

ISIN attribute analysis

Executive summary

- Trade data analysis carried out for fixed v float interest rates swap, FX option and interest rates swaption to assess the impact of including different attributes in an identifier (ISIN) for these 3 products.
- Volatile/dynamic attributes (e.g. strike prices of options, fixed rates of swaps, maturity dates of swaps, expiry dates of options), which show a large variability in the values they take across trading data, have the impact of causing the number of identifiers (ISINs) generated to dramatically increase if they are included as attributes of the identifier (ISIN).
- Identifiers (ISINs) including volatile/dynamic attributes tend to generally behave more like *transaction level* identifiers on the whole, only describing the product of one or two trades.

The trade data analysis

We have carried out an analysis using trade data sourced from two regulatory report repositories¹. The purpose of this analysis was to assess the impact of including different attributes as reference data in the specification of a product/instrument identifier. The result of this analysis will inform decisions of the ISO study group and its asset class working groups about how to accommodate different attributes in the reference data of an ISIN for derivative products/instruments. We present the results within.

With specific regard to MiFIR, and the mandatory requirement to use ISINs to identify instruments, regulatory technical standards (RTS) 22 and 23 can be read to infer that ESMA expects that certain attributes of a transaction should be included in the instrument reference data to be sent to ESMA under RTS 23. And with that, what should be associated with an instrument's ISIN, to the extent that it might be assumed that ESMA expects that such attributes would be included in the reference data of the ISIN. Key amongst these attributes are price/strike price/fixed rate and maturity/expiry date information from transactions in derivative instruments.

The values observed for these attributes would commonly be expected to vary greatly from transaction to transaction for products traded in interest rates and FX markets. They are *dynamic attributes* of such products. If included as attributes in an identifier it can be safely assumed that many unique identifiers will be needed, almost one for every value observed of these attributes. This is in contrast to the values of *static attributes* which are not expected to vary greatly after an initial

¹ For the interest rates asset class, the dataset used in the analysis was built from publicly available data taken from DTCC and Bloomberg's public swap data repository websites. The period for which data was retrieved was the 3 months up to the 4th April 2016.

For the FX asset class, data was only taken from DTCC's public swap data repository. The period of focus was 21st March 2016 to 14th April 2016.

NB: Excel files with full lists of ISIN analysis results can be [found at this link](#). If you would like a copy of the raw data and analysis other files to understand the approach taken to obtain the results of this analysis (and any necessary filtering and cleansing of the data which took place) please contact ISDADataReporting@isda.org

observation period. E.g. product name, currency, exercise style, etc. The number of possible values observed for such attributes is much less and would be expected to vary minimally after any initial phase of trading where most combinations will be observed in trade data.

To address the above, special attention is given in the analysis of the impact of including:

1. swap price/swap fixed rate for fixed v float interest rate swap products
2. swap price/swap fixed rate, and option premium for interest rate swaption products
3. option strike price for FX option products

Additionally, with focus on date/time attributes of transactions, special attention is given in the analysis to the impact of including:

4. swap end/maturity date for fixed v float interest rate swap products
5. swap end/maturity date and option expiry date for swaption products
6. option expiry date for FX option products

The analysis was carried out as follows for each product. Trade data for a period was collected (see footnote 1 above). Identifiers (let's call them "ISINs" throughout for simplicity) were generated from the trade data using the concatenation of values observed for each combination of attributes being assessed. The "number of ISINs required" was counted from number of unique ISINs generated for each combination of attributes being analysed. (See Appendix for more detailed Example of how number of ISINs required is calculated from trade data.)

Analysis results

The results of this analysis can be found below in Table 1 for fixed v float interest rate swaps, in Table 2 for FX options and in Table 3 for interest rate swaption products.

Uniformly, across each of the product's analysis, the introduction of a price attribute to the ISIN leads to a very significant increase in the number of ISINs required. For the fixed v float interest rate swap product, inclusion of the fixed rate of the swap as an attribute of the ISIN meant that 58,508 ISINs were required for this dataset of 168,450 trades. This is in contrast to the ISINs required when the ISIN only includes the set of static attributes for this product. The introduction of option strike price as an attribute of the ISIN for the FX options product generated 11,336 required ISINs across 35,894 trades in the data set in comparison to just 515 from the static set. In the interest rate swaption product 5,440 ISINs were generated from a data set of 12,337 trades when the fixed rate of the underlying swap was included as an attribute of the ISIN for the swaption product, whereas the ISIN based on only the static attributes generated 101 ISINs from the same trade data.

