

# MiFID-II RTS28: annual 2018 report

Top 5 venues and qualitative review Cardano Risk  
Management B.V.



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# About the report

MiFID-II (the revised EU Markets in Financial Instruments Directive 2014/65/EU) requires investment firms who execute client orders, to summarise and disclose on an annual basis for each class of financial instrument, the top 5 execution venues (in terms of trading volume) where they executed client orders in the preceding year. MiFID-II also requires investment firms to publish a summary of the analysis and conclusions from monitoring the quality of execution. This report details the above information over 2018 for Cardano Risk Management B.V. It is constructed in accordance with the technical standards set-out in Commission Delegated Regulation EU/2017/576 (RTS 28) supplementing MiFID-II.



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# 1. General remarks

This document sets out, for each class of financial instrument, information on the top five execution venues where Cardano executed or placed client orders in 2018. The document also highlights a summary of the analysis and conclusions we took from monitoring best execution. The following commentary applies to all our trading for each class of financial instrument.

## Scope of financial instruments

The scope of instruments is provided in Annex 1 of RTS 28. If the aggregate number of trades in a class of financial instruments is below 250 per annum (less than 1 trade per business day on average), the corresponding top 5 venues will not be disclosed as per MiFID-II requirements. Such information would not be meaningful nor representative of order execution arrangements. Cardano did not execute Securities Finance Transactions (SFTs)

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

Cardano does not have any close links or common ownership or arrangements concerning rebates with respect to any execution venue used to execute orders. Therefore, there are no conflicts of interest with any venue we currently use for execution. In addition, Cardano's *"Inducements, Non-Monetary Benefits & Research Policy"* covers all potential conflicts that may arise between Cardano (or its personnel) and any of the venues/counterparties it engages with.

## Change in execution venues

In 2018, we have started to invest in some futures listed on exchanges we did not transact on, these will be added to our Execution Policy. In addition, we added some OTC counterparties for clients to increase the potential for best execution and to best protect against a hard Brexit scenario outcome.

## Client categorisation

All Cardano clients are classified as Professional Clients. Cardano does not service Retail Clients. Cardano does not treat Professional clients differently.

## Execution Monitoring

For monitoring the effectiveness of our execution, Cardano has a 2-tier process in place. The first step covers the pre-trade process of identifying the best possible trade routing:

- First, Cardano Trading ('CT') is responsible for determining the execution strategy best fit to a trade instruction. The strategy differs per instrument class, factors in any restrictions that may apply (e.g. counterparty restrictions per client) and is targeted towards meeting the clients' objectives in the best possible manner.



- In order to challenge the fairness of pricing at the point of execution, CT must have access to a mid-market reference pricing:
  - o To the extent available, we use independent market data for this purpose;
  - o For some of the more bespoke OTC instruments we transact in, we use in-house models to derive mid-market reference prices. Independent market data feeds into the models. Supported with other relevant information (e.g. ISDA terms, counterparty intelligence), this determines our mid-market position;
  - o Cardano's Model Approval Committee is responsible for making sure our models reflect the latest developments in valuing OTC derivatives and challenges any inputs used. The committee meets monthly. All relevant internal stakeholders have a seat in the committee (e.g. Quant team, Trading, Back and Mid office)
- CT employs a skilled team of traders, knowledgeable in the instruments they transact in.
- CT is at the forefront of new regulatory developments which may influence pricing of the instruments we transact in (e.g. Basel-III, EMIR);

Our second step covers post-trade analysis. On a quarterly basis, CT ranks the performance of all OTC counterparties based upon a wide set of criteria. CT uses transaction-based information (e.g. volumes, hit ratio's and TCA analytics from the platforms we use) and includes other criteria we deem relevant in assessing counterparties (e.g. pre- and post-trade service levels, coverage, speed and flexibility in contract negotiations). The results feed into continuous dialogues we have with counterparties. If need be, any pressing or noteworthy matters we run into whilst trading, will be discussed in any of the weekly CT team meetings and escalated to our senior sales relations at the banks.

Post-trade information also assists us to identify possible factors to improve execution.

To the extent we use electronic trading venues, we closely monitor the competitive landscape (e.g. new entrants or new services that have become available) and review our choice of venues to determine if they still offer the best possible conditions for the product suite we use the venues for.

With respect to exchange traded instruments (futures & options), we monitor our brokers and keep track of keep track of the algo's they offer for trading and review their pricing schedules.

