e.g. day-to-day buy-side purchases or sales) and categories that reflect increasing levels of aggressiveness and intra-day profit objectives.

3.49 Profiling analysis can include purely subjective criteria, but also includes order size, duration, cancellation rates, resting time and price improvement. It also extends to post-trade price reversion analysis, where we noted that some firms measure reversion over five seconds while others measure over five minutes. Once again, it is important that operators clearly define profiling criteria, explain it to users and conduct effective monitoring in line with the features promoted. Similarly, it is important for users to conduct careful due diligence to understand these features and how they are monitored.

User preferences

3.50 Generally, we observed that operators were not sufficiently systematic in ensuring the prevention of trades with restricted counterparties. Preferences that were not centrally stored were the most difficult for firms to monitor and audit.

3.51 An order could be onward routed under the name of the broker rather than the underlying client, and the preferences of that client might not be communicated. Another instance where onward routing can adversely affect client preferences is under reciprocal access agreements. As noted earlier, operators were unclear about the extent to which their clients' preferences were preserved when their orders were routed onward to venues under reciprocal agreements. Even if the preferences were preserved, there was no way for the initiating operator to assess, let alone control, whether their client order had crossed against a restricted counterparty.

3.52 In circumstances where a client order is routed onward from one pool to another, client designations by the originating bank or broker or pool operator may differ from the designation for that same firm held by the next venue. As a result, a client may find its order being matched with a counterparty that it has a clear preference not to trade with. Another example could occur in a circumstances where an order is processed by an algorithm and routed onward to match against principal flows. As noted above, where the operator is executing orders on behalf of a client, this should be treated as a client instruction, in which case the order must be executed following this instruction.⁴⁰

3.53 Weak processes may give rise to a risk that operators executing orders on behalf of clients may not be meeting their best execution obligations, which state that orders must be executed in line with specific client instructions where provided.⁴¹ More generally, we expect firms to have robust systems and controls and to keep adequate records relating to their services.⁴²

⁴⁰ COBS 11.2.19R.

⁴¹ COBS 11.2.19R.

⁴² SYSC 3, 4 and 9.

Data feeds and stale prices

3.54 Operational infrastructure includes substantial connections to internal and external inflows of data. We observed that monitoring of data inflows, including price feeds, was not always robust. Slow or failed feeds can undermine execution capabilities and affect strategy, routing or other execution-focused algorithms. Oversight and management of any disruption, including notification to users and taking venues or pools offline in a timely manner, where appropriate, is an important aspect of the responsibility to prevent a disorderly market.⁴³ It may also undermine the provision of best execution where this is owed to clients if there is a risk of orders being executed on the basis of old or inaccurate price information.

Message volumes and gaming

3.55 We referred to headroom to accommodate surges in volume in an earlier section above. In addition, operators should monitor the nature of orders, modifications, cancellations and other messaging flows in a pool. Operators should be alert to not only average volumes of such activity but also to sudden, perhaps isolated, changes in volumes or order direction.

3.56 Overall, monitoring capability is perhaps the weakest area of the end-to-end trading process related to dark pools that we identified. We observed that some operators have invested in substantial monitoring infrastructure at the aggregate level, as well as the individual user level, while others less so. We would encourage active dialogue between users and operators regarding key needs and priorities.

3.57 The best execution obligations are overarching on a firm's business and should be taken into consideration at every stage of the order routing and execution process.

3.58 Operators executing orders in dark pools on behalf of clients must ensure that their monitoring is helping to deliver best execution on a consistent basis and equips them to improve their performance where the results of monitoring show this is necessary.⁴⁴ The best execution obligations should be taken into consideration at every stage of the order routing and execution process. Effective monitoring and oversight by operators (and by users) underpins fair and orderly markets.

Questions that operators might ask themselves include:

Q47: Are our monitoring processes able to assess and evidence adherence to client preferences and specific instructions?

Q48: Is the data-monitoring infrastructure on which our execution strategies rely robust and timely?

Q49: Are boundaries for identifying stale pricing as tight as they should be in a low latency environment?

Q50: Have we set appropriate thresholds for taking the pool offline due to feed problems?

Q51: Is there sufficient capability in place to observe adherence or delivery of promised service levels?

⁴³ SYSC 4 and 7 will be relevant.

⁴⁴ COBS 11.2.1R and COBS 11.2.27R.

Q52: Can we identify unwanted activity in the pool sufficiently quickly and act on it?

Q53: Do we have clear internal guidance about when clients should be informed of system outages that affect our ability to monitor activity in the pool?

Good and poor practice findings

Good practice

- Analysing and grouping clients according to set criteria based on trading activity.
- Daily systematic checking of client preferences through a proactive push system.
- Establishing clearly defined metrics to monitor activity by group.
- Establishing and monitoring controls for minimum resting times for DMA clients in the pool to prevent IOC pings lighting up resting orders.
- Evidencing action taken against participants that display undesirable activity (penalties included suspension from the pool or being deprioritised in the queuing structure).
- Weekly analysis of participant trading and reassessment of the client's profiling category.
- Monitoring client classification in real time and escalating issues the same day or overnight (as opposed to weekly or monthly).
- Trading was regularly assessed post-trade to ensure matching restrictions were adhered to.
- Gaming analysis was undertaken real time on the pool activity.

Poor practice

- No evidence of systematic monitoring of the client's activity in the pool.
- Use of pricing based on stale data (more than one second old), which then affected the SOR.
- Lack of breach tracking or follow-up against breaches of undesirable activity thresholds.

Confidentiality of data and dark trading information

- 3.59** A key risk and conflict of interest arises where live or very recent order flow information in a dark pool is seen by other trading desks or support units in the firm – or ultimately seen by an external party. This risk must be identified and managed in line with SYSC 10 requirements. Controls around access for traders, trade support and second line of defence staff also need to be robust.
- 3.60** A limited number of front-office staff in the electronic trading unit monitor and manage the order flow to and within dark pools. Access to flow information was typically restricted to this team and a dedicated compliance team. In addition, oversight of live orders and execution data was often available to a dedicated IT support team. The access of these trading support teams was consistent with their narrow roles in ensuring the continued operation of the electronic platform. These same teams typically had access to historical order and execution information. At the specific request of the client, some sales traders were given access to their electronic order flow to optimise execution opportunities; this requires demonstrable client authorisation and adequate controls. Some firms also extended access to this historical order and execution data to their in-house quantitative research teams. It is important that firms have such procedures and measures in place to ensure robust management of conflicts of interest and the risk of market abuse.⁴⁵
- 3.61** We observed evidence of proactive efforts to restrict access more tightly and to strengthen controls. Most firms have now implemented effective controls to enable regular systematic checking that access granted to a staff member remains appropriate.
- 3.62** Some controls protecting live and historical order information were not as robust as we would have liked. Access restrictions on secondary lines of defence or support units across our sample were sometimes seen to be weak. A number of internal audit reports noted: shortcomings arising from retained access by IT support staff long after completion of the IT work; continued access by staff, including former trading staff, who had moved to a different role within the bank; and weak controls or oversight around access monitoring and follow-up.
- 3.63** We were surprised that the number of staff granted access varied significantly, with one firm's permitted tally in the hundreds. The risk of an adverse event rises with the number of staff members who have access to sensitive information. We would expect firms with larger numbers of staff or support specialists to consider whether the access currently afforded to staff is critical to the performance of their roles.
- 3.64** Internal controls or internal audit reports identified incidents where inappropriate access was available to some staff, although it was also determined that this access had not been acted upon by those staff members. We did not identify instances during our review of inappropriate access actually occurring. We expect firms to continually monitor whether access rights given to staff remain appropriate.
- 3.65** Confidentiality of data within a pool is essential to preserving the integrity of markets and preventing conflicts of interest. If an operator detects a weakness in their protection of data confidentiality, we would expect them to rectify this at the earliest opportunity.