Similarly, the inclusion of date attributes such as the expiry date of an option or maturity date of a swap leads to a very significant increase of the number of ISINs required due to the variability of values observed for these attributes in the data in the same way as inclusion of price attributes did. For the fixed v float interest

rate swap product, inclusion of the maturity date of the swap as an attribute of the ISIN meant that 29,871 ISINs were required for this dataset of 168,450 trades. The inclusion of option expiry date as an attribute in the ISIN for the FX options generated 9,710 ISINs which on average only described 3.7 trades each. And, for the swaption product, which has a number of date features which might be considered as attributes for the ISIN, coupling the expiry of the optional element of the swaption with the maturity date of the underlying swap formed ISINs which described on average only 1.95 trades in the data set, with 6,318 ISINs covering the data set when these dates were included as attributes.

Looking in more detail at how the ISINs cover/describe the trade data sets for each product (the distribution of trades per ISIN), a high level diagram of how the trades are distributed across the individual ISINs for each product analysis is plotted in Figure 1 (and for each product analysis separately under the heading *Distributions of trades over ISINs for each combination of attributes* in the Appendix). While some of the ISINs may identify and describe the instrument for many trades it is clear that a lot only identify the instrument for 1 trade and are in effect transaction level identifiers rather than product/instrument identifiers. The ISINs which contain only static attributes have a tighter distribution without long tails seen in the distributions of trades over the ISINs which contain dynamic attributes such as expiry/maturity date and fixed rate/strike price. It would be our contention that, sometimes the same ISIN will be observed in trading data to be applicable for many trades. This should only be the case if that ISIN describes an instrument/product which is very liquid and trades in large volumes. And, that other ISINs, if they are to have wider applications, would be expected to generally be observed covering a volume of trades larger than the tens or single figure observations in some of the analysis' results, when dynamic attributes are introduced to the ISIN.

It is important to understand another feature of the dynamic attributes. As well as being observed to have large variability in a trade data set from a fixed period of time, the attributes will continue to show variability over time. Take maturity date, if a 5 year swap is executed to be effective today (April 26th 2016), its maturity date would be April 26th 2021. If an identical swap is executed tomorrow, its maturity date will be April 27th 2021. In contrast, new values of static attributes are expected to be observed at a diminishing rate. Figure 3 and Figure 2 below show how the numbers of ISINs, and the distribution of trades over those ISINs, evolve over a period of time as more trades are observed in the data set for the fixed v float interest rate swap. The ISINs which are based on static attributes tend to a (straight line) constant number generated after an initial period of growth. Also, looking at Figure 2, it is clear that the number of ISINs based on volatile/dynamic attributes continue to grow in direct proportion to the number of trades observed (*NB: in week 13 a reduced number of trades is observed, tapering to approx. 9,000*).

In conclusion, it is clear that inclusion of these dynamic attributes leads the ISIN to be more akin to a transaction level identifier rather than a product/instrument identifier which can be used to aggregate trade data for systemic risk analysis or for certain regulatory reporting applications. It would also appear that the population of ISINs will continue to grow over time in direct proportion to the number of derivatives transactions for which an ISIN is required, if such dynamic attributes are included as attributes.

Table 1

Interest rates fixed v float swap		
	Static attributes included in ISIN	attribute values examples observed
static attributes of product	taxonomy	<i>InterestRate:IRSwap:FixedFloat</i>
	underlying_asset_1	<i>e.g. EUR-EURIBOR-Reuters</i>
	reset_frequency	<i>e.g. 6M</i>
	notional_currency_1	<i>e.g. EUR</i>
	payment_frequency	<i>e.g. 6M</i>
	underlying_asset_2	<i>e.g. fixed</i>
	reset_frequency_2	<i>e.g. N/A</i>
	payment_frequency_2	<i>e.g. 6M</i>
	day_count_convention	<i>e.g. 30/360</i>
	bespoke_swap	<i>e.g. Y</i>
	attributes included in ISIN	
static attributes of the fixed float swap included		average trades per ISIN ratio: 448 376.00
add dynamic attributes	adding only fixed rate/price of the swap to static attributes	58,505 2.88
	adding only swap end (maturity) date to static attributes	29,871 5.64
	adding fixed rate/price and end (maturity) date of the swap to static attributes	112,608 1.50
<i>Total number of trades in sample: 168,450</i>		

Table 2

FX options		
	Static attributes included in ISIN	attribute values examples observed
static attributes of product	TAXONOMY	ForeignExchange:NDO; ForeignExchange:VanillaOption
	NOTIONAL_CURRENCY_1	e.g. EUR
	NOTIONAL_CURRENCY_2	e.g. GBP
	OPTION_TYPE	e.g. C-
	OPTION_FAMILY	e.g. EU
	OPTION_CURRENCY	e.g. EUR
attributes included in ISIN		Number of ISINs required:
static attributes of FX option products included		515
add dynamic attributes	adding only option premium to static attributes	28,413
	adding only option strike price to static attributes	11,336
	adding only option expiry date to static attributes	9,710
	adding option strike price and expiry date to static attributes	22,107
<i>Total number of trades in sample: 35,894</i>		average trades per ISIN ratio:
		69.70
		1.26
		3.17
		3.70
		1.62