### Assessment of the quality of execution

The Compliance and Execution Committee (consisting of senior compliance, senior trading and senior business staff) reviewed transaction costs. The overall conclusion was that realised transaction costs are in line with expectations given our execution policy. We are comfortable in stating we've achieved good trading outcomes for and on behalf of our clients over 2018. We remain cautious and continue to monitor our trading strategies, counterparties, electronic trading venues and new developments to continue delivering best execution.



The remainder of this document sets out the top-5 venues per class of financial instrument and details some instrument observations drawn from monitoring best execution.



## 2. Top five execution venues

Please find below our top five execution venues, split per class of financial instrument.

### A: Equity – Shares & Depositary Receipts

Class of Instrument	Shares & Depositary Receipts: Tick size liquidity bands 5 & 6 (from 2000 trades per day)				
Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period

Class of Instrument	Shares & Depositary Receipts: Tick size liquidity bands 3 & 4 (from 80 to 1999 trades per day)				
Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period

Class of Instrument	Shares & Depositary Receipts: Tick size liquidity bands 1 & 2 (from 1 to 79 trades per day)				
Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period



## B: Debt instruments

### Bonds

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Tradeweb Europe Ltd (2138001WXZQOPMPA3D50)	94%	95%	0%	100%	0%
HSBC BANK PLC (MP6I5YZBEU3UXPYFY54)	1%	1%	0%	100%	0%
Merrill Lynch International (GGDZP1UYGU9STUHRDP48)	1%	1%	0%	100%	0%
CITIGROUP GLOBAL MARKETS LIMITED (XKZZ2JZF41MRHTR1V493)	1%	0%	0%	100%	0%
ABN AMRO BANK N.V. (BFXS5XCH7N0Y05NIXW11)	1%	1%	0%	100%	0%

Class of Instrument	Bonds: information on the top five counterparties on Tradeweb				
Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
J.P. MORGAN SECURITIES PLC (K6Q0W1PS1L1O4IQL9C32)	12%	8%	0%	100%	0%
Société Générale SA (O2RNE8IBXP4R0TD8PU41)	12%	9%	0%	100%	0%
THE ROYAL BANK OF SCOTLAND PUBLIC LIMITED COMPANY (RR3QWICVWIPCS8A4S074)	10%	14%	0%	100%	0%
HSBC BANK PLC (MP6I5YZBEU3UXPYFY54)	8%	8%	0%	100%	0%
Nordea Bank AB (529900ODI3047E2LIV03)	8%	8%	0%	100%	0%





## Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading bonds, highest priority is given to achieving best price / lowest costs. Speed and likelihood of execution are important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has made fixed fee arrangements with Tradeweb for 6 users. We pay a monthly fee for 4 users. In line with their general terms and conditions, two users are free of charge.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>Trade execution reports are used to analyse transaction costs in terms of achieved price relative to mid-market levels. Mid-market levels are determined by price information from different platforms, typically Tradeweb and Bloomberg for the instruments we transact in.</p> <p>Cardano uses Tradeweb as its platform of choice executing most of its bond transactions. We performed a review to substantiate this choice. Having regard to the product suite we transact in, the Bloomberg platform and BondVision were identified as the most prominent competitors. We have no indications whatsoever that pricing and/or liquidity is better than on Tradeweb. Therefore, we are comfortable to continue using Tradeweb, but will continue monitoring competing venues to ensure we continue to achieve the best possible result for clients.</p> <p>RTS 28 information and TCA information are available on Tradeweb. We use this information to identify possible factors to improve execution. The information greatly helps to identify parties that consistently under / outperform in certain instruments which feeds into our continuous dialogue we have with the counterparties we have available for trading</p>



## C: Interest rates derivatives

### Futures and options admitted to trading on a venue

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
JP Morgan Securities PLC (K6Q0W1PS1L1O4IQL9C32)	56%	73%	91%	9%	0%
RBC Europe Limited (TXDSU46SXBWIGJ8G8E98)	44%	27%	48%	52%	0%
Société Générale SA (O2RNE8IBXP4R0TD8PU41)	2%	1%	0%	100%	0%
HSBC BANK PLC (MP6I5ZYBZEU3UXPYFY54)	2%	2%	0%	100%	0%
GOLDMAN SACHS INTERNATIONAL (W22LROWP2IHZNBBK528)	1%	1%	0%	100%	0%

The number of orders in futures determines the number of trades for the volume test.

#### Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading interest rate futures, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has fixed fee arrangements per transaction with the venue of the interest rate derivatives futures.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>Cardano checks the depth of the central limit order book and speed of execution during execution. Furthermore, we check the impact on pricing when executing (including algorithms) and how swift often orders are filled.</p> <p>We have a continuous dialogue with our future brokers in terms of pricing and their capacities (e.g. algo's available for trading). On the latter, we investigate the suitability of each and determine as to whether they could be of use to us.</p> <p>Based on our trading volumes on different venues and price information from brokers, we reviewed existing arrangements vis-à-vis realized trading volumes and were able to reduce the explicit cost of trading.</p>



## Swaps, forwards and other interest rate derivatives

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
JP Morgan Securities PLC (K6Q0W1PS1L1O4IQL9C32)	18%	21%	0%	100%	0%
CITIGROUP GLOBAL MARKETS LIMITED (XKZZ2JZF41MRHTR1V493)	13%	10%	0%	100%	0%
HSBC BANK PLC (MP6I5ZYBZEU3UXPYFY54)	13%	15%	0%	100%	0%
BARCLAYS BANK PLC (G5GSEF7VJP5I7OUK5573)	8%	6%	0%	100%	0%
Merrill Lynch International (GGDZP1UYGU9STUHRDP48)	7%	4%	0%	100%	0%

Swaptions are included as "other interest rate derivatives"

## Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading interest rate swaps, forwards and other interest rate derivatives, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has made fixed fee arrangements with Tradeweb for 6 users. We pay a monthly fee for 4 users. In line with their general terms and conditions, two users are free of charge. Cardano has no other fee arrangements with the venues used. No discounts, rebates or non-monetary benefits were received
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>On a quarterly basis the potential counterparties to interest rate derivatives are evaluated based on a wide set of criteria including hit ratio, pre- and post-trade service levels, speed and flexibility in contract negotiation.</p> <p>Pre-trade, traders assess prices relative to a mid-market reference price. This includes the determination whether cleared or non-cleared transactions will lead to the best overall outcome. Independent reference data is used to the extent available: this includes, but is not limited to, liquidity in terms of bid or offered volumes and pricing (interest rates). Supported with other information relevant to a trade, e.g. intelligence from counterparties and specific agreements in ISDAs between client and counterparty, this data is used by Cardano to establish a mid-market reference price for each transaction. The spread to mid-market is mirrored against other best execution factors such as liquidity and client objectives/restrictions to determine the attractiveness of the price offered by a counterparty</p> <p>Analysis of realized transaction costs for all trades in 2018 showed a consistent pattern. No notable exceptions, without any rationale to it, have been identified demonstrating our consistent pre-trade approach to best execution.</p>



## D: Credit derivatives

### Futures and options admitted to trading on a trading venue

Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

### Other credit derivatives

Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					



## E: Currency derivatives

### Futures and options admitted to trading on a trading venue

Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

The number of orders in futures determines the number of trades for the volume test.

Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>We have a continuous dialogue with our future brokers in terms of pricing and their capacities (e.g. algo's available for trading). On the latter, we investigate the suitability of each and determine as to whether they could be of use to us.</p> <p>In terms of explicit cost, we reviewed existing arrangements vis-à-vis realized trading volumes and were able to reduce the explicit cost of trading</p>

### Swaps, forwards and other currency derivatives

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
J.P. MORGAN SECURITIES PLC (K6Q0W1PS1L1O4IQL9C32)	20%	21%	0%	100%	0%
UBS AG (BFM8T61CT2L1QCEMIK50)	14%	11%	0%	100%	0%
COOPERATIEVE CENTRALE RAIFFEISEN-BOERENLEENBANK B.A. (DG3RU1DBUFHT4ZF9WN62)	12%	8%	0%	100%	0%
GOLDMAN SACHS INTERNATIONAL (W22LROWP2IHZNBB6K528)	9%	10%	0%	100%	0%
ABN AMRO BANK N.V. (BFXS5XCH7N0Y05NIXW11)	8%	7%	0%	100%	0%

All tabled FX trades have been executed on FX-ALL. FX spot transactions are included as "other currency derivatives"



## Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading currency derivatives, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has no fee arrangements with the venue used. No discounts, rebates or non-monetary benefits were received.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>On a quarterly basis the potential counterparties to currency derivatives are evaluated based on a wide set of criteria including hit ratio, pre- and post-trade service levels, speed and flexibility in contract negotiation.</p> <p>Cardano uses FX-ALL (recently rebranded to Refinitiv) to execute FX-spot, FX-forward and FX- swap transactions. We performed a review to substantiate this choice. Given the product suite we transact in, Bloomberg and 360T have been identified as prominent competitors. We have no indications that pricing and/or liquidity on the Bloomberg MTF is better than on Tradeweb. Therefore, we are comfortable to continue using FX-ALL, but will continue monitoring competing venues to ensure we continue to achieve the best possible result for clients.</p> <p>RTS 28 and TCA information is available on FX-ALL. Using, amongst others, hit ratios per currency pair and tenor, we try to identify factors to improve upon execution. It also assists in identifying parties that consistently under / outperform and feeds into our continuous dialogue we have with the counterparties we have available for trading.</p> <p>We use traders' expert judgement, information from banks, and information from FX-ALL to assist in identifying optimal trading windows and to determine liquid trade sizes for currency pairs.</p> <p>At the point of trade, our traders use Bloomberg mid prices as an independent point of reference to determine the attractiveness of the quotes they receive on FX-ALL (from the panel of banks invited to the RFQ), and to determine as to whether to accept the best price in the platform RFQ.</p> <p>We completed a review of the transaction costs incurred over 2018. Results show a consistent pattern between the different instruments in the currencies traded in demonstrating our consistent approach to best execution</p>



## F: Structured finance instruments

Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period



## G: Equity Derivatives

### Options and Futures admitted to trading on a trading venue

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
JP Morgan Securities PLC (K6Q0W1PS1L1O4IQL9C32)	56%	77%	76%	24%	0%
RBC LEI	36%	17%	51%	49%	0%
Société Générale SA (O2RNE8IBXP4R0TD8PU41)	6%	4%	29%	71%	0%
HSBC BANK PLC (MP6ISZYZBEU3UXPYFY54)	2%	1%	0%	100%	0%

The number of orders in futures determines the number of trades for the volume test.

Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading equity option and futures, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has fixed fee arrangements per transaction with the venue of the equity derivatives admitted to trading on a trading venue.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>Cardano checks the depth of the central limit order book and speed of execution during execution. Furthermore, we check the impact on pricing when executing (including algorithms) and how often orders are filled.</p> <p>We have a continuous dialogue with our future brokers in terms of pricing and their capacities (e.g. algo's available for trading). On the latter, we investigate the suitability of each and determine as to whether they could be of use to us.</p> <p>In terms of explicit cost, we reviewed existing arrangements vis-à-vis realized trading volumes and were able to reduce the explicit cost of trading</p>





## Swaps and other equity derivatives

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
JP Morgan Securities PLC (K6Q0W1PS1L1O4IQL9C32)	22%	42%	0%	100%	0%
UBS AG (BFM8T61CT2L1QCEMIK50)	17%	7%	0%	100%	0%
Citigroup Global Markets LTD (XKZZ2JZF41MRHTR1V493)	15%	18%	0%	100%	0%
CREDIT SUISSE INTERNATIONAL (E58DKGMJYYJLN8C3868)	10%	2%	0%	100%	0%
GOLDMAN SACHS INTERNATIONAL (W22LROWP2IHZNBB6K528)	8%	5%	0%	100%	0%

## Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading equity option and swaps, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has no fee arrangements with the venues used. No discounts, rebates or non-monetary benefits were received.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>On a quarterly basis the potential counterparties to currency derivatives are evaluated based on a wide set of criteria including hit ratio, pre- and post-trade service levels, speed and flexibility in contract negotiation.</p> <p>At the point of execution, traders assess prices relative to a mid-market reference price. Independent reference data is used to the extent available: this includes, but is not limited to dividends, volatility skews and correlations received from a contracted data vendor and interest rates. Supported with other information relevant to a trade (e.g. intelligence from counterparties), this data is used by Cardano to establish a mid-market reference price for each transaction. The spread to mid-market is mirrored against other best execution factors such as liquidity and client objectives/restrictions to determine the attractiveness of the price offered by a counterparty.</p> <p>We analysed realized transaction costs for 2018 and found a consistent pattern in terms of transaction cost. No notable exceptions, without any rationale to it, have been identified demonstrating our consistent pre-trade approach to best execution.</p>



## H: Securitized Derivatives

Class of Instrument	Warrants and Certificate Derivatives				
Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period

Class of Instrument	Other securitized derivatives				
Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period

## I: Commodities derivatives and emission allowances Derivatives

Class of Instrument	Options and Futures admitted to trading on a trading venue				
Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period

Class of Instrument	Other commodities derivatives and emission allowances derivatives				
Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period

## J: Contracts for difference

Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period



## K: Exchange traded products

Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading ETF's, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has no fee arrangements with the venues used. No discounts, rebates or non-monetary benefits were received.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	On a quarterly basis the potential counterparties to ETF's are evaluated primarily based hit ratios.

