

RTS 28 Quality of Execution Annual Report

Firm: Marshall Wace LLP ('MW' or the "Firm")

Calendar Year Disclosure Period: 1 January 2019 to 31 December 2019

Date: 8 June 2020

MW is an EU-based investment manager registered with the Financial Conduct Authority ("FCA"). MW is authorised by the FCA to conduct three broad categories of business:

- managing alternative investment funds in its capacity as an Alternative Investment Fund Manager ("AIFM") under the Alternative Investment Fund Managers Directive ("AIFMD"),
- acting as the management company of, and investment manager to, EEA-regulated UCITS schemes as part of the Undertakings for Collective Investments in Transferable Securities Directive ("UCITS"), and;
- providing discretionary management services (and related advisory and dealing services) to segregated account and managed account clients.

The terms of MW's FCA permissions entitle it to carry on certain investment management activities that are regulated under the re-cast Markets in Financial Instruments Directive and Regulation (together, "MiFID II"). In relation to such investment management activities (known as MiFID II "top-up" services), MW is subject to the FCA rules that implement MiFID II as well as certain directly applicable EU secondary regulation like Regulatory Technical Standard 28 ("RTS 28"). In accordance with RTS 28, MW is providing additional disclosures around the execution venues utilized for each class of financial instrument and quality of execution.

MW is required to provide relevant execution data and make statements for only those instrument classes in which it carries out indirect trading. Consequently, classes of instruments in respect of which MW carried out only direct trading during 2019 are not included in this report.

Summary of classes of instruments included in this report, and class of instruments not included in this report (because the Firm has not executed client orders in that class of instruments):

| Classes of instruments included in this report | Classes of instruments not included in this report |
|--|---|
| <ul style="list-style-type: none"> • Equities – Shares & Depositary Receipts (a) <ul style="list-style-type: none"> ○ Tick size liquidity bands 5 and 6 (i) ○ Tick size liquidity bands 3 and 4 (ii) ○ Tick size liquidity bands 1 and 2 (iii) • Debt Instruments (b) <ul style="list-style-type: none"> ○ Bonds (i) • Credit derivatives (d) <ul style="list-style-type: none"> ○ Futures and options admitted to trading on a trading venue (i) • Currency Derivatives (e) | <ul style="list-style-type: none"> • Debt Instruments (b) <ul style="list-style-type: none"> ○ Money markets instruments (ii) • Interest rate derivatives (c) <ul style="list-style-type: none"> ○ Futures and options admitted to trading on a trading venue (i) ○ Swaps, forwards, and other interest rate derivatives (ii) • Credit derivatives (d) <ul style="list-style-type: none"> ○ Other credit derivatives (ii) • Currency Derivatives (e) <ul style="list-style-type: none"> ○ Swaps, forwards, and other currency derivatives (ii) |

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|--|---|
| <ul style="list-style-type: none"> ○ Futures and options admitted to trading on a trading venue (i) • Equity Derivatives (g) <ul style="list-style-type: none"> ○ Options and futures admitted to trading on a trading venue (i) ○ Swaps and other equity derivatives (ii) • Commodities derivatives and emission allowances Derivatives (i) <ul style="list-style-type: none"> ○ Options and Futures admitted to trading on a trading venue (i) • Exchange traded products (Exchange traded funds, exchange traded notes and exchange traded commodities) (k) • Other instruments (m) | <ul style="list-style-type: none"> • Structured finance instruments (f) • Securitized Derivatives (h) <ul style="list-style-type: none"> ○ Warrants and other certificate derivatives (i) ○ Other securitized derivatives (ii) • Commodities derivatives and emission allowances Derivatives (i) <ul style="list-style-type: none"> ○ Other commodities derivatives and emission allowances derivatives (ii) • Contracts for difference (j) • Emission allowances (l) |
|--|---|

Introduction

On an annual basis, MW is required to provide disclosures around the execution venues we use for each class of MiFiD II financial instrument and other specific information on the quality of execution in accordance with the requirements of Regulatory Technical Standard 28 (RTS 28) of the MiFID II Regulations and Article 65(5) of the MiFID II Delegated Regulations.