Table 3

Interest rates swaption		
	Static attributes included in ISIN	attribute values examples observed
static attributes of product	taxonomy	<i>InterestRate:Option:Swaption</i>
	option_type	<i>e.g. RF-</i>
	option_family	<i>e.g. EU</i>
	option_currency	<i>e.g. EUR</i>
	underlying_asset_1	<i>e.g. EUR-EURIBOR-Reuters</i>
	reset_frequency	<i>e.g. 6M</i>
	notional_currency_1	<i>e.g. EUR</i>
	payment_frequency	<i>e.g. 6M</i>
	underlying_asset_2	<i>e.g. fixed</i>
	reset_frequency_2	<i>e.g. N/A</i>
	notional_currency_2	<i>e.g. EUR</i>
	payment_frequency_2	<i>e.g. 6M</i>
	day_count_convention	<i>e.g. 30/360</i>
	bespoke_swap	<i>e.g. Y</i>
attributes included in ISIN		Number of ISINs required:
static attributes of swaption included		101
add dynamic attributes	adding option expiry date and fixed rate/price of the swap to static attributes	9,558
	adding option expiry date and swap end (maturity) date to static attributes	6,318
	adding only effective date to static attributes	4,001
	adding only fixed rate/price of the swap to static attributes	5,440
<i>Total number of trades in sample: 12,337</i>		average trades per ISIN ratio:
		122.15
		1.29
		1.95
		3.08
		2.27

Figure 1 Distributions of trades over ISINs for each analysis. Note that the no. of trades for which an ISIN is applicable decays to 1 with varying velocity and certain ISINs identify thousands of trades while others are only applicable for 1. For more details of this see appendix: *Distributions of trades over ISINs for each combination of attributes*

