

ESMA Market Report

EU Derivatives Markets 2023



ESMA Market Report on EU Derivatives Markets 2023

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Executive summary

The EU derivatives market: Outstanding notional amounts in the EU derivatives market grew 29% to EUR 314tn in 4Q22 from EUR 244tn in 4Q20. Intragroup notional amounts particularly grew, up 91% from 4Q20, to EUR 44tn. There was little change in the relative shares of asset classes. Interest rate derivatives (IRDs) were 78% of notional amount in 4Q22 (+1pp from 4Q20), currency 14% (+1pp), while equity, credit and commodities were 5%, 2% and 1% respectively. There was a shift away from non-banks to banks (62%, +7ppt), with credit institutions and investment firms continuing to hold the most notional amount, while CCPs account for 7% and non-financials 4%. Largely as the result of continued trading in UK trading venues that are no longer recognised as equivalent, the share of ETD and OTC exchanged on trading venues both fell. ETD fell to 5% by 4Q22 (-3ppt from 4Q20), while on-trading-venue OTC fell to 11% (-5ppt from 4Q20). Nonetheless, the share of outstanding notional amounts for OTC IRDs and credit that were cleared continued to grow, from 71% in 4Q20 to 77% in 4Q22 for IRDs, and from 41% to 45% for credit. The UK remains the locus of much derivative trading in Europe, with 52% of outstanding notional amounts held in EEA-to-UK contracts (+3ppt from 4Q20). EEA exposures to other third countries also grew (to 22%, +3ppt).

Interest rate derivatives: The IRD market grew substantially, by 26% in outstanding notional amounts, to EUR 244tn in 4Q22, up EUR 51tn since 4Q20. A third of the growth was in intragroup positions, whose notional amounts grew 121% to EUR 31tn (4Q22) from 14tn (4Q20), mainly in interest rate swaps held with UK and other third-country counterparties subject to the clearing obligation. Shares held by credit institutions (65%, +7ppt from 4Q20) and investment firms grew (23%, +4ppt) while shares for AIFs (1%, -8ppt) and non-financials (2%, -2ppt) fell, with intragroup growth for both credit institutions and investment firms. OTC positions rose significantly, to 97% in 4Q22 from 93% in 4Q20. Both ETD (3%, -4ppt from 4Q20) and OTC executed on an MTF or OTF fell (13%, -4ppt). A sizeable part of this shift was due to UK venues ceasing to be recognised after 2020, affecting the status of trades subsequently executed on these venues. Central clearing of outstanding IRDs continued since 4Q20, from 71% to 77%, while quarterly clearing rates for the IRDs subject to the clearing obligation, IRDs in G4 currencies and IRDs in NOK, SEK and PLN were both near 100%.

Credit derivatives: Credit derivatives grew significantly, to EUR 7tn in notional amounts outstanding, from EUR 5.7tn in 4Q20. Growth was throughout the reporting period and driven by credit default swaps (CDS) which remain by far the dominant instrument. Growth in intragroup positions was dramatic, quadrupling to EUR 1.1tn (4Q22), accounting for about half of the notional growth overall and almost entirely in swaps, i.e. CDS, and mainly in contracts held with UK (up EUR 0.5tn) and other third-country counterparties (up EUR 0.3tn). The OTC share rose sharply to over 99.7% in 4Q22 from 95% in 4Q20, with falls in both ETD (0.3%, -5ppt from 4Q20) and in on-venue OTC (7%, -2ppt). Again, much of this was related to the change in status of UK venues. Central clearing of outstanding credit derivatives grew from 41% in 4Q20 to 50% in 4Q22 and quarterly clearing rates for the CDS on European indices subject to the clearing obligation averaged around 85%, with clearing predominantly at UK CCPs.

Equity derivatives: Equity derivative notional amounts increased 36% to EUR 15tn in 4Q22, from EUR 11tn in 4Q20, with growth mostly in equity options. Equity options also drove a significant increase in the share of notional amounts in ETD (58% 4Q22, +8ppt from 4Q20) which, with an increase in central clearing for OTC derivatives to 5% (+3ppt), increased the share held by CCPs (18%, +16ppt) and increased concentration in the market. By the end of 2022, over half of notional amount was also in contracts with third countries, 31% (+9ppt) to the UK and 22% (-2ppt) to other third countries. While among EEA counterparties, most notional amounts were in contracts held between counterparties based in Germany, France, and the Netherlands, with geographical patterns of exposures remaining similar in 2021 and 2022.