This document provides a summary for each class of MiFID II financial instrument and the top five execution venues, at the entity group level, in terms of trading volumes for 2019 where MW has executed or placed indirect client orders.

RTS 28/ARTICLE 65(6) – QUALITATIVE STATEMENTS COMMON TO ALL ASSET CLASSES

The following commentary applies to all trading for each class of financial instruments unless otherwise noted in the specific commentary provided per class of financial instrument:

Close links, conflicts of interest or common ownership with execution venues

Close Links

MW does not have any reportable to close links or common ownership with an execution venue. MW and its affiliate entities Marshall Wace North America (“MWNA”) and Marshall Wace Asia Limited (“MWAL”), have relevant agreements in place for the provision of trading activities. The MW legal entities all share the same holding company and overall organisational structure. MW ensures that all transactions undertaken are executed in accordance with the Global Best Execution Policy.

MW may on behalf of its clients during the course of its portfolio management activities, invest in entities who are or whose sub-entities include trading counterparties. MW may on behalf of its clients during the course of its execution management activities, route an order to a counterparty for execution, and that counterparty provides or is affiliated with an entity that provides, prime brokerage services, which the Firm may also utilize.

Conflicts of Interest

MW has controls in place to monitor and manage any potential conflicts of interest. In addition to an investment in a financial services company with a trading counterparty not being an execution factor in choosing execution venues, a separate and distinct Trading and Execution Management function exists which has independent discretion and monitoring of which execution venues are selected in the course of effecting a transaction. The Firm has automated and ad-hoc reporting and monitoring on best execution, analysing execution factors such as price, likelihood of execution, order size, likelihood of settlement, speed of execution, cost of execution, and other important execution factors,

designed to identify outliers in execution quality which would include instances where an execution counterparty and related prime broker are utilized in effecting a transaction, and the overall quality of execution does not meet the Firm's expectations. Deviations in execution quality are escalated and monitored for successful resolution. Independent monitoring is also performed by the Firm's Execution & Trade Management Committee ("ETMC") and Conflicts of Interest Committee, both formal governance and oversight committees. The potential conflicts of interest are therefore appropriately mitigated.

Specific arrangements with any execution venues

MW has put in place trading arrangements with each counterparty to set out expected commissions and fees for the funds. These arrangements cover exchange fees, associated taxes, broker commissions and clearing and settlement fees, including the costs offset or included in a venues' execution fee structure. The associated costs of execution and any rebates received after execution are assigned to the relevant fund or funds. MW itself does not receive payments, discounts, rebates or non-monetary benefits in respect of these arrangements. MW does not have specific arrangements in place with any execution venue that would induce or encourage the firm not to meet its best execution responsibility to its clients.

In line with the Financial Conduct Authority ("FCA") inducement and research rules which prohibit investment firms which carry out portfolio management activities from receiving inducements, MW has a policy and controls in place to ensure it does not receive inducements (other than acceptable minor non-monetary benefits) in the course of business. All minor non-monetary benefits must not prevent MW from adhering to its requirement to act with honesty, fairness and integrity in the best interests of its clients. MW has implemented a 'Global Research Use and Payment' and 'Gifts and Entertainment' policy to monitor all research relationships and pre-clearance is required in relation to gifts and entertainment. This is to ensure that MW is not induced to direct orders to an execution venue over another.

Client categorisation

MW provides investment management services to only "professional clients." In providing investment management services to only "professional clients," Marshall Wace LLP effects transactions in which it passes or transmits orders to another firm (e.g., broker counterparty) for execution (i.e., "indirect trading").

The MW Best Execution Policy ensures that all clients are dealt with in a consistent way and in line with all relevant regulations. For products that trade under legal agreements such as ISDAs, MW can only deal with counterparties where it has the documentation in place.

Execution Process

The Firm has put in place a Global Best Execution policy (the "Policy"). The application of the Policy is overseen by the ETMC. The Global Head of Trading is a Senior Manager of the Firm and is assigned the responsibility for the implementation of the Policy.