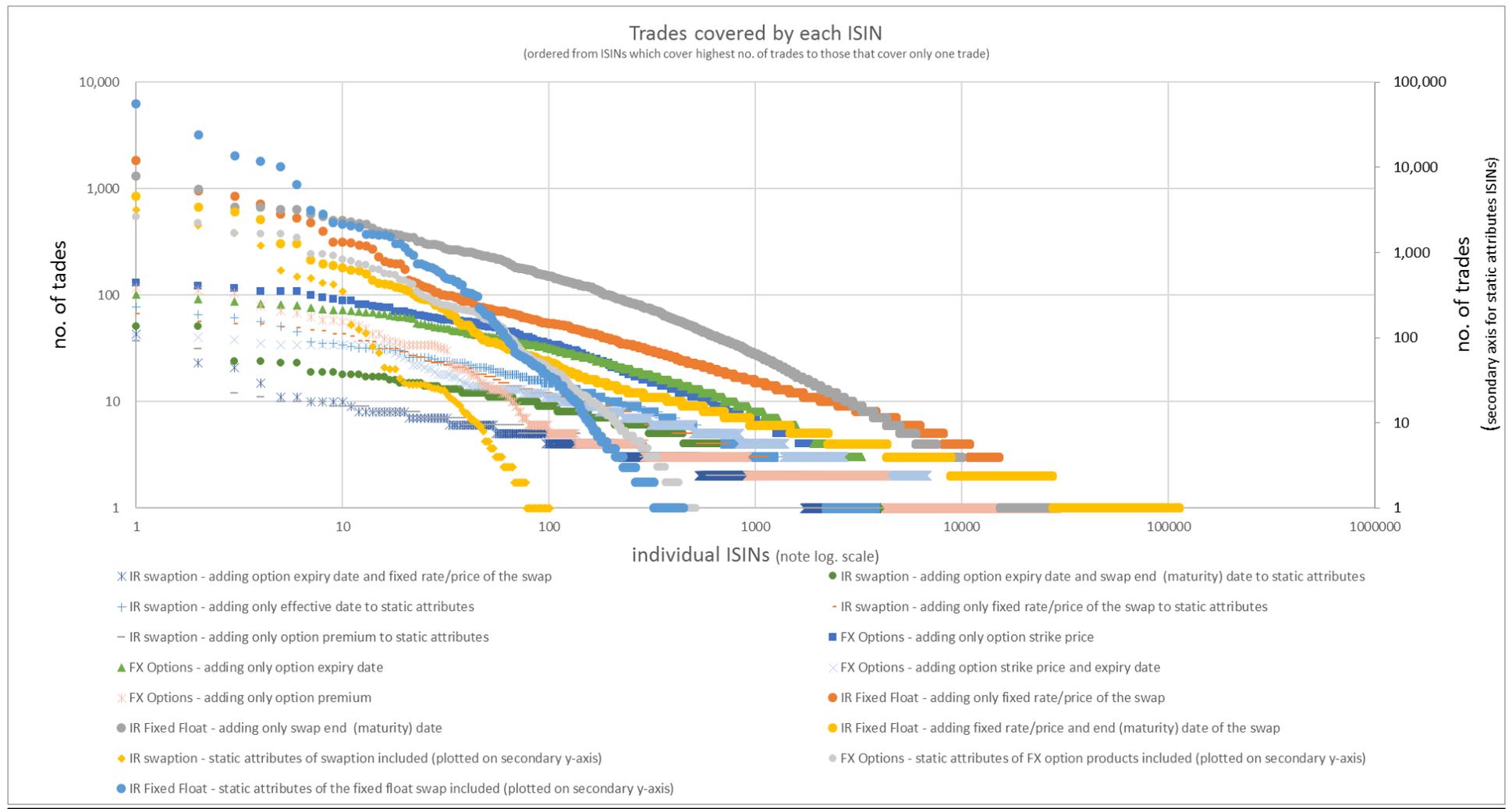


Figure 3

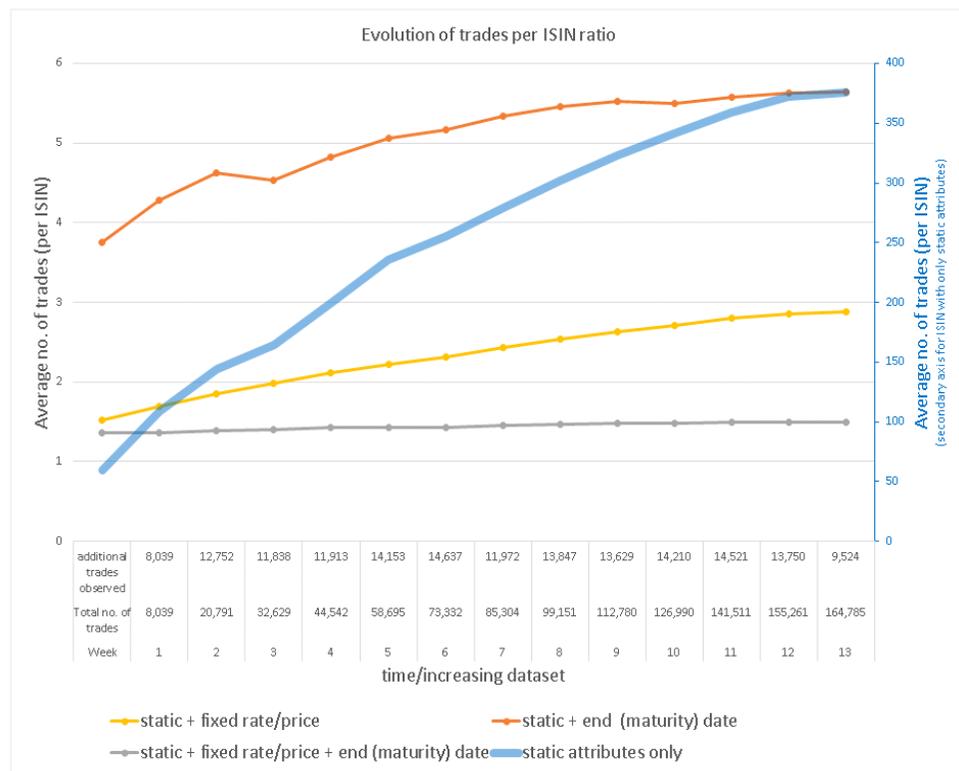


Figure 2

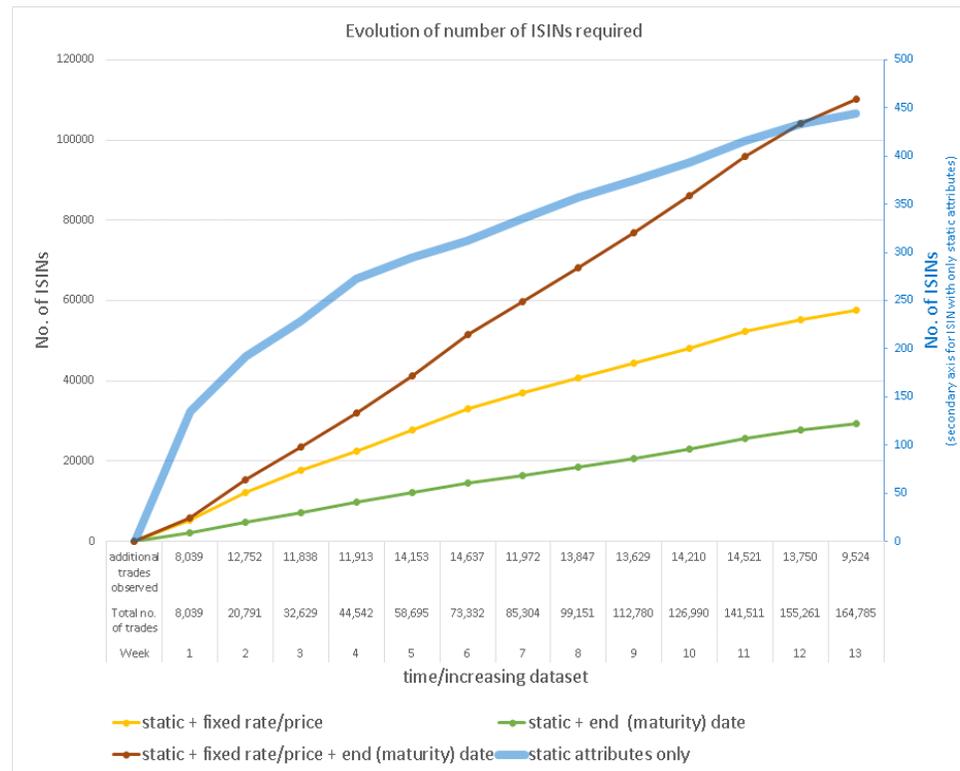


Figure 3 shows how the average number of trades per ISIN evolves as trades are added to the fixed v float interest rate swap dataset. The dynamic attributes' inclusion in the ISIN see this ratio approach a constant, which