⁴⁵ SYSC 10.1.11R and Principles 3, 5 and 8.

Questions that operators might ask themselves include:

- Q54:** Have we adequately tested the risk of data leakage from the dark pools to ensure that controls and safety measures around the trading platform are sufficiently robust?
- Q55:** Do we regularly and systematically review access rights to dark pool platforms and the restricted trading data therein?
- Q56:** Are supplementary access rights automatically reviewed and revoked upon completion of IT upgrades, system rollouts or staff movements? Has this control process been audited recently?
- Q57:** Do we have the technical capability to assess audit trails as evidence of authorised or unauthorised access?

Good and poor practice findings

Good practice

- Tight control over access to the dark pool platform data, with individuals logged on a 'need to know' list that was tightly regulated and frequently refreshed.

Poor practice

- Use of outdated 'need to know' employee lists enabling staff who had left this area of the firm continued access to dark pool information (audit confirmed that, in this case, no staff had actually attempted to access any data),
- System design that potentially allowed some traders to see resting orders and the aggregated order book.
- Allowing potentially hundreds of staff across the support infrastructure (i.e. a number well above any of its peer group of a similar scale) to have access to live trade data.

Conflicts of interest policy and register

- 3.66** We typically observed that operators had a single high-level policy document accompanied by conflict registers, some of which were specific to individual businesses but rarely covered dark pools.
- 3.67** Firms are required to have and regularly update a record of conflicts of interest and establish, implement and maintain an effective conflicts of interest policy that is set out in writing and is appropriate to the size and organisation of the firm and the nature, scale and complexity of its business.⁴⁶ Firms should ensure conflicts of interest policies identify circumstances that constitute, or may give rise to, a material risk of damage to the interests of one or more clients by reference to specific services and activities that they carry out.⁴⁷
- 3.68** If relevant, we expect firms to include a reference to dark pools as part of the drafting and review of their conflicts of interest policy. Firms that use a high-level approach and omit specific risks with respect to their dark pool should consider whether they are taking all reasonable steps to identify and manage conflicts of interest as required by our rules.⁴⁸ This is particularly relevant as we referred to conflicts of interest in our 2014 Thematic Review of Best Execution and additional rules are proposed for MiFID II.
- 3.69** While internalisation or execution of orders through connected parties can deliver good client outcomes, the activity should be transparent, evidenced and subject to appropriate conflict-management monitoring and controls.
- 3.70** Clear policies and procedures, including examples and articulated in language that staff can readily understand, are essential to ensure firms meet their obligations under SYSC 10. Training programmes should be in place to ensure that these policies and processes are fully understood and followed by staff.

Questions that operators might ask themselves include:

- Q58:** Should we revise our conflicts of interest policy to include our dark pool business in order to comply more fully with the SYSC 10 requirements?
- Q59:** Is our conflicts policy written in a way that our employees can easily understand?
- Q60:** Does senior management receive regular written reports on risks or situations arising and discuss the acceptability of proposed mitigation?
- Q61:** Is it clear who within the firm is responsible for managing situations arising as described in the conflicts register?
- Q62:** How often are we reviewing the conflicts record and policy to ensure that we are meeting the SYSC 10 requirements?

⁴⁶ SYSC 10.1.6R and SYSC 10.1.10R.

⁴⁷ SYSC 10.11R.

⁴⁸ SYSC 10.1.3R, SYSC 10.1.4R and SYSC 10.1.11R.

Q63: Are we inclusive of other areas of the business, such as other profit centres, legal, compliance or risk in our review process of policies and procedures?

Q64: Are basic order routing matters covered, such as onward routing from flow books, to a dark pool or to an MTF?

Good and poor practice findings

Good practice

- Regular updates to the conflicts of interest policy and the register and recording of specific conflicts of interest that can arise with respect to its dark pool.
- Inclusion of specific scenarios related to algorithmic trading and the BCN in a conflicts of interest matrix.
- Tailored conflicts of interest training to include risks relating specifically to dark pools.
- Mapping of conflicts of interest by individual processes and how these interlinked with other processes.
- Ensuring that input from the three lines of defence was taken into consideration in the conflicts assessment.

Poor practice

- Use of very generic high-level policies that were non-specific and difficult to apply to dark pools.
- Weak articulation of risks and conflicts of interest through the whole trading cycle.

Governance and the lines of defence

3.71 The hallmarks of good governance include accountability at the top of the organisation with clear delineation of responsibility to operational levels, as set out in our SYSC Handbook.⁴⁹ This has recently been reaffirmed by the UK’s Senior Managers and Certification Regime (SM&CR).

3.72 Firms who are in scope of the SM&CR that provide algorithmic trading/systems as one of their activities must allocate overall responsibility for this activity to a Senior Management Function (SMF) (i.e. to the most senior person accountable to the board for this activity). In addition, there is an ‘algorithmic trading function’, which is one of the ‘significant harm functions’⁵⁰ within the Certification Regime. This includes individuals responsible for deploying, changing or monitoring algorithms. While certified persons (including those performing the ‘Algorithmic

⁴⁹ Including SYSC 4 and 6.

⁵⁰ In particular, SYSC 5.2.49R.

trading function’) are not subject to regulatory preapproval, a firm in-scope of the SM&CR must ensure that these individuals are certified as fit and proper appointments at least annually.