Currency derivatives: Currency derivative notional amounts grew by 41% to EUR 45tn in 4Q22, from EUR 32tn in 4Q20. Growth occurred throughout most of the reporting period, peaking in 3Q22 and was mainly from forwards, which continue to be the largest instrument by notional amount (72% as of 4Q22). Swaps and options likewise grew. Their growth was accompanied by a shift to credit institutions, 62% in 4Q22 (+10ppt from 4Q20) and investment firms (17%, +1ppt) away from other firm types. The shift was accompanied by increasing concentration throughout the period. There was also a slight shift towards notional in contracts with non-UK third countries (46%, +3ppt) while those with UK counterparties remained unchanged (22%). Patterns within the EEA remained relatively dispersed compared to other assets, and dominated by Germany, France and the Netherlands.

Commodity derivatives: Commodity derivative notional amounts grew 65% in the reporting period, to EUR 3.3tn in 4Q22 from about EUR 2tn in 4Q20. Growth was steady, peaking at 3Q22 at EUR 3.6tn, and was across the largest instruments: swaps, futures, and options. This was fuelled by the Russian invasion of Ukraine in February 2022 increasing commodity prices in 2022, particularly natural gas, and correspondingly increasing notional amounts of new contracts. The share of ETD fell over the reporting period (39% in 4Q22, -10ppt from 4Q20), OTC grew correspondingly to 61%. OTC trading activity grew as prices rose in 2022, part of which may be due to higher margin costs at CCPs during periods of higher prices. Central clearing of OTC finished unchanged at 9% by 4Q22 (unchanged from 4Q20). Central clearing was predominantly in the UK (averaging 91% cleared in the UK).

Essential statistics

	All		Commodities		Credit		Currency		Equity		Interest rate	
Size	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
Total notional amount (EUR tn)	275	314	2.6	3.3	6.1	7.0	40	45	16	15	211	244
Proportion (% of total)	100	100	1.0	1.0	2.2	2.2	14	14	5.7	4.6	76	78
Change in year (%)	11	14	30	24	6	15	19	14	46	-8	8	16
No. of positions (mn)	28	27	3.5	3.3	0.4	0.4	0.4	0.4	8.4	7.6	12.2	11.6
Proportion (% of total)	100	100	12	12	1.2	1.5	30	28	43	43	13	15
Change in year (%)	18	-5	5	12	10	6	23	-10	39	-5	-22	9
Underlying instrument												
Instrument with most notional amount	Swap	Swap	Futures	Futures	Swap	Swap	Forward	Forward	Option	Option	Swap	Swap
Proportion (% of total)	57	63	41	40	79	85	69	72	62	63	67	75
Instrument with most positions	CFD	CFD	CFD	CFD	Swap	Swap	Forward	Forward	Option	CFD	Swap	Swap
Proportion (% of total)	26	37	36	44	88	90	56	54	47	51	65	78
Counterparty exposures												
By type												
Credit institutions	61	62	27	19	42	48	57	62	29	38	65	65
Investment firms	22	22	38	38	20	18	20	17	34	31	21	23
CCPs	6.7	6.5	2.0	3.4	15	18	0.001	0.0005	24	18	6.6	6.8
Non-Financial firms	4.2	3.8	31	37	1.9	1.6	9.2	8.8	4.8	4.8	2.8	2.3
By domicile												
Intra EEA	25	25	38	46	20	21	29	30	49	46	22	23
EEA to third country	73	74	54	51	74	76	69	68	48	53	76	76
EEA to UK	51	52	24	25	41	41	25	22	29	31	59	59
EEA to other TC	22	22	30	26	33	36	44	46	19	22	17	17
UK to other TC	0.3	0.2	1.0	1.6	3.8	1.5	0.3	0.2	0.2	0.1	0.2	0.1
Intragroup exposures												
Intragroup notional amount (EUR tn)	32	44	0.6	1.1	0.7	1.1	7.1	6.9	2.7	3.4	21	31
Proportion (% of total)	12	14	24	34	11	15	18	15	17	24	10	13
Intragroup no. of positions (mn)	3.7	3.1	0.6	0.4	0.04	0.07	1.3	0.9	1.3	1.2	0.4	0.5
Proportion (% of total)	13	11	19	11	11	18	17	12	11	10	10	13
Execution & clearing												
ETD (% of notional)	6.0	5.3	39	39	0.1	0.3	1.4	1.1	66	58	2.7	3.0
OTC (% of notional)	94	95	61	61	100	100	99	99	34	42	97	97
On-trading venue	11	11	0.002	0.0003	6.7	7.1	8.1	8.6	0.008	0.003	12	13
Off-trading venue	83	83	61	61	93	93	91	90	34	42	85	84
Clearing rate (% of OTC notional)	-	-	7.4	9.3	43	50	1.6	1.3	5.5	5.2	75	77
Concentration												
Top 5 (% of notional)												
Excluding CCPs	-	-	39	40	46	49	47	52	37	47	44	45
Including CCPs	-	-	39	40	59	65	47	52	54	61	46	47