is expected as these ISINs behave like transaction level identifiers.

Figure 2 shows the evolution of the number of ISINs generated by the fixed v float interest rate swap trade data over time as trades are added week to week over the 3 month period. The dynamic attributes' inclusion as attributes of the ISIN has the effect of making the number of such ISINs rise directly in proportion to the number of trades observed in the data set. In contrast the number of ISINs which are based on the static attribute tends to a constant value after initially generating a lot of new ISINs in the first 6 weeks of trade data.

Appendix

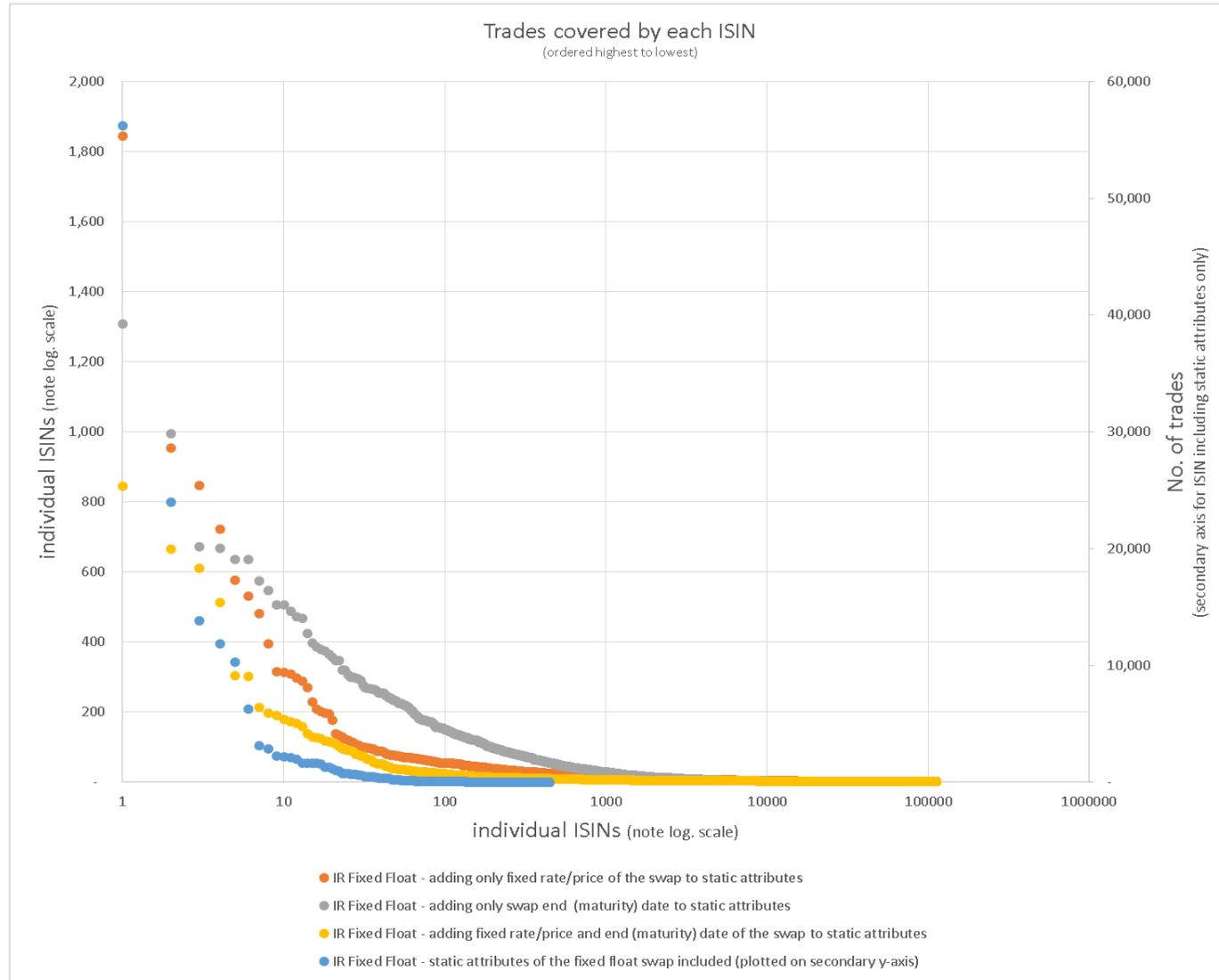
Example of how number of ISINs required is calculated from trade data