MW selects those execution venues which it believes will provide the best opportunities to obtain the best possible result for its clients, and its brokerage counterparties have an analogous duty when seeking to provide the firm with best execution. These venues include:

- Systematic internalisers
- Market makers
- Multilateral trading facilities
- Regulated markets
- Electronic communication networks; and
- Other liquidity providers (including "dark pools" and "alternative trading systems")

When it selects the appropriate execution venue, MW generally seeks the venue, or venues, offering the potential for achieving the best price. MW takes into account other factors, including those that constitute implicit and explicit transaction costs (such as brokerage commissions, execution venue fees, clearing and settlement fees, and any other fees paid to third parties involved in the execution of the order), and such factors can be prioritized in order to obtain the overall highest quality of execution. Examples of such execution venue factors are:

- Likelihood of execution
- Likelihood of settlement
- Uniqueness of execution
- Type of instrument
- Transaction costs (e.g., exchange fees, clearing fees, etc.)
- Speed of execution or latency
- Order size and volume
- Nature or type of the order
- Venue liquidity and whether there is a centralised market
- Type of counterparty liquidity; and
- Availability (e.g., trading halts, circuit breakers)

These factors are subject to any specific instructions that are given to MW by its clients. In determining the relative importance of these factors MW takes into account its clients' status and each client's objectives, investment policy and specific risk profile together with the nature of the orders it places, the characteristics of the financial instruments to which those orders relate and the characteristics of the execution venues to which these client orders can be directed.

When effecting transactions, MW undertakes a determination of the fairness of price by gathering market data via market data providers (where available). Market data can be compared to estimate the best possible price to the extent such comparison is possible. For example, instruments may trade on only one venue which means that there is only one source of market data for that instrument. Depending on execution factors like the characteristics of the instrument being traded and its liquidity, the price discovery process can be systematic or manual (e.g., instruments like variance swaps can trade Over the Counter). MW may, at its discretion, prioritise execution factors differently in seeking to provide best execution.

MW and its affiliated investment management entities, Marshall Wace North America L.P. and Marshall Wace Asia Limited (each an "Affiliate") may delegate all or part of the discretionary management of a client portfolio to each other. Where an Affiliate delegates discretionary management of a client portfolio to another, each entity ensures that such delegation is permitted in its contractual arrangements with the client. Each Affiliate is subject to the legal requirements and the rules of regulators in the relevant jurisdiction and each affiliate is required to ensure that the service provided to its clients is performed in accordance with the best interests of those clients. Where delegation occurs, MW takes reasonable steps to ensure that the overall management of the portfolio, including execution quality, continues to meet this requirement.

These venue and execution factors are considered across all asset classes when effecting transactions for clients in order to achieve the best execution. The prioritization of execution factors can be amended in order to obtain the overall highest quality of execution.

Execution Monitoring

MW monitors the quality and effectiveness of its order execution arrangements in order to identify, and where necessary, correct any potential deficiencies. MW regularly assesses whether internal trading models, brokerage counterparties and execution venues comply with its duty to seek to obtain best execution. To assist in this monitoring, reports are internally generated that monitor metrics pertaining to best execution including, but not limited to:

- Execution price
- Execution speed (e.g. latency)
- Likelihood of execution (e.g. fill rate, cancel rate)
- Uniqueness of execution
- Order size
- Slippage or market impact
- Adverse selection; and
- Operational risk

Best execution metrics are measured daily. Depending on the metric being analysed, the reporting may compare the performance of internal trading models, brokerage counterparties, or execution venues ranked against one another or ranked against an appropriate benchmark.