- 3.73** Good governance and organisational structure typically includes a number of committees, each with clear terms of reference, membership that includes the requisite expertise, management information and reports that are sufficiently comprehensive to enable informed decision-making, and clear escalation routes as appropriate within the organisation. The Board and senior management should have a good understanding of all the major components of the firm’s electronic trading platform, including its dark pools, and ensure the effective monitoring of performance. Ideally, the relevant senior committees will include individuals who have a deep knowledge of the electronic platform.
- 3.74** We noted that firms that had invested in best execution infrastructure as a consequence of the FCA’s Best Execution review were able to make good use of this new infrastructure for oversight of dark pools.
- 3.75** We observed some instances where the risk, compliance and audit functions did not appear to have sufficient understanding of the technical complexities of the business to adequately challenge management and staff on process or technical issues. In one example, we noticed the second and third lines of defence quickly acquiescing and being directed by the head of the dealing desk on operational issues. This is unlikely to be consistent with our requirements in SYSC 6.⁵¹
- 3.76** ESMA Guidelines⁵² require firms to ensure that changes to their algorithms are reviewed by a firm’s risk and compliance teams. Firms should ensure that their risk and compliance teams are conversant with all aspects of the firm’s broader electronic platform, including algorithms, smart order routing and dark pools (as well as the market overall), and that they can provide robust challenge to business heads where required.
- 3.77** Good governance and effective lines of defence are essential to ensuring the proper functioning of a firm and for overall market integrity. Independent challenge is a key component of governance and the role of the risk, compliance and internal audit functions. We expect individuals working with electronic trading platforms including dark pools to have the requisite knowledge and influence to enable them to provide the appropriate check and balance to front-office staff and business unit management. It is equally important that they be given adequate support and resources to do so. Staff must be able to access clear escalation channels when needed to ensure adequate internal supervision of the firm’s compliance with their regulatory obligations and to uphold market integrity and consumer protection standards.

Questions that operators might ask themselves include:

Q65: Is the governance infrastructure, including committees, terms of reference and reporting, being evaluated for effectiveness, and has this been evidenced at Board level?

⁵¹ In particular, SYSC 6.1.4R and SYSC 6.2.1R.

⁵² ESMA document from 2012: ‘Guidelines – Systems and controls in an automated trading environment for trading platforms, investment firms and competent authorities’. Page 9: In the governance process, compliance staff should be responsible for providing clarity about the firm’s regulatory obligations and the policies and procedures that seek to ensure the use of the trading systems and algorithms comply with the firm’s obligations and that any failures to comply are detected. This means compliance staff members need to understand the way in which trading systems and algorithms operate, but not necessarily have knowledge of the technical properties of the trading systems or algorithms.

- Q66:** Are all lines of defence sufficiently skilled or knowledgeable of the areas that they oversee?
- Q67:** Are there effective escalation processes in place to ensure that issues are either dealt with or further escalated in a timely manner?
- Q68:** Is the information provided to senior management, directly or via committee, sufficient to demonstrate the effectiveness of the control environment overall including its support functions?
- Q69:** Are we providing adequate support to our second line of defence staff to ensure their ability to challenge keeps pace with front-office developments?
- Q70:** Is the internal audit budget and resource sufficient to cover processes around dark pools and the broader electronic trading platform?
- Q71:** Can we monitor and report adequately on best execution performance?
- Q72:** Are sufficient preparations in place for structural changes to our business that may be required as a result of MiFID II?
- Q73:** Are we sufficiently poised to implement new and emerging data processing and reporting requirements under MiFID II?
- Q74:** Have we considered how and where new conduct risks, including conflicts of interest, may emerge or put in place plans to do so as part of our regular oversight regime?
- Q75:** Have we considered how lessons learned from our experience with fast developing equity markets can be applied to anticipating new conduct risks in other products and markets?

Good and poor practice findings

Good practice

- Clear governance structures and appropriate terms of reference for each committee.
- Overarching infrastructure that specifically addressed dark pools, including best execution.
- Evidence of issues being identified and raised at the governance committee responsible for overseeing the pool by the business or by second or third lines of defence.
- A fully coordinated approach to control by the Chief Operating Officer, compliance and technical support units.
- Monthly reviews of plant performance with remediation of identified and/or trending issues discussed and minuted.
- Clear articulation of how dark pool and best execution issues are identified and escalated.
- Revamping management information with useful metrics and prose in a manner that assisted the governance committee in the decision-making process.

Poor practice

- Ineffective internal management reports that relied on incorrect or outdated data.
- Weak escalation process for matters related to oversight with no evidence that the process was ever utilised.
- Inadequate definition and separation of responsibility between the first and second lines of defence for monitoring best execution or conflicts of interest related to dark pools.
- Unhealthy deference by the second and third line of defence to the business head.

4. Next steps

- 4.1** Our review findings confirm sustained, innovative change on the part of market participants and a continuing commitment to infrastructure investment, as well as the accompanying policy and process analysis and improvements. Nevertheless, our review has also indicated a number of areas for further improvement.
- 4.2** We expect dark pool users and operators to carefully review the contents of this report and its key messages, and reflect on their own operations and practices. The report will also be of interest to wider stakeholders and participants across the UK wholesale equity markets.
- 4.3** All firms, whether users or operators, need to ensure that business practices are fit for purpose and that these are supported by appropriate second line of defence controls. Users should ensure that they understand the attributes of individual pools and monitor their use to ensure that the expected benefits are obtained. Operators should ensure that they provide clear explanations and comprehensive answers to queries about how their pools operate. Firms must ensure that they identify and manage conflicts of interest when operating dark pools and routing orders via their electronic trading systems. They must also ensure that they meet their discrete best execution obligations when executing orders on behalf of clients. We also remind both dark pool operators and users that updated requirements with regards to market abuse came into force on 3 July 2016 with the application of the Market Abuse Regulation (MAR).
- 4.4** Given the nature and broad relevance of the findings, all firms should also review their arrangements for delivering best execution where applicable. Ultra-fast processing speeds, complex strategies and complicated smart order routing may complicate adherence, but provides no exemption from best execution obligations.
- 4.5** All firms need to assess the risks and issues identified in this report. Some specific additional obligations in MiFID II are intended to address a number of concerns specific to dark pools. Firms need to improve their current systems and controls and be ready for the implementation of future policy changes. More generally, much financial regulation currently applicable in the UK derives from EU legislation. This regulation will remain applicable until any changes are made, which will be a matter for Government and Parliament. Firms must continue to abide by their obligations under UK law, including those derived from EU law and continue with implementation plans for legislation that is still to come into effect. The longer term impacts of the referendum decision to leave the EU on the overall regulatory framework for the UK will depend, in part, on the relationship that the UK seeks with the EU in the future.
- 4.6** Finally, the rapid advances in technology and related innovation gave rise to significant new conduct risks in wholesale equity markets. Similar conduct risk challenges may occur, perhaps in slightly different form, in other products or markets. It is a key managerial responsibility to make an effort to apply lessons learned in this sector to other products and markets. Failure to be proactive in this regard ultimately presents a risk to the trust and confidence in the integrity of our markets, as well as potentially undermining competition between trading venues.

