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Thematic assessment of Algorithmic Trading Firms' compliance with RTS 6 of MIFID II.

Dear CEO,

The Central Bank of Ireland ("Central Bank") undertook a thematic review to assess how firms undertaking algorithmic trading have incorporated within their risk management and control frameworks the requirements set out in Regulatory Technical Standard C(2016) 4478 ("RTS 6") supplementing Directive 2014/65/EU ("MIFID II"). The purpose of this letter is to provide background to our assessment, highlight the key findings of this review and outline the expectations of the Central Bank in relation to the governance, testing and controls surrounding algorithmic trading.

Algorithmic trading gives rise to significant risks stemming from potential failures of algorithms, information technology ("IT") systems and processes. In recent years, a number of significant algorithmic trading failures have resulted in substantial losses, fines and reputational damage for firms globally. This demonstrates a clear need for all entities engaging in algorithmic trading to ensure risk management and control frameworks in respect of algorithmic trading are appropriately embedded and are operating to a high standard. RTS 6 provides a framework to mitigate these, and other risks, through the requirement to maintain effective systems, procedures, arrangements and controls.

This thematic review focused on the five principal areas underpinned by the requirements set out in RTS 6[1] of MIFID II[2]: (i) Governance; (ii) Development & Testing; (iii) Risk Measurement and Control; (iv) Processes and Controls; and (v) Trade Lifecycle Management.

The Central Bank noted many positive practices, including the presence of experienced, competent professionals across the first and second lines of defence, in addition to a comprehensive suite of controls in terms of monitoring, development, testing and deployment of trading algorithms. Notwithstanding this, supervisors also identified varying levels of maturity and a number of concerns across governance, control and risk management frameworks of in scope entities. A full list of the practices observed are noted in Appendix 1 of this letter. The key concerns arising from the review include:

[1] https://ec.europa.eu/finance/securities/docs/isd/mifid/rts/160719-rts-6_en.pdf
[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0065&from=EN

i. **An over-reliance on service providers with a lack of demonstrable autonomy at regulated entity level**. This was evidenced through a distinct absence of entity Board oversight in setting or challenging the key controls and in the oversight of the development of trading algorithms.
ii. **Insufficient formality with respect to key documentation**. This was evidenced through a lack of appropriate documentation in relation to algorithmic trading controls and procedures. This speaks to this sector being at the early stages of maturity and also the extent to which firms leverage Group documentation, where relevant, which creates a possibility that entity specific risk may be overlooked.
iii. **A lack of clearly defined roles and responsibilities, and in particular a lack of appropriate delineation between the "Three Lines of Defence"**. This is a consequence of a combination of (i) the scale of certain firms, (ii) the maturity of risk management frameworks and (iii) the non-specific nature for managing risks associated with algorithmic trading in certain firms.

These do not align with a comprehensive and effective implementation of the requirements set out in RTS 6.

Findings

1. Governance – Deficient control and risk management frameworks:

Varying levels of maturity were observed with respect to firms' governance, control and risk management frameworks. Supervisors observed weaknesses with respect to:

i. The absence of formalised algorithm governance documentation;
ii. The lack of local entity autonomy evidenced through minimal Board involvement in the setting or challenging of the key controls and in the oversight of the development of trading algorithms;
iii. The absence of regular, formalised reporting to the Board in relation to algorithms; and
iv. The significant reliance placed on Group resources without an appropriate level of formalised Group reporting lines.

The Central Bank considers the maintenance of a robust algorithmic governance and oversight framework to be of paramount importance in enabling firms to identify, monitor and mitigate the risks associated with algorithm trading strategies. Firms are reminded RTS 6 requires that as part of its overall governance framework and decision-making framework, an investment firm should have a clear and formalised governance arrangement, including clear lines of accountability, effective procedures for the communication of information and a separation of tasks and responsibilities. These arrangements should ensure reduced dependency on a single person or unit.

2. Development and Testing - Lack of formal documentation with respect to development, testing and deployment processes:

Supervisors observed strong development, testing and deployment controls. However, significant disparities were identified between firms with respect to the level of detail pertaining to documentation on development, testing and deployment processes most notably:

i. Firms were unable to provide sufficient detail with respect to their testing environments and how the parameters detailed in Article 5 of RTS 6 were embedded.

ii. There is a lack of adequate information in relation to testing environments used to assess the performance of algorithms including assurance that trading algorithms:

   a. would not contribute to disorderly trading conditions;
   b. can continue to work effectively in stressed market conditions; and,
   c. where necessary under those conditions, can be disabled without contributing to disorderly trading.

iii. Where firms are part of larger groups, it was noted that strong reliance was placed on Group entities. While outsourcing the development of trading algorithms is permitted under MiFID II, the investment firms deploying trading algorithms must fully understand the development and testing processes and the subsequent controls required. Outsourcing arrangements must be supported by appropriate documentation at local entity level with respect to the development, testing and deployment processes, be subject to regular review by the appropriate control function and consider the parameters detailed in Article 5 of RTS 6.