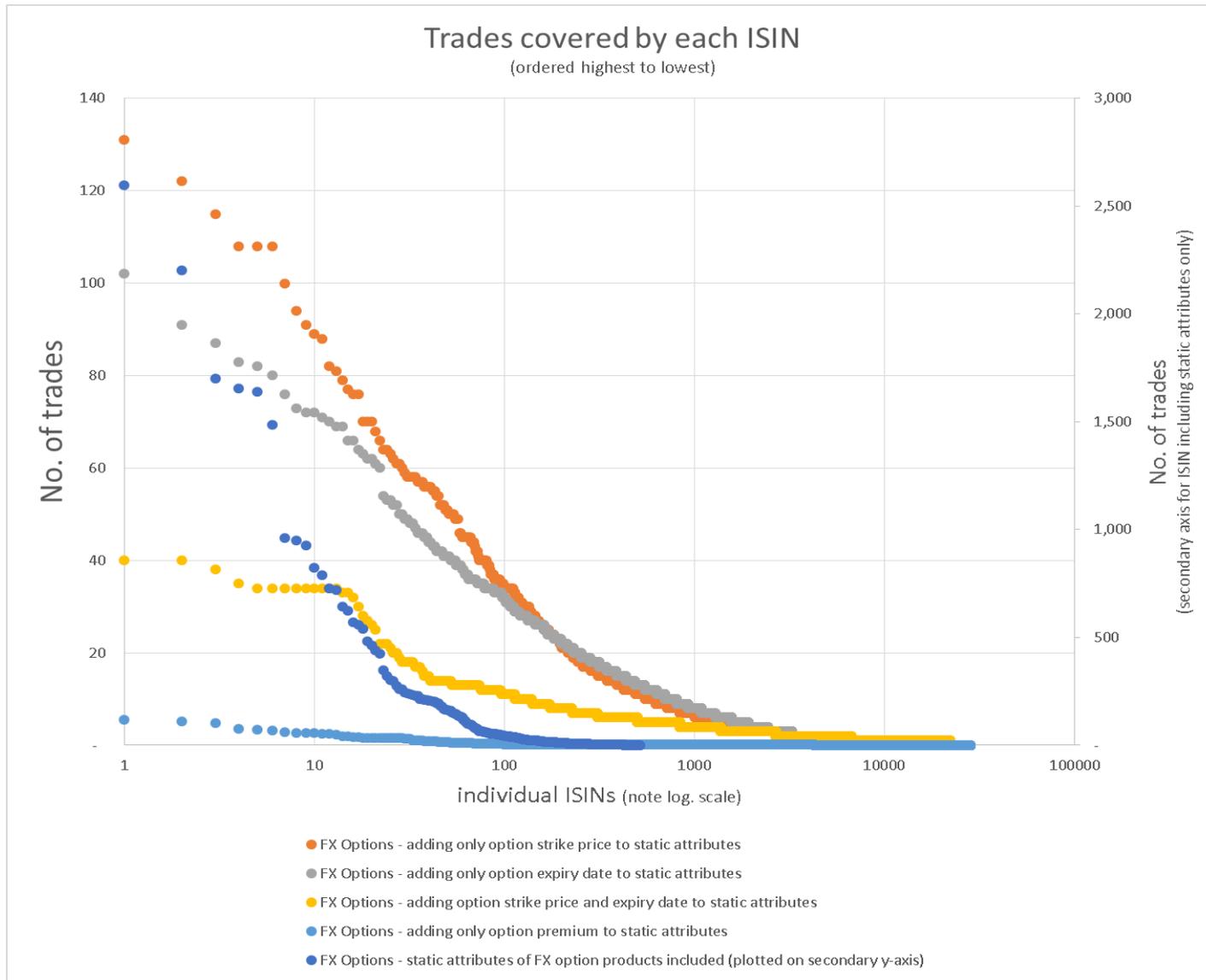
The “number of ISINs required” metric is just the number ISINs generated by the concatenation of the values observed, in the dataset, for each attribute included in the ISIN. Using a basic example and dataset shown in Table 4 - so if attribute 1 takes values in a dataset: A & B, and attribute 2 is observed to have 3 possible values X,Y & Z but Z is only seen in combination with B while X and Y are seen in combination with both values A & B of attribute 1. We have a set of identifiers as follows, A:X, A:Y, B:X, B:Y, B:Z – so the number of ISINs required is 5.