Annex 1

Overview of UK equity markets

1. Significant changes in the UK equity market have been driven by technological advances that have led to the emergence of new market participants. Regulatory change has also given rise to new sub-markets and services. While dark pools are one feature of equity market evolution and are often referred to as if they are homogenous, on close examination it is apparent that no two BCNs or dark MTFs are alike. Each is affected by the reputation and size of the sponsor or operator, its ability to attract flow from the market, and its client base. A major point to note is that the UK equity market and regulation differs significantly from the US and other markets, including with regard to dark pools.

Technology

2. Technological advances in computational processing power, communication speeds and interconnectivity have transformed secondary markets. These developments have been further enabled by the impact of regulatory change that has opened markets to wider competition – but also deeper scrutiny.
3. Trading has migrated from human-to-human voice negotiation to computer-to-computer exchange. At the same time, the Markets in Financial Instruments Directive (MiFID Directive 2004/39/EC), which came into force in 2007, fostered greater competition. This confluence has meant that buy-side institutions now have a larger number of methods and more diverse destinations to execute their orders. Even voice contact orders given to a sales traders will ultimately be executed using the same suite of algorithms, order routers, multiple platforms (including dark pools), and order types as available to electronic execution clients.
4. Equity trading in the UK can now take place in venues that are ‘lit’ or ‘dark’. Trading in a regulated market⁵³, or some MTFs⁵⁴, provides pre-trade transparency on bid and offer prices and the depth of trading interest at those prices. As a result of the full transparency, these markets are referred to as lit.⁵⁵ Dark venues, such as dark MTFs and BCNs⁵⁶ operate with no pre-trade transparency matching volume orders at prices often derived from other markets: generally the bid, mid or offer prices derived from the primary market or from a composite price from a number of markets (EBBO). User familiarity with prices on the referenced markets creates expectations for price levels, but not with certainty. Post-trade reporting obligations for trading in dark pools are the same as for lit markets.

53 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 the system and in accordance with its non-discretionary rules – in a way that results in a contract, in respect of the financial instruments admitted to trading under its rules and/or systems, and which is authorised and functions regularly and in accordance with the provisions of Title III of MiFID. In the UK, a regulated market can only be operated by an RIE.

54 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 – in the system and in accordance with non-discretionary rules – in a way that results in a contract in accordance with the provisions of Title II of MiFID.

55 Regulated markets also make use of pre-trade transparency waivers (for block trades and for negotiated trades), but most activity on those systems is transparent and aimed at generating an efficient price discovery process.

56 Under MiFID, trading under a BCN would fall under OTC trading. OTC is defined in relation to a transaction in an investment, not on-exchange.

5. Dark MTFs are offered by a range of operators, including investment banks, brokers and exchanges (but nothing prevents a regulated market from operating a similar system) using one of the waivers⁵⁷ provided under MiFID to be exempted from the obligation to provide pre-trade transparency. The reference price waiver, for example, allows the operator of the MTF to cross orders at a reference price without disclosing the size of the orders interacting on the order book. BCNs, by virtue of the discretion that the investment firm exercises in bringing together buying and selling trading interest, and in accordance with client instructions or permissions, currently sit outside the definition of MTF under MiFID. As such, they do not need to apply for and operate under a specific waiver.
6. There is a third category of platform, SIs, where an investment firm deals on its own account by executing clients orders outside a regulated market or an MTF. These venues provide a certain amount of pre-trade transparency, which is limited to quotes up to a standard market size.
7. The focus of investment in technology has included co-location of computer equipment (servers) with exchanges or pool operators, software design and the selection of specific hardware components – all for the purpose of shaving a few more microseconds from message cycle times. Raw computing power has also been harnessed in numerous ways, including:
 - development of investment ideas based on extensive, but almost instantaneous, data analysis
 - selection of trading strategies based on chosen priorities (e.g. speed or certainty of execution), and
 - routing of order instructions in sequence, in parallel or both, possibly in repetitive salvos to a wide range of venues (e.g. SOR programs)
8. We briefly describe below key emerging participants, venue types, and the uniqueness of the UK compared to markets elsewhere.

New market participants

9. The main participants in the UK equity market are investment banks, broker-dealers, large asset managers, fund managers of various types, insurance companies, proprietary trading firms and hedge funds as users. The operators are mainly regulated exchanges, investment banks and investment firms.
10. Additionally, technology had enabled the emergence of new categories of participant and some new or hyper-versions of old trading strategies. HFTs emerged as a common label applied to traders seeking gains over a very short holding period (e.g. seconds or minutes and rarely overnight) and making use of high-speed, computing power, coupled with purpose-designed algorithms. This represents a high-tech variation of long-established proprietary trading models. Counterparties acting in this manner are contrasted with the more traditional institutional asset management approach focused primarily on longer-term buy and hold activity, now described as ‘natural flow’ by equity market participants.

⁵⁷ Commission Regulation (EC) No 1287/2006 of 10 August 2006, Articles 18–20.

11. The HFT labelling is difficult to define but is commonly understood to be a compendium of pure speed, large numbers of orders, and very short holding periods. There are wide variations of the label applied in different countries and markets; generally, however, HFT has also come to be used as a description of what is now a wide-spread technological capability rather than just as an industry sub-group.
12. Some operators classify a subset of their users as ELPs. These are generally HFT firms that operate market-making type strategies and post liquidity actively across a wide range of traded securities, including UK equity markets (both lit and dark).
13. It should be noted that technological improvements are widespread. Many, if not most, larger banks, brokers and venue providers now operate at near-equal, ultra-fast speeds; as such, a pure processing speed advantage is becoming rare. Innovation around the use of this technological capability via complex algorithms and unique strategies remains a highly competitive endeavour.

UK sub-markets – lit and dark

14. Technological development and regulatory change have enabled new markets and trading venue types to evolve. This report will make reference to four types, sometimes referred to as micro-markets. As shown in the table below, some of these micro-markets are lit and some are dark.

Market type	Lit	Dark
Regulated market	X	
Multilateral trading facilities	X	X
Broker crossing networks		X
Systematic internalisers	X	

Regulated markets – lit

15. In the UK, regulated markets are operated by RIEs, such as the London Stock Exchange, based on a range of order-driven, quote-driven and hybrid models offering a high degree of pre-trade transparency with the option of some dark order types. These order types are required to meet certain conditions under MIFID, such as being large in scale or conducted via an order management system – for example, stop loss orders. RIEs are recognised bodies and are exempt from the requirement to be authorised for the regulated activities that they perform in relation to their business as an investment exchange. Under this exemption, an RIE may also operate an MTF in accordance with the same requirements that apply to an investment firm's MTF, as set out below.

MTFs – lit and dark

16. The FCA requires any multilateral system operated by an investment firm to be regulated as an MTF, where that system brings together multiple third-party buying and selling interests in shares (or any other financial instrument), in accordance with non-discretionary rules, and in a way that results in a contract. Although dark pools are generally operated in the UK and in the rest of Europe as MTFs, nothing in MiFID prevents regulated markets from establishing similar platforms.