3. Risk Measurement and Control - Lack of clearly defined Three Lines of Defence:

While it was evident that certain firms had appropriately skilled and resourced second lines of defence, a number of firms demonstrated an absence of a formalised "Three Lines of Defence model". It is important that firms have a robust model in place, with clear delineation between each line i.e. the business, the risk management functions and the internal audit function. Supervisors observed:

i. A blurring of lines between the first line, where the operation and implementation of risk management occurs, and second line management of risk, responsible for oversight of risk management, creating concerns around independence and appropriate separation of duties;

ii. Within the second line, a lack of clarity between the roles and responsibilities of Risk and Compliance, in some instances, may increase the likelihood for risks to go unidentified or identified risks to go unaddressed;

iii. An absence of a formalised plan regarding the steps taken by the Head of Compliance or first line in the event that the kill switch has been activated; and

iv. As required under Article 9 of RTS6, all firms are required to conduct annual self-assessments and produce subsequent validation reports. Supervisors observed three common areas not sufficiently addressed by the majority of firms within the self-assessment[3]:

a. The adequacy of governance arrangements;
b. The lack of appropriate detail with respect to testing methodologies applied and testing environments used; and
c. A lack of clarity with regard to the third line of defence and the role of Internal Audit in the self-assessment and validation process. As per Article 9(3) of RTS 6, Internal Audit should play a key role in the oversight of the self-assessment and validation process to ensure that the governance and conclusions reached are valid.

4. **Trade Lifecycle Management – Lack of appropriate documentation with respect to pre and post-trade controls:**

The presence of extensive pre and post-trade controls was evident during this Thematic Review however:

i. These were not formally reflected in the firms' policies and procedures, where supervisors identified a lack of adequate documentation regarding these controls and calculation of associated limits.
ii. Firms did not demonstrate appropriate compliance with Article 15 of RTS 6 with respect to the documentation of the application and usage of appropriate limits. This information must be formally documented within the firms' algorithmic governance documentation.

Firms must have in place appropriate pre and post-trade controls that are commensurate to the nature, scale and complexity of the entity and ensure that these controls are appropriately documented.

Actions

As a result of the findings of this thematic review, the Central Bank has engaged with the investment firms where specific concerns have been identified, issuing risk mitigation programmes to address these specific issues.

The Central Bank requires all firms engaging in algorithmic trading to consider the contents of this letter, where applicable and take all remedial action necessary to ensure that they have the appropriate control and oversight in place with respect to algorithmic trading and that the requirements within RTS 6 of MIFID II are being fully adhered to. This letter should be read in conjunction with the joint ESMA and European Banking Authority ("EBA") Guidelines on the

[3] Article 9 (Article 17(1) of Directive 2014/65/EU) Annual self-assessment requires an investment firm to annually perform a self-assessment and validation process and issue a validation report on that basis. This should include a) algorithmic trading systems, trading algorithms and algorithmic trading strategies b) its governance, accountability and approval framework c) its business continuity arrangements and d) its overall compliance with Article 17 of Directive 2014/65/EU with regard to the nature scale and complexity of its business

assessment of suitability of members of the management body and key function holders[4]; EBA Guidelines on internal governance[5]' and the Central Bank's Outsourcing: Findings & Issues for Discussion[6].

The Central Bank will continue to assess whether firms have taken sufficient steps to reduce risks arising from algorithmic trading and will have regard to the contents of this letter when conducting future supervisory engagement. Furthermore, in circumstances of non-compliance by any firm with the regulatory requirements associated with algorithmic trading, the Central Bank may, in the course of future supervisory engagement, or when exercising its supervisory and/or enforcement powers in respect of such non-compliance, have regard to the consideration given by a firm to the matters raised in the letter.

If you have any questions in relation to the content of this letter please discuss with your supervisory point of contact.

Yours sincerely,

Simon Sloan
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[4] www.eba.europa.eu/documents/10180/1972984/Joint+ESMA+and+EBA+Guidelines+on+the+assessment+of+suitability+of+members+of+the+management+body+and+key+function+holders+%28EBA-GL-2017-12%29.pdf.
[5] www.eba.europa.eu/documents/10180/1972987/Final+Guidelines+on+Internal+Governance+%28EBA-GL-2017-11%29.pdf/eb859955-614a-4afb-bdcd-aaa664994889.
[6] https://www.centralbank.ie/docs/default-source/publications/discussion-papers/discussion-paper-8/discussion-paper-8---outsourcing-findings-and-issues-for-discussion.pdf

Appendix

Positive Practices

Positive practices identified throughout the review include:

- Experienced, competent professionals in place across the first and second lines of defence with sufficient authority to enable them to challenge staff responsible for algorithmic trading.
- Comprehensive first and second line real-time monitoring arrangements.
- Comprehensive development, testing and deployment controls in place.
- Stress testing of controls and monitoring procedures conducted on a regular basis.

Weak Practices;

Weak practices identified throughout the review include;

- Absence of formalised algorithm governance documentation.
- Lack of oversight/challenge from the Board with respect to challenging key controls and development of trading algorithms.
- Over reliance on Group technology and an absence of formalised Group reporting lines.
- Inappropriate algorithmic control frameworks, where the responsibilities of the three lines of defence are poorly defined.
- Lack of clarity between the roles of Risk and Compliance, which may increase the likelihood for risks to go unidentified or identified risks to go unaddressed.
- Blurring of lines between the first and second line, creating concerns around independence and appropriate segregation of duties
- Internal Audit functions that lack autonomy in the development of the Internal Audit plan due to direction provided by the second lines.
- Lack of formalised plan in place regarding steps to be taken by Chief Compliance Officer in the event that the 'Kill Switch' is activated.
- Weaknesses in the annual self-assessment process.
- Lack of formal documentation regarding the process for the testing of newly deployed or materially altered algorithms.
- Insufficient detail with respect to the testing environment and whether this considered the respective parameters detailed in Article 5 of RTS 6.
- Over reliance on Group documentation/policies and a lack of local entity ownership with regard to the development and testing of algorithms.
- Weak documentation regarding the function of pre and post trade controls and the process detailing how limits are set.