MW monitors the quality and effectiveness of its order execution arrangements through the use of automated and ad-hoc reporting, as well as a Transaction Cost Analysis (“TCA”) system. MW uses the TCA and associated automated and ad-hoc reporting that are designed to assess the quality of execution by analysing implicit and explicit costs that can arise in the course of effecting transactions. The reporting is regularly reviewed by the Trading team and outliers are accordingly escalated to the appropriate team(s) which can include the Portfolio Management teams and Compliance. Furthermore, reporting and escalations are presented to and reviewed by the Firm’s Execution & Trade Management Committee, a formal governance and oversight committee that meets at minimum on a quarterly basis. The Execution & Trade Management Committee reviews adherence to the Firm’s Best Execution Policy and policies and procedures designed to achieve the highest overall quality of execution for clients and monitors the ongoing effectiveness of the arrangements and policies. It is attended by senior Investment, Trading, Compliance, Legal, Risk, Technology, and Operations employees.

The relevant reports are generated daily on an automated basis for each region and are run on an ad-hoc basis as needed with the flexibility to customise time ranges as appropriate. Members of the Trading, Quantitative Development, and Production Engineering functions regularly monitor the data and reporting output. MW may investigate the execution performance of any counterparty, and it may cease to employ the services of any counterparty where it determines that the counterparty’s execution arrangements are not sufficiently effective to achieve the objective of best execution.

Conclusion

MW reviews its quality of execution report annually and its best execution processes regularly to identify if there have been any material changes occur that would impact the ability to provide best execution to the clients. For 2019 MW’s monitoring confirmed that the execution quality from the Top 5 Venues reflected consistency with and adherence to the relative importance of the execution factors utilized in effecting transactions. The Firm considers that it has satisfied its obligation to achieve the best possible result for its clients and will continue to monitor its performance to provide best execution for all trading activity.

RTS 28 Disclosures

A. Equities - Shares & Depositary Receipts

| Class of instrument | | | | | | |
|--|----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Equities – Shares & Depositary Receipts (a): tick size liquidity bands 5 & 6 (i) | | | | | | |
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 42% | 22% | N/A | 4% | 0% |
| J.P Morgan Securities PLC | K6QOW1PS1L104IQL9C32 | 36% | 20% | N/A | 3% | 0% |
| UBS AG | BFM8T61CT2L1QCEMIK50 | 9% | 15% | N/A | 2% | 0% |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 4% | 10% | N/A | 0% | 0% |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 4% | 10% | N/A | 4% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA | N/A |

| Class of instrument | | Annex I(a)(ii): Equities - Shares & Depository Receipts; tick size liquidity bands 3 and 4 (from 80 to 1999 trades per day) | | | | |
|--|-----------------------|---|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 35% | 36% | N/A | 4% | 0% |
| J.P Morgan Securities PLC | K6Q0W1PS1L104IQL9C32 | 28% | 17% | N/A | 1% | 0% |
| UBS AG | BFM8T61CT2L1QCCEMIK50 | 18% | 17% | N/A | 1% | 0% |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 5% | 6% | N/A | 5% | 0% |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 5% | 10% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

| Class of instrument | | Annex I(a)(iii): Equities - Shares & Depositary Receipts; tick size liquidity bands 1 and 2 (from 0 to 79 trades per day) | | | | |
|--|-----------------------|---|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 49% | 32% | N/A | 4% | 0% |
| J.P Morgan Securities PLC | K6Q0W1PS1L104IQL9C32 | 29% | 16% | N/A | 3% | 0% |
| UBS AG | BFM8T61CT2L1QCCEMIK50 | 11% | 18% | N/A | 2% | 0% |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 4% | 6% | N/A | 9% | 0% |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 4% | 13% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

B. Debt Instruments

| Class of instrument | | Annex I (b)(i): Debt Instruments; Bonds | | | | |
|--|----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| J.P Morgan Securities PLC | K6Q0W1PS1L104IQL9C32 | 18% | 19% | N/A | 0% | 0% |
| BofA Merrill Lynch International Limited | GDZP1UYGU9STUHRDP48 | 18% | 16% | N/A | 0% | 0% |
| Exane BNP Paribas | 969500UP76J52A90XU27 | 12% | 11% | N/A | 0% | 0% |
| Citigroup Global Markets Limited | XKZZ2JZF41MRHTR1V493 | 10% | 11% | N/A | 0% | 0% |
| Deutsche Bank AG (London Branch) | 7LTWFZYICNSX8D621K86 | 8% | 6% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