17. Venues offering trading in shares are generally required to publically display the aggregate number of orders and shares they represent at each price level for at least the five best bids and offers. While dark MTFs can waive pre-trade transparency, all transactions executed on those systems are required to be disclosed to the public immediately following matching, unless the transaction is large in scale (i.e. is a block trade). Disclosure to the public of large transactions may be delayed.
 18. In most dark MTF venues, orders are matched on electronic order books where multiple orders can interact and where execution occurs at a price that is derived from another system. In order to operate without pre-trade transparency, trading venues may apply for the so-called reference price waiver to the FCA. The reference price is often the current mid-price of the primary market's best bid-offer prices.
 19. Prior regulatory authorisation is required to operate a dark pool. At the time of authorisation and on an ongoing basis, the FCA ensures (among other things) that the operator is capable of maintaining a fair and orderly market, that proper systems and controls are in place, and that transparent and objective rules govern the access to the system and the execution of orders by members. Trading venue operators, including those of dark pools, are also required to establish proper systems for the monitoring of the transactions carried out by the members in order to identify – and report to the FCA as appropriate – significant breaches of its rules, disorderly trading conditions, or conduct that may involve market abuse.
 20. Operators of an MTF are required to have a rulebook covering (among other things) access to its facilities (with such access based on objective and, under MiFID II proposals, non-discriminatory criteria), fair and orderly trading, and objective criteria for the efficient execution of orders. Firms that use an MTF are members or participants of the MTF and this impacts how the Conduct of Business obligations impact the operator⁵⁸, whereby users of a BCN or SIs are clients of the operator of those venues and best execution and other conduct of business obligations would apply if the broker-operator is executing orders on their behalf.
- BCNs – dark only**
21. This is a broker-operated in-house electronic trading platform; essentially, it is a pool within its overall platform, not a separate venue. The broker matches buyers and sellers of stock directly in this pool without routing them out to an exchange. Firms can facilitate the direct crossing of orders from its clients in this separate pool. This crossing may be facilitated by executions between different clients or against its own market-making or proprietary trading flow.
 22. Unlike an MTF, access to the pool is determined by the broker who has discretion as to who can interact with the pool and who cannot. If the broker offers the service, it may also hold out that it can tailor order flow for each participant of the pool to ensure that counterparty execution preferences are monitored and upheld. For example, an institution may state that it does not want to interact with certain counterparties or counterparty types (e.g. aggressive HFTs or ELPs). Some BCNs make no attempt to screen out aggressive HFT participants, while others seek to ensure there are no such participants whatsoever in their BCN pool.
 23. The operators endeavour to find matches for their client orders with other client orders at a price that is typically derived from a lit venue (for instance, the midpoint⁵⁹ of the bid-ask spread of a lit regulated market, e.g. the London Stock Exchange). Apart from price improvement, use of the BCN may also result in cost savings by avoidance of exchange fees, clearing fees and settlement costs attributed to using a third-party venue. It is also argued that if orders are matched between

58 COBS1 Annex 1 – 2.1R and 3.1R.

59 Some BCNs also offer far/near touch price as a reference price. Therefore, clients do not always receive price improvement in a BCN.

clients, then both clients benefit from the fact that the order did not need to execute on a lit venue; the market impact is therefore minimised as those orders do not ‘move the market’. However, these advantages need to be weighed against other execution factors, such as speed of execution, since orders may have to rest while awaiting a match on the other side.

- 24.** From a regulatory standpoint, the use of discretion on the part of the investment firm in relation to how trading interest interacts on the platform takes those internal matching systems outside the trading venue perimeter under MiFID. The use of discretion by the firm is often exercised within the limits set by the client and reflected in the firm’s execution policy. By not being separately regulated as trading venues, internal matching systems are not subject to pre-trade transparency (but post-trade transparency would apply in the same way as to any lit or dark pool or venue) or to the various requirements that apply to trading venues in relation to access, fair and orderly trading and market monitoring.
- 25.** However, it is worth noting that an investment firm operating an internal matching system by arranging or executing transactions is:
- fully authorised to do so and regulated by the Prudential Regulation Authority (PRA) and/or FCA and thereby subject to supervision and detailed reporting requirements on all trading activity
 - required to report suspicious transactions to the FCA without delay (a suspicious transaction is one in which there are reasonable grounds to suspect it might constitute market abuse, such as insider dealing or market manipulation), and
 - subject to conduct of business obligations, including the duty to provide best execution to its clients (no equivalent obligation applies to the operator of a dark MTF)
- 26.** Furthermore, investment firms executing client orders by dealing on their own account must have regard for the SI regime and the obligation that MiFID imposes on them in relation to the disclosure of trading interest.
- 27.** Post-trade transparency is immediate for dark MTFs identifying the venue, whereas most BCNs report trades immediately as over-the-counter (OTC), which does not identify the individual pool where the trade occurred. BCNs are also typically marketed as being a cheaper form of trading, as there are no exchange and/or clearing fees to pay.⁶⁰
- 28.** Provided that operators have an effective way of monitoring their business, managing conflicts of interest, treating their clients fairly, and ensuring follow-through on their marketing (and ultimately contractual) claims, dark pools can act as a valuable constituent of equity market structure.
- 29.** Some of the recent concerns about dark pools have centred on the idea that operators can take advantage of the ‘darkness’ of the venues to favour some clients or orders over others. This may be more prevalent with BCNs than MTFs as MTFs have to be publicly transparent about the way that orders interact. In particular, there have been concerns about aggressive HFTs using gaming strategies and latency advantages to front-run large institutional orders. Another issue when trading in dark pools is that it can be harder to tell whether or not operators are adhering to claims they make about how the venue operates. We remind the reader that BCN pools are not proposed under MiFID II, and trading activity in BCNs will be forced to migrate elsewhere.

⁶⁰ It depends on which form of fee structure is agreed with the brokers. A cost plus arrangement may include all or part of the exchange/clearing fee.

SIs – lit only

30. This platform type is lit⁶¹ only in relation to transactions up to standard market size. The definition of an SI is under review as part of MiFID II, but generally refers to an investment firm which, on an organised, frequent and systematic basis, deals on its own account by internally executing client orders, rather than using an outside trading venue. An SI is not allowed to bring together third-party buying and selling interests.
31. We would note the use of auctions as another area of innovation. Some venues hold a few auctions at set times, while others offer more frequent auctions over the course of the trading day. Auctions can be appealing, as they can attract liquidity and can provide some degree of protection from information leakage.