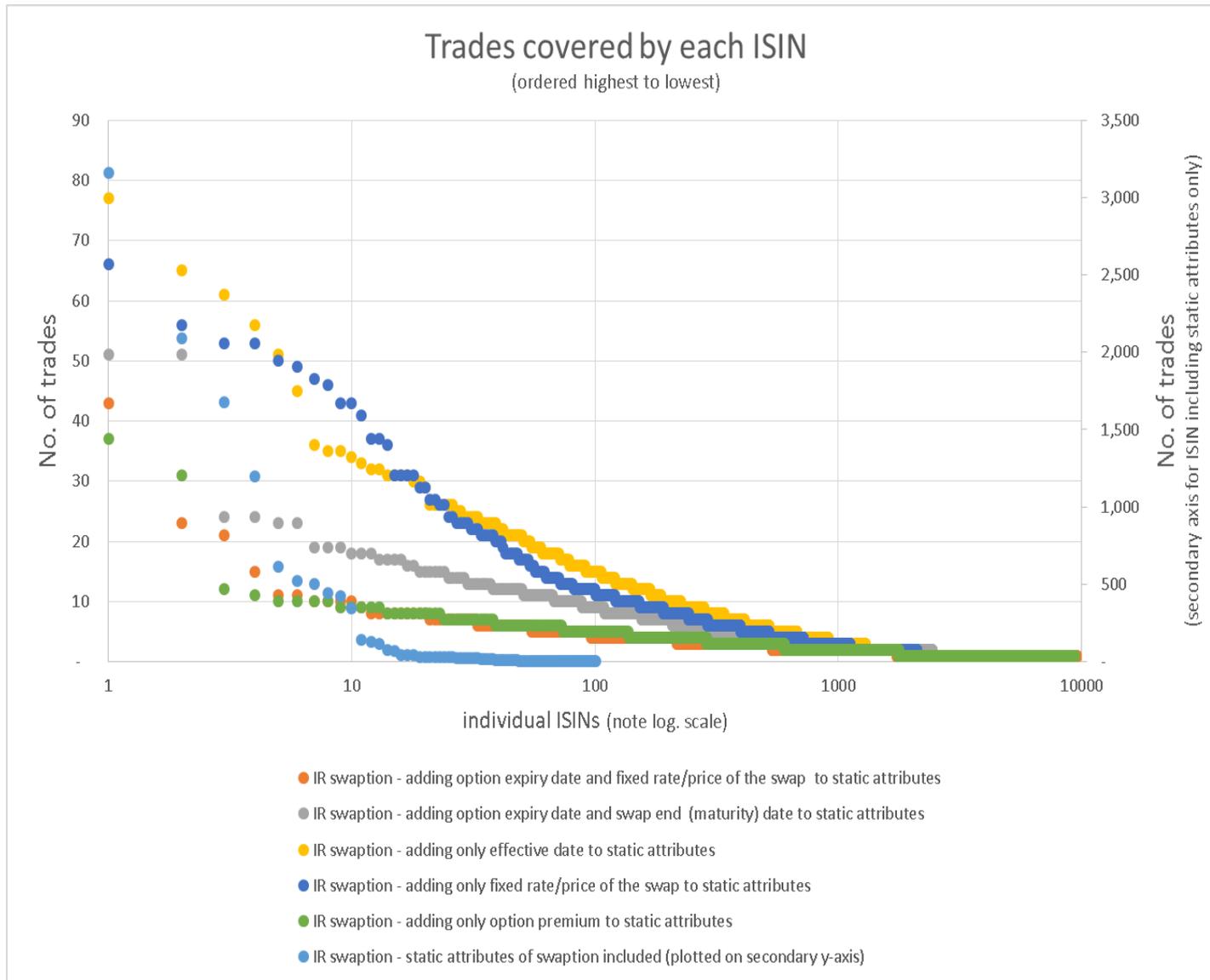
Table 4

attribute 1	attribute 2	attribute 3	attribute 4	Identifier (ISIN) created from concatenation of attribute 1 and 2	Identifier (ISIN) created from concatenation of attribute 1, 2 & 3
A	Y	red	square	A:Y	A:Y:red
B	Y	green	square	B:Y	B:Y:green
B	Z	yellow	circle	B:Z	B:Z:yellow
A	X	pink	circle	A:X	A:X:pink
B	Z	orange	circle	B:Z	B:Z:orange
B	X	orange	square	B:X	B:X:orange

Distributions of trades over ISINs for each combination of attributes
(Results from each product analysis graphed separately.)







Comment on *Instrument Details* from MiFIR RTS 22 –“ISIN or fields 42-56”

{NB: the following is paraphrasing text from ISDA's response to ESMA's consultation on further guidance for MiFIR from March 2016}

Article 1 of RTS 22 mandates use of the data fields per Annex 1 Table 2 for transaction reporting. We would like to highlight an issue which might be a concern for ESMA regarding instrument details and the format in which this information is provided. The banner above field 42 states “**Fields 42-56 are not applicable where: transactions are executed on a trading venue or with an investment firm acting as a SI; or field 41 is populated with an ISIN that exists on the reference data list from ESMA**”

It could be inferred that ESMA expects those attributes found in fields 42-56 to be contained in the reference data of the ISIN and only explicitly reported if there is no ISIN. ISO are currently working through an accelerated work program to assess which attributes for derivative products would be appropriate for inclusion within the ISIN. With that in mind, we would caution that any suggestion that all the attributes 42-56 will be contained in the ISIN reference data is premature as such decisions have not been made for the vast majority of products and ESMA should allow flexibility here to respect the outcome of that ISO work on ISINs for derivative products which is currently taking place.

Take for example the following fields, field 51-Strike Price, field 54-Maturity Date and field 55-Expiry Date. These fields may be transaction level data which may not be contained in the instrument reference data envisioned by ISO for the ISINs for many derivative products. It is noted that all three example fields have qualifying statements in the Annex of RTS 22 to say where the field “is not applicable the field shall not be populated”. This is a positive artefact but in addition to such values not being available as reference data in lieu of an ISIN, the converse also needs to be catered for in the tables i.e. an ISIN may be provided in field 41-*Instrument identification code* and additionally some of these other fields 42-56 should also be available to provide values pertaining to transaction level data if not included in the ISIN.

Consider two example products: an interest rate swap and an FX option (for which we have presented trade data analysis above). Both OTC products will almost certainly be listed on some MiFID II / MiFIR trading venue after MiFID II comes into force.

In the case of the interest rate swap, if the instrument identification ISIN did not include the maturity date as an attribute, maturity date would be transaction level data – whereby the ISIN may describe every other part of the swap, to fully understand the economics of the transaction other information such as the notional amount, the effective date and the maturity date are held separately and additional to the ISIN.

Similarly, if option strike price was held separately from the product level attributes of an FX option, to fully describe the economics of the transaction the ISIN would be needed, and additionally the option strike price and notional amounts would be needed too to have a full description of the economics of the transaction.

The above examples are merely to illustrate the issue at hand – as alluded to above, the work ISO is carrying out is ongoing and decisions about the exact structure of the reference data and attributes which will be contained in the ISIN remain to be finalised. We expect ESMA should be able to, via the

guidance document, provide exceptions to the statement in table 2 of annex 1 of RTS 22 for these fields (41-56) which can be effected via the validation rules at a later date when the final ISIN solution for derivative products is clear.

Some related outstanding questions around attributes for ESMA which arise reading RTS 22 and RTS 23:

- ISIN for non-MiFID instruments. Where the underlier for an option is a non-MiFID instrument, we suggest that this field is not required e.g. a FX spot trade is the underlier of an FX option but FX spot (rate) does not have an ISIN.
- In RTS 23, field #48 'FX type' Can ESMA provide guidance as to which currency pair belong into each of the following categories: FXCR; FXEM; FXMJ
- Inclusion of Asian as an exercise style is incorrect. Asian refers to an averaging process to determine the initial price or settlement price of an option not an expiration style which indicates when it can be exercised.