Note: Year values as of 4Q21 and 4Q22 (10 December 2021, 16 December 2022). Derivatives that do not fall into the asset classes above are excluded as these are a very small proportion of total. OTC contracts on-trading venue are those executed on multilateral or organised trading facilities, other OTC derivatives are considered off trading venue. Top-five measure is the total notional amount of the exposures of the largest five counterparties. All data, unless otherwise noted, display the EEA30 (no UK data). There are some UK to third country exposures listed because under EMIR some UK entities will still need to report, such as UK AIFs that are managed by an EEA AIF manager.

Source: TRs, ISO, GLEIF, ESMA.

Market monitoring

The EU derivatives market

Summary

Outstanding notional amounts in the EU derivatives market grew 29% to EUR 314tn in 4Q22 from EUR 244tn in 4Q20. Intragroup notional amounts particularly grew, up 91% from 4Q20, to EUR 44tn. There was little change in the relative shares of asset classes. Interest rate derivatives (IRDs) were 78% of notional amount in 4Q22 (+1ppt from 4Q20), currency 14% (+1ppt), while equity, credit and commodities were 5%, 2% and 1% respectively. There was a shift away from non-banks to banks (62%, +7ppt), with credit institutions and investment firms continuing to hold the most notional amount, with a combined share over 80%, while CCPs account for 7% and non-financials 4%. Largely as the result of continued trading in UK venues that are no longer recognised as equivalent, the share of ETD and OTC exchanged on trading venues both fell. ETD fell to 5% by 4Q22 (-3ppt from 4Q20), while on-trading-venue OTC fell to 11% (-5ppt from 4Q20). Nonetheless, the share of outstanding notional amounts for OTC IRDs and credit that were cleared continued to grow, from 71% in 4Q20 to 77% in 4Q22 for IRDs, and from 41% to 45% for credit. The UK remains central to derivative trading in Europe, with 52% of outstanding notional amounts in EEA-to-UK contracts (+3ppt from 4Q20). EEA exposures to other third countries also grew (22%, +3ppt).

Growth across asset classes¹

At the end of 2022, the total notional amount outstanding in the EEA derivatives market stood at EUR 314tn, held in 27mn open derivative positions. The total notional amount increased in the previous two years, by 14% in 2021 and by 11% in 2020.²

The increase in **market size** over the two-year period was driven by increases in outstanding notional amounts in all asset classes (MR-DR.1). The largest proportional increase in notional amount was in credit derivatives, which rose by 30% in 2021 and 15% in 2022. In absolute terms, however, growth was due to interest rate derivatives and to currency derivatives, the two

asset classes with the largest outstanding notional amounts.