Dark pools in other jurisdictions

32. There has been much debate and focus on dark pool activity in Europe, the US, Asia, Canada and Australia. Some issues (such as misleading marketing, improper information sharing, and poor conflicts management) have global relevance for other markets, while others (such as the breaches of the sub-penny rule) are specific to US trading market microstructure.⁶²
33. To some extent, the US Regulation NMS rules symbolise the fundamental differences in trading and best execution perspectives between the US and Europe. While the US implements a top-of-the-book order protection policy focused solely on price⁶³, European best execution rules are multi-faceted and take into consideration a range of factors, with price being just one factor.⁶⁴ This is important to note, as it profoundly affects the manner in which US firm algorithms are programmed and how orders are routed and executed to both lit markets and dark pools.
34. In some European markets, processing of order messages takes priority over cancellation and amendment messages. This simple rule raises the risk that orders will be filled and can serve as a dampener on very aggressive trading strategies.

61 An SI is required to make transparent prices on a continuous basis when dealing up to standard market size, which, for the majority of European shares, is €7,500. No pre-trade transparency is enforced by MiFID for SIs dealing above the standard market size.

62 Rule 612 – named the sub-penny rule. This rule prohibits stocks over \$1.00 being quoted in increments below \$0.01. This rule is designed to prevent firms jumping to the front of the queue of an order by posting a \$0.001 or smaller increment, thereby taking away fills from investors who place orders at the NBBO. The NBBO is the best bid and best offer for a security that is calculated and disseminated pursuant to the Consolidated Tape Association Plan for exchange-listed stocks and the NASDAQ/Unlisted Trading Privilege Basis Plan for NASDAQ stocks.

63 SEC Regulation National Market System Rule 611 requires venues to establish procedures to prevent trade-through (i.e. the execution of a trade at inferior prices). Expressed another way, if an order can be traded at a better price at another venue, then the order must be directed to that venue.

64 Article 21 of MiFID, COBS 11.2R.

Annex 2

MiFID: key changes

MiFID

1. Dark pools are organised systems for the trading of shares where transactions take place without pre-trade transparency. Depending on the actual systems and arrangements established by the operator, dark pools are regulated under MiFID as either trading venues or as internal matching systems run by an investment firm. We described these models and regulatory requirements in more detail in Chapter 2.

MiFID II

2. New rules applying from 3 January 2018, will bring a number of significant changes to dark pools. Those changes mainly relate to:
 - a. the regulatory regime applicable to internal matching systems, and
 - b. the transparency regime
3. Under the new regime, any multilateral system in financial instruments, including shares, will be categorised as a trading venue and therefore be subject to specific organisational requirements for trading venues. As a result, BCNs run by investment firms will have to be reorganised either as MTFs or as SIs depending on the type of activity, multilateral or bilateral, carried out under those systems.
4. The new regime is expected to increase transparency and ensure a level playing field among systems providing equivalent services.⁶⁵ In addition, MiFID II introduces a trading obligation for shares; this will ensure that investment firms execute transactions on regulated venues or through SIs unless the transactions are non-systematic, ad hoc, irregular and infrequent, or do not contribute to the price-formation process (as determined by implementing measures).

Volume caps

5. With the aim of protecting price formation, MiFID II introduces a volume cap on dark trading of equity and equity-like financial instruments through the so-called double-volume cap mechanism. This mechanism will be such that the use of some pre-trade transparency waivers (the reference price and negotiated trade waivers) is capped at certain levels. The mechanism will limit the volume traded through the use of pre-trade transparency waivers by any trading

⁶⁵ Much financial regulation currently applicable in the UK derives from EU legislation. This regulation will remain applicable until any changes are made, which will be a matter for Government and Parliament. Firms must continue to abide by their obligations under UK law, including those derived from EU law and continue with implementation plans for legislation that is still to come into effect. The longer term impacts of the referendum decision to leave the EU on the overall regulatory framework for the UK will depend, in part, on the relationship that the UK seeks with the EU in the future.

venue to less than 4% of the total on-venue trading across the EU in any equity or equity-like instrument. Similarly, the aggregate volume across all trading venues through the use of pre-trade transparency waivers will be limited to 8% of total on-venue trading across the EU in any equity or equity-like instrument. If trading exceeds either of the caps, the use of the waivers is suspended (across the EU or at the level of a trading venue) for a period of six months.

Reference price waiver

6. Another very important change relates to the reference prices that can be used by reference price systems to benefit from the reference price waiver from pre-trade transparency. MiFID II restricts the reference price to the primary market (i.e. the venue where the financial instrument was first admitted to trading) or the most relevant market in terms of liquidity. In addition, for continuous trading, only the midpoint between the best bid and best offer will be a permissible price for execution of an order on a system to which a reference price waiver has been granted. This is a significant change to the pricing parameters for SORs, algorithms and other infrastructure, and therefore requires attention.
7. As part of the best execution regime, MiFID II also introduces a requirement for all trading venues and SIs, lit and dark, to publish a quarterly report containing detailed information about the quality of execution throughout the period.⁶⁶ Investment firms will have to make public on an annual basis information on the top five venues by execution volume⁶⁷, as well as information on the quality of execution obtained.
8. While aspects of the proposed new regime are clear, detailed rules are not yet complete. Market participants are cautioned to thoroughly review the detailed rules as they emerge and to ensure adherence.

Regulatory application processes

- 4.7 Given the impact of proposed MiFID II changes related to BCNs, we noted that some firms are considering their options, including the establishment of MTF venues, which will require a detailed regulatory application, or preparing to establish a SI, which requires regulatory registration.

⁶⁶ A requirement for all trading venues to publish data on the execution quality obtained, including details about price, costs, speed and likelihood of execution for individual financial instrument (Art 27(3) of Directive 2014/65/EU and ESMA's RTS 27).

⁶⁷ A requirement for investment firms to summarise and make public on an annual basis, for each class of financial instruments, the top five execution venues in terms of trading volumes where they have executed their client orders and information on the quality of the execution obtained (Art 27(6) of Directive 2014/65/EU and ESMA's RTS 28).

Annex 3

List of questions

User questions

Value and purpose of dark pools

- Q1:** Would the use of dark pools be beneficial for our client-focused objectives or obligations? For example, will the use of dark pools help us to deliver our best execution duties where owed?
- Q2:** Is our strategic approach to trading activity in dark pools clear and understood?
- Q3:** Do we have the resources to assess, participate, monitor and manage our involvement in the range and number of dark pools proposed or currently utilised?
- Q4:** Are sufficient preparations in place for changes to our business that may be required as a result of MiFID II, either to our own obligations (for example, in reporting and best execution requirements where relevant), or due to wider changes in the market, which may impact the execution venues that will be available to us and how they operate?