D. Credit Derivatives

| Class of instrument | | Annex I (d)(i): Credit derivatives; Futures and options admitted to trading on a trading venue | | | | |
|--|-----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 94% | 99% | N/A | 0% | 0% |
| Morgan Stanley & Co International PLC | 4PQUHN3JPF GFNF3BB653 | 6% | 1% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

E. Currency Derivatives

| Class of instrument | | Annex I (e)(i): Currency derivatives; Futures and options admitted to trading on a trading venue | | | | |
|--|-----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 49% | 41% | N/A | 0% | 0% |
| UBS AG | BFM8T61CT2L1QCCEMIK50 | 28% | 40% | N/A | 0% | 0% |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 23% | 19% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

G. Equity Derivatives

| Class of instrument | | Annex I (g)(i): Equity Derivatives; Options and futures admitted to trading on a trading venue | | | | |
|--|----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 95% | 96% | N/A | 11% | 0% |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFGFNF3BB653 | 3% | 4% | N/A | 0% | 0% |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 2% | 0% | N/A | 0% | 0% |
| UBS AG | BFM8T61CT2L1QCEMIK50 | 0% | 0% | N/A | 0% | 0% |
| Barclays Capital Inc. | AC28XWWI3WIBK2824319 | 0% | 0% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

| Class of instrument | | Annex I (g)(ii): Equity Derivatives; Swaps and other equity derivatives | | | | |
|--|-----------------------|---|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Barclays Capital Inc. | AC28XWWI3WIBK2824319 | 50% | 9% | N/A | 0% | 0% |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 23% | 48% | N/A | 0% | 0% |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 13% | 15% | N/A | 0% | 0% |
| BofA Merrill Lynch International Limited | GDZP1UYGU9STUHRDP48 | 12% | 16% | N/A | 0% | 0% |
| UBS AG | BFM8T61CT2L1QCCEMIK50 | 2% | 12% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

I. Commodities derivatives and emission allowances Derivatives

| Class of instrument | | Annex I (i)(i): Commodities derivatives and emission allowances derivatives; Options and futures admitted to trading on a trading venue | | | | |
|--|-----------------------|---|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 95% | 98% | N/A | 0% | 0% |
| UBS AG | BFM8T61CT2L1QCCEMIK50 | 5% | 2% | N/A | 0% | 0% |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 0% | 0% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

K. Exchange traded products (Exchange traded funds, exchange traded notes and exchange traded commodities)

| Annex I (k): Exchange traded products (Exchange traded funds, exchange traded notes and exchange traded commodities) | | | | | | |
|--|----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 80% | 63% | N/A | 0% | 0% |
| J.P Morgan Securities PLC | K6QOW1PS1L104IQL9C32 | 20% | 36% | N/A | 0% | 0% |
| Canaccord Genuity Limited | ZBU7V5V5NIMN4ILRFC23 | 0% | 0% | N/A | 0% | 0% |
| Jefferies International Limited | S5THZMDUJCTQZBTRVI98 | 0% | 1% | N/A | 0% | 0% |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 0% | 0% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

M. Other instruments

| Class of instrument | | Annex I (m): Other instruments | | | | |
|--|-----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 81% | 61% | N/A | 0% | 0% |
| UBS AG | BFM8T61CT2L1QCCEMIK50 | 18% | 24% | N/A | 0% | 0% |
| J.P Morgan Securities PLC | K6Q0W1PS1L104IQL9C32 | 1% | 10% | N/A | 0% | 0% |
| Deutsche Bank AG (London Branch) | 7LTWFZYICNSX8D621K86 | 0% | 1% | N/A | 0% | 0% |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 0% | 3% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