In 4Q22 exposures between counterparties in the same group, **intragroup** positions, accounted for EUR 44tn of the total notional amount, held in 3mn outstanding positions. This was an increase of 35% from the EUR 32tn in 4Q21, which in turn was an increase of 39% from 4Q20. The growth in intragroup notional amounts in percentage terms was more than twice that of the overall growth. The intragroup increase was also associated with growth in interest rate and credit derivative intragroup notional amounts, which given the clearing obligation applies to products in these instrument classes, may indicate changing clearing behaviour by large cross-

¹ Statistics presented in this report are based on the reporting requirements specified in Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012, (the European Markets and Infrastructure Regulation, EMIR) and the regulatory technical standards adopted for its implementation.

Unless otherwise stated, statistics presented here are based on trade-state data, i.e. all outstanding derivatives at the end of the reference day, based on the state of each derivative along the derivatives life cycle. Statistics are presented as the number of derivatives outstanding, or the notional amount value of derivatives outstanding, with notional amount outstanding defined as the nominal or notional value of all derivatives reported and not yet terminated at the reporting date. The total notional amount is the sum of the reported outstanding notional amounts. Numbers of derivatives refer to the number of individual derivative reports, as reported under EMIR. A

derivative report can be of positions that have arisen from the combining, netting or compressing individual transactions, or of individual transactions themselves, depending on the actions of the reporting counterparty. In this report we use 'positions' generically when referring to these derivative reports.

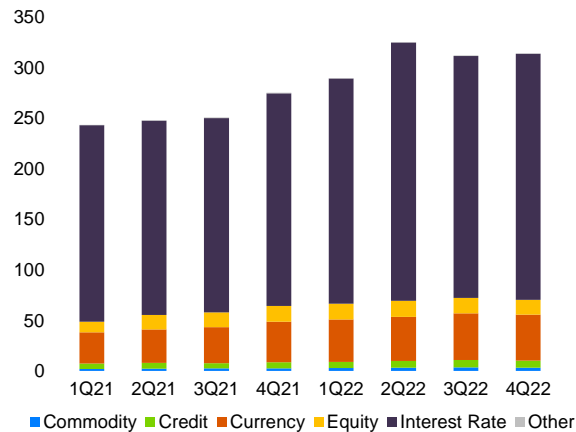
The reporting period for this report are the 2021 and 2022 calendar years. The statistics presented are based on reports from four reference dates per year spaced at approximately quarterly intervals subject to the availability of data from TRs, while avoiding days near to the end of quarters to avoid distortions from end-of-quarter activity (e.g. from contract expiry or rollover). The eight reference dates are 19 March 2021, 11 June 2021, 10 September 2021, 10 December 2021, 11 March 2022, 10 June 2022, 16 September 2022, and 16 December 2022.

² See the [Annual Statistical Report EU Derivatives Markets 2021](#).

border institutions, who manage clearing at group level to optimise access to liquidity and to reduce costs of clearing.

MR-DR.1

Total notional amount trends by asset class Growth across asset classes



Note: Total notional amount outstanding by asset class in EUR trillions.
Sources: TRs, ESMA.

The **composition** of the total outstanding notional amount by asset class remained broadly stable in 2022 and 2021 (IRDs: 78%, currency: 15%, equity: 5%, credit: 2% and commodities: 1% in 4Q22). The relative proportions of open positions also remained essentially unchanged with equities (43% in 4Q22) and currencies (28% in 4Q22) continuing to account for the bulk of positions in both 2022 and 2021 (MR-DR-S.3-6).

At **product** level, interest rate swaps, currency swaps and interest rate FRAs continued to account for about 80% of the outstanding total derivative market notional amounts. While in terms of number of positions, equity CFDs and currency forwards remained the two most prevalent in both 2021 and 2022 (MR-DR-S.7-10).

The distribution of notional amount by **currency of denomination** was also similar to previous years, with most notional amounts denominated in EUR (62% by end 2022) followed by USD (25%) (MR-DR-S.13-S.14). Only commodities had a larger share of USD (49% vs 46% for EUR), though here the EUR share increased in 2022 from 32% in 2021, due in part to the very rapid increase in European natural gas prices in March and August 2022 following the Russian invasion of Ukraine, which disproportionately increased the notional amounts of natural gas contracts denominated in EUR.