Pool sign-up and due diligence standards

- Q5:** Is the contractual basis for our use of various dark pools sound and consistent?
- Q6:** Have we obtained clear, positive verification of crossing logic, internal and onward routing, pre- and post-trade price checking and other operating procedures whenever requested?
- Q7:** Are we conducting our own price checks that are sufficiently frequent, detailed and accurately time-stamped?
- Q8:** If the pool offers different types of access/connectivity, what are the latency implications?

- Q9:** Is the operator fully capturing and monitoring our trading preferences, including interaction with the operator's principal/proprietary flow or with certain liquidity providers?
- Q10:** Do we have a process for the regular review and refresh of our trading preferences?
- Q11:** Does the operator provide access rights to order flow in the dark pool to internal teams?
- Q12:** Do we have adequate assurances that direct connections do not give any participants or external liquidity providers an undisclosed latency advantage?
- Q13:** Does the dark pool operator's principal/proprietary flow access the pool in the same way as we, and all other users, do?
- Q14:** How well do we understand how the operator determines routing priority to external pools?
- Q15:** Is the report pack provided to us by the operator adequate for our purposes?

User monitoring of own dark pool activity and best execution

- Q16:** Does our governance and oversight process enable adequate analysis of our performance in dark pools?
- Q17:** Do we have adequate statistics on activity in the pool (e.g. amount of our order flow crossed with the pool operator's principal flow/proprietary business or ELPs)?
- Q18:** Are the agreed order-routing preferences being monitored and adhered to?
- Q19:** Does the operator monitor for execution performance and unwanted trading activity?
- Q20:** Do we periodically question the efficacy of controls that an operator has promised?
- Q21:** Do our transaction instructions typically result in significant information leakage that adversely affects achieved prices on a single order or on a larger strategic scale order?
- Q22:** Have reasonable thresholds or price targets been set for monitoring overall execution performance?

- Q23:** Are we making good tactical decisions about order processing such as our design (if applicable) and use of algorithms, order routing and order types?
- Q24:** Who is raising operational mistakes in dark pool trading: the operator or ourselves?
- Q25:** Does our overall approach to trade processing comply with best execution standards? How can we evidence this?

Operator questions

Marketing material for dark pools and electronic trading

- Q26:** Do our marketing materials clearly and consistently explain the way in which a platform functions: for example, the nature and sequence of order internalisation?
- Q27:** Have we tested with clients whether there are pool features or complexity that would warrant expanded explanation or disclosure on our part?
- Q28:** Are controls adequate to ensure that materials are distributed only in the jurisdiction for which they were designed?
- Q29:** Have we articulated to clients, in a balanced manner, not only the advantages of features, but also the potential disadvantages, as well as alternative choices?
- Q30:** Do we have a clear, documented internal governance process for the review and approval of marketing material, which includes legal and compliance oversight?

Client onboarding

- Q31:** Do user questions indicate adequate understanding by them of how the pool operates?
- Q32:** Are the strategies that a prospective client is likely to employ on the platform understood and considered to be acceptable for the other participants in the pool?
- Q33:** Do our standard contracts adequately cater for the features or complexity of the pool?
- Q34:** Is there sufficient capacity to accommodate the range of activity a new client may generate?

- Q35:** Is client classification criteria clear, understood, consistently applied and regularly reviewed?
- Q36:** Can initial client preferences be captured and centrally stored as a 'golden source', and are subsequent update requests similarly controlled?

Operational design and integrity

- Q37:** Is our routing logic reviewed and updated on a regular basis, including a conflicts of interest assessment, in response to changing market conditions?
- Q38:** Can we be sure that all clients and/or classes of clients have equal access to the pool, especially if some participants access the pool via different infrastructure than others?
- Q39:** Is our matching logic properly explained and understood by all participants?
- Q40:** Does our infrastructure allow any access via stripped down protocols?
- Q41:** Are all price and other data feeds operating at or above our set resiliency thresholds?
- Q42:** Is capacity sufficient to meet user requirements under market stress conditions?
- Q43:** Do clear trading volume threshold breaches trigger additional capacity being brought online?
- Q44:** Do outsourcing arrangements enable adherence to oversight and regulatory reporting needs?
- Q45:** Does the second line of defence have sufficient expertise and resources to provide adequate challenge?
- Q46:** Are user testing processes for the development and updating of algorithms acceptable?

Monitoring of activity in the pool

- Q47:** Are our monitoring processes able to assess and evidence adherence to client preferences and specific instructions?
- Q48:** Is the data-monitoring infrastructure on which our execution strategies rely robust and timely?
- Q49:** Are boundaries for identifying stale pricing as tight as they should be in a low-latency environment?

- Q50:** Have we set appropriate thresholds for taking the pool offline due to feed problems?
- Q51:** Is there sufficient capability in place to observe adherence or delivery of promised service levels?
- Q52:** Can we identify unwanted activity in the pool sufficiently quickly and act on it?
- Q53:** Do we have clear internal guidance about when clients should be informed of system outages that affect our ability to monitor activity in the pool?

Confidentiality of data and dark trading information

- Q54:** Have we adequately tested the risk of data leakage from the dark pools to ensure that controls and safety measures around the trading platform are sufficiently robust?
- Q55:** Do we regularly and systematically review access rights to dark pool platforms and the restricted trading data therein?
- Q56:** Are supplementary access rights automatically reviewed and revoked upon completion of IT upgrades, system rollouts or staff movements? Has this control process been audited recently?
- Q57:** Do we have the technical capability to assess audit trails as evidence of authorised or unauthorised access?

Conflicts of interest policy and register

- Q58:** Should we revise our conflicts of interest policy to include our dark pool business in order to comply more fully with the SYSC 10 requirements?
- Q59:** Is our conflicts policy written in a manner that our employees can easily understand?
- Q60:** Does senior management receive regular written reports on risks or situations arising and discuss the acceptability of proposed mitigation.
- Q61:** Is it clear who within the firm is responsible for managing situations arising as described in the conflicts register?
- Q62:** How often are we reviewing the conflicts record and policy to ensure that we are meeting the SYSC 10 requirements?

Q63: Are we inclusive of other areas of the business, such as other profit centres, legal, compliance or risk in our review process of policies and procedures?

Q64: Are basic order routing matters covered, such as onward routing from flow books, to a dark pool or to an MTF?

Governance and the lines of defence

Q65: Is the governance infrastructure, including committees, terms of reference and reporting, being evaluated for effectiveness and has this been evidenced at Board level?

Q66: Are all lines of defence sufficiently skilled or knowledgeable of the areas they oversee?

Q67: Are there effective escalation processes in place to ensure that issues are either dealt with or further escalated in a timely manner?

Q68: Is the information provided to senior management (directly or via committee) sufficient to demonstrate the effectiveness of the control environment overall, including its support functions?

Q69: Are we providing adequate support to our second line of defence staff to ensure their ability to challenge keeps pace with front-office developments?

Q70: Is the internal audit budget and resource sufficient to cover processes around dark pools and the broader electronic trading platform?