## L: Emission allowances

Notification if < 1 average trade per business day in the previous year	Yes				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
Not Applicable					

Cardano did not execute orders in this class of instrument in the Reporting Period



## M: Other instruments

### Bond TRS

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
HSBC Bank PLC (MP6ISZYBEU3UXPYFY54)	27%	29%	0%	100%	0%
J.P. MORGAN SECURITIES PLC (K6Q0W1PS1L1O4IQL9C32)	24%	21%	0%	100%	0%
LLOYDS BANK CORPORATE MARKETS PLC (213800MBWEIJDMSUCU638)	23%	25%	0%	100%	0%
Citigroup Global Markets LTD (XKZZ2JZF41MRHTR1V493)	12%	9%	0%	100%	0%
DEUTSCHE BANK AKTIENGESELLSCHAFT (7LTWFZYICNSX8D621K86)	5%	6%	0%	100%	0%

Bond TRS usually involve a bond transfer as well, these are not included in the Bond tables (part B).

Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading Bond TRS, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has no fee arrangements with the venues used. No discounts, rebates or non-monetary benefits were received.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	On a quarterly basis the potential counterparties to Bond TRS are evaluated primarily based hit ratios.



## Inflation Linked Swaps

Notification if < 1 average trade per business day in the previous year	No				
Top five execution venues ranked in terms of trading volumes (descending order)	Proportion of volume traded as a % of total in that class	Proportion of orders executed as a % of total in that class	% of passive orders	% of aggressive orders	% of directed orders
JP Morgan Securities PLC (K6Q0W1PS1L1O4IQL9C32)	28%	28%	0%	100%	0%
HSBC BANK PLC (MP6I5YZBEU3UXPYFY54)	11%	18%	0%	100%	0%
CITIGROUP GLOBAL MARKETS LIMITED (XKZZ2JZF41MRHTR1V493)	9%	8%	0%	100%	0%
CREDIT SUISSE INTERNATIONAL (E58DKGMJYYJLN8C3868)	9%	10%	0%	100%	0%
Goldman Sachs International PLC (W22LROWP2IHZNBB6K528)	8%	6%	0%	100%	0%

Notes drawn from monitoring the quality of execution:

Item	Analysis and conclusions
Relative importance given to price, costs, speed, likelihood of execution or other considerations.	When trading Inflation Linked Swaps, best price / lowest costs and likelihood of execution are equally important. Speed of execution is important if the client gave a specific timeframe to an order.
Arrangements with any execution venues regarding payments made or received, discounts, rebates or non-monetary benefits received.	Cardano has no fee arrangements with the venues used. No discounts, rebates or non-monetary benefits were received.
Explanation of how the investment firm has used any data or tools relating to the quality of execution.	<p>On a quarterly basis the potential counterparties to Inflation Linked Swaps are evaluated based on a wide set of criteria including hit ratio, pre- and post-trade service levels, speed and flexibility in contract negotiation.</p> <p>At the point of execution, traders assess prices relative to a mid-market reference price. This includes the determination whether cleared or non-cleared transactions will lead to the best overall outcome. Independent reference data is used to the extent available: this includes, but is not limited to break-even rates, seasonalities and interest rates. Supported with other information relevant to a trade (e.g. from counterparties and specific agreements in the ISDAs between clients and counterparties) relevant to a trade, this data is used by Cardano to establish a mid-market reference price for each transaction. The spread to mid-market is mirrored against other best execution factors such as liquidity and client objectives/restrictions to determine the attractiveness of the price offered by a counterparty</p> <p>We have analysed realized transaction costs for 2018 and found a consistent pattern in terms of transaction cost. No notable exceptions, without any rationale to it, have been identified demonstrating our consistent pre-trade approach to best execution.</p>