The distribution of notional amount by the **maturity** for derivatives in the reporting period remained similar to previous years. Currency, commodity, and equity derivatives have the shortest maturities, each of these having at least half of their outstanding notional amount in contracts with a maturity of a year or less at execution. In contrast, credit and interest rate derivatives have a much greater prevalence of contracts with maturities of several years or more (MR-DR-S.15-16).

Banks and investment firms continue to dominate

Looking at the derivatives holdings by different **types of counterparties**, credit institutions hold by far the largest amount of overall notional (62% in 4Q22, +7ppt since 4Q20) with over 80% of their notional amount in interest rate derivatives and just under 15% in currency derivatives in 4Q22.

In terms of non-banks, their overall share of notional amount fell over the reporting period (48%, -7ppt) with a shift away from non-banks in all assets except commodities, and away from alternative investment funds and non-financial firms to banks in particular.

Investment firms accounted for 22% of the total outstanding notional amount in 4Q22. The split of their exposures was similar to credit institutions, with just under 80% in interest rate derivatives and 18% in currency derivatives. CCPs, which account for 7% of total notional amount, also have most exposures in interest rate derivatives (75% in 4Q22), equity (13%) and credit derivatives (5%).

Non-financial firm exposures, which account for 4% of total notional amounts had half of their exposures in interest rate derivatives, a third in currency derivatives and 10% in commodities in 4Q22. For undertakings for collective investment in transferable securities (UCITS), which account for 2% of total notional, 43% of exposures were in currency derivatives, 35% in interest rate, 12% in equity and 10% in credit. Alternative investment funds (AIFs), also 2% of total notional, had almost two thirds of their notional in interest rate derivatives, a fifth in currency, and 8% and 7% in credit and equity respectively in 4Q22. Pension funds, about 1% of total notional, had about 40% in interest rate derivatives and just under 60% in currency derivatives. Assurance and insurance accounted for just over 0.5% of total notional amount, both with about three quarters of exposures in interest rate derivatives.

The distribution of exposures across counterparty types and the distributions held by counterparty type did not show major changes during the reporting period (MR-DR-S.19-20).³

Change in status of UK trading venues increases OTC

In terms of **execution method**, ETD contracts – as defined under EMIR – are those executed on an EU regulated market⁴ or a third-country venue assessed to be equivalent to an EU regulated market,⁵ with the rest classified as OTC.⁶

MR-DR.2

Post Brexit developments in cross-border regulation UK trading venue recognition ends from 2021

With the exit of the UK from the European Union on January 31 2020 and the subsequent end of the transition period at the end of 2020, the United Kingdom has been treated as a third country from January 1 2021 onwards.

In terms of derivative trading there were several regulatory developments leading to and during the reporting period that are relevant for interpreting cross-border derivative activity between the UK and the EU following Brexit. This box briefly summarises these, in particular those related to the EMIR clearing obligation (CO) and the MiFIR derivative trading obligation (DTO).

The CO requires that in-scope interest-rate and credit OTC derivative contracts made by certain counterparties be cleared in EU-recognised CCPs or in third-country CCPs recognised to provide the relevant clearing services.⁷

In the absence of an EU equivalence decision, UK CCPs providing clearing services to EEA counterparties would have ceased to have been recognised at the end of 2020. However, to avoid the short-term disruption that could have arisen from this, in September 2020 the Commission issued a decision temporarily recognising the UK regulatory framework as equivalent. With this decision in place, ESMA then issued a temporary recognition of UK CCPs running until 30 June 2022.⁸ In early 2022 this decision was extended until 30 June 2025,⁹ following ESMA's assessment of their systemic importance.¹⁰

The temporary intragroup exemption to the CO was similarly extended, first in February 2021 to 30 June 2022 following ESA proposals in November 2020,¹¹ and again from 30 June 2022 to 30 June 2025.¹² As a result of these changes, EEA counterparties have been able to continue clearing contracts with the recognised UK CCPs subject to the CO during the reporting period.

The DTO requires that certain contracts, namely specific interest-rate and credit derivatives subject to the CO, be traded on EU-recognised trading venues (regulated markets, MTFs and OTFs) or third-country trading venues meeting the equivalence requirements.¹³ The DTO does not apply to intragroup transactions.¹