Q71: Can we monitor and report adequately on best execution performance?

Q72: Are sufficient preparations in place for structural changes to our business that may be required as a result of MiFID II?

Q73: Are we sufficiently poised to implement new and emerging data processing and reporting requirements under MiFID II?

Q74: Have we considered how and where new conduct risks, including conflicts of interest, may emerge or put in place plans to do so as part of our regular oversight regime?

Q75: Have we considered how lessons learned from our experience with fast developing equity markets can be applied to anticipating new conduct risks in other products and markets?

Glossary

Definitions in this Glossary are provided solely for the convenience of readers of this report. They are not presented as approved regulatory definitions or to be used for any other purpose.

Aggregator – A service operator that makes the decision on behalf of a client regarding to which dark pool or other trading venue an order is routed.

Algorithm – A specific set of clearly defined instructions programmed into a computer to execute a trade in a certain manner.

Broker crossing network (BCN) – A subset of an investment bank operator's electronic platform where third-party orders can be matched anonymously using reference prices taken from selected lit markets. Under MiFID, trading under a BCN would fall under OTC trading. OTC is defined in relation to a transaction in an investment, not on-exchange.

Central risk book – Long or short positions in securities in an operator's own books and arising from a range of activity including market making and hedging.

Child order – A sub-section of a parent order, sent to market at a particular time.

Co-location – The practice of co-locating computer servers in the same data centres as trading venues.

Dark pool market or venue – A trading platform with no pre-trade transparency as all orders are hidden as to price and volume and are anonymous.

Delta One – Delta One business is defined generically as a product with a one-to-one valuation relationship with an underlying security or list of securities and a delta of one, meaning no optionality in the pricing relationship, such that a change in price in the underlying is matched by the same change in the price of the product.

Direct market access (DMA) – Direct electronic access to an exchange provided to clients using a broker-dealer's IT infrastructure.

EBBO – The 'European Best Bid and Offer' is a composite of the best prices available for buying or selling a stock from a selected number of European trading venues.

Electronic/external liquidity providers (ELP) – These are generally proprietary trading firms that operate market-making type strategies and post liquidity actively across a wide range of traded securities, including UK equity markets.

Electronic trading platform – The broad and whole technological infrastructure for trading including dark pools, MTFs, SORs, algorithms, data feeds, etc.

FIX – An electronic communications protocol used for the real-time exchange of information related to securities trading. FIX tag 30 refers to the FIX message field that contains data about the venue at which an order is executed.

High frequency trading (HFT) – Broadly described here as firms that use algorithms at high speed to execute proprietary trading strategies with a short-term time horizon. This description is not to be confused with the definition in the delegated acts underpinning MiFID II published by the European Commission on 25 April 2016.

High touch order – An order that is manually handled by a sales trader at a bank or broker-dealer.

Information leakage – As used in this paper, is related to sensitive knowledge about intentions to buy or sell a share.

Latency – The time that elapses from when a signal is sent to when it is received. Lower latency means faster speed.

Lit market or venue – A lit market is a venue where the order book is visible to all members so that traders can see the amount of liquidity available on the bid and offer.

Low touch order – An electronic order, using DMA or algorithms, which a client can execute without the involvement of a sales trader.

MiFID / MiFIR – The Markets in Financial Instruments Directive is the framework of EU legislation for the organised trading of financial instruments, and MiFIR is the related regulation. MiFID was first implemented in 2007 and is being comprehensively revised (MiFID II), with the changes expected to take effect from January 2018.

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 (in the system and in accordance with non-discretionary rules) in a way that results in a contract in accordance with the provisions of Title II of MiFID.

Natural flow – Client trading activity from strategic investment decision-making rather than very short-term market-making or opportunistic intra-day trading flow.

Operator – The sponsor or business owner of a dark pool or platform.

Parent order – A larger order from which a number of child orders are split and routed separately to be executed in the market.

PBBO – The ‘Primary Best Bid and Offer’ is the best price available for buying or selling a stock from an individual European primary trading venue.

Price reversion – The tendency of a share price to return toward a pre-existing level following a succession of buy or sell orders and related messaging.

Principal/proprietary flow – In the context of an operator, this refers to order flow arising from its internal activity, such as hedge unwinds, central risk book or proprietary trade positions.

Profiling – Categorising dark pool participants by their likely trading activity. Categories used vary.

Reciprocal access – a BCN operator with a standing agreement to access a competitor’s BCN pool and vice-versa.

Recognised investment exchange (RIE) – An investment exchange that is declared by a recognition order for the time being in force to be a recognised investment exchange.

Reference price waiver – A waiver from pre-trade transparency whereby a system satisfies the criteria that ‘...they must be based on a trading methodology by which the price is determined in accordance with a reference price generated by another system, where that reference price is widely published and is regarded generally by market participants as a reliable reference price.’

Regulated market – 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 the system and in accordance with its non-discretionary rules) in a way that results in a contract, in respect of the financial instruments admitted to trading under its rules and/or systems, and which is authorised and functions regularly and in accordance with the provisions of Title III of MiFID. In the UK, a regulated market can only be operated by an RIE.

Resting order – An non-executed order that is sitting on the order book.

Resting time – The period of time an order is left on an order book before being executed, automatically expiring or being withdrawn.

Senior Management and Certification Regime (SM&CR) – A regulatory regime which came into effect on 7 March 2016 which sets out an accountability framework for individuals working in banks, building societies and credit unions. The SM&CR replaced the Approved Person Regime (APR).

Smart order router (SOR) – A computer - or algorithm-assisted process used in electronic trading to send order instructions to an exchange or trading market following a defined set of rules.

Stale data – Information about volume or price that is older than a pre-determined threshold.

Standard market size – A term used with regard to SIs, defined as the average size of orders executed in the market, above which an SI's pre-trade disclosure obligations are removed.

Systematic internaliser (SI) – A systematic internaliser is an investment firm which, on an organised, frequent and systematic basis, deals on its own account by executing client orders outside a regulated market or an MTF.

Transaction cost analysis (TCA) – A way of measuring the effectiveness of trades. TCA provides analysis of how a trade has performed when compared to a particular benchmark and may include adverse price movements during the timeframe taken to complete a trade.

Users – In this report, we use the term ‘users’ to refer primarily to asset managers, insurers and hedge funds, while recognising that the user community is much broader (i.e. any type of wholesale organisation that participates as a trader in a dark pool including banks, brokers, HFTs and ELPs). We use the term ‘operators’ to mean providers of any type of dark venue, including MTFs or banks that provide access to an internal crossing network.

Volume cap – A cap on the amount of trading volume that can be conducted under the use of reference price waivers and negotiated price waivers, proposed by MiFID II as 4% per venue and 8% across all relevant venues.

VWAP – The volume weighted average price is a commonly used pricing benchmark.

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