Securities Financing Transactions (SFTs)

| Class of instrument | | Securities Financing Transactions (SFTs) - Annex I (a)(i): Equities - Shares & Depositary Receipts; tick size liquidity bands 5 and 6 (from 2000 trades per day) | | | | |
|--|----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Notification if <1 average trade per business day in the previous year: N | | | | | | |
| Top 5 execution venues ranked in terms of trading volumes (descending order) | | | | | | |
| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
| Morgan Stanley & Co International PLC | 4PQUHN3JPFGFNF3BB653 | 48% | 54% | N/A | 0% | 0% |
| Goldman Sachs International | W22LROWP2IHZNBB6K528 | 20% | 13% | N/A | 0% | 0% |
| BofA Merrill Lynch International Limited | GDZP1UYGU9STUHRDP48 | 13% | 10% | N/A | 0% | 0% |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 9% | 10% | N/A | 0% | 0% |
| J.P Morgan Securities PLC | K6Q0W1PS1L104IQL9C32 | 9% | 11% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA | N/A |

Class of instrument Securities Financing Transactions (SFTs) - Annex I (a)(ii): Equities - Shares & Depositary Receipts; tick size liquidity bands 3 and 4 (from 80 to 1999 trades per day)

Notification if <1 average trade per business day in the previous year: N

Top 5 execution venues ranked in terms of trading volumes (descending order)

| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
|---|-----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Morgan Stanley & Co International PLC | 4PQUHN3JPFQFNF3BB653 | 54% | 55% | N/A | 0% | 0% |
| BofA Merrill Lynch International Limited | GDZP1UYGU9STUHRDP48 | 15% | 15% | N/A | 0% | 0% |
| J.P Morgan Securities PLC | K6Q0W1PS1L104IQL9C32 | 12% | 13% | N/A | 0% | 0% |
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 7% | 8% | N/A | 0% | 0% |
| UBS AG | BFM8T61CT2L1QCCEMIK50 | 6% | 2% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |

Class of instrument Securities Financing Transactions (SFTs) - Annex I a(iii): Equities - Shares & Depositary Receipts; tick size liquidity bands 1 and 2 (from 0 to 79 trades per day)

Notification if <1 average trade per business day in the previous year: N

Top 5 execution venues ranked in terms of trading volumes (descending order)

| Name | LEI | Proportion of volume traded as a percentage of total in that class | Proportion of orders executed as a percentage of total in that class | Percentage of passive orders | Percentage of aggressive orders | Percentage of directed orders |
|---|----------------------|--|--|------------------------------|---------------------------------|-------------------------------|
| Credit Suisse Securities (Europe) Limited | DL6FFRRLF74S01HE2M14 | 73% | 45% | N/A | 0% | 0% |
| Goldman Sachs International | W22LR0WP2IHZNBB6K528 | 24% | 44% | N/A | 0% | 0% |
| Morgan Stanley & Co International PLC | 4PQUHN3JPPGFNF3BB653 | 3% | 8% | N/A | 0% | 0% |
| J.P Morgan Securities PLC | K6QOW1PS1L104IQL9C32 | 0% | 3% | N/A | 0% | 0% |

| Commentary | Summary of analysis |
|---|--|
| Execution factors | The relative importance given to the execution factors was in line with the Firm's order execution policy. |
| Close links, conflicts of interest and common ownership with respect to execution venues | Close links The Firm has no close links to report. |
| | Conflicts of interest The Firm has no conflicts of interest to report. |
| | Common ownerships The Firm has no common ownership to report. |
| Specific arrangements with execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received | Please refer to the 'Specific arrangements with any execution venues' section of the introduction. |
| Factors leading to a change in the list of execution venues listed in the Order Execution Policy | There were no changes to the list of execution venues/brokers in the Firm's Order Execution Policy. |
| Differentiation across client categories | N/A - all of the Firm's clients are professional clients |
| Use of data / tools relating to quality of execution | The Firm uses an in-house Transaction Cost Analysis ("TCA") tool and associated reporting that are designed to assess the quality of execution by analysing implicit and explicit costs. |
| Use of consolidated tape provider output | The Firm has not used output from consolidated tape providers. |
| Use of DEA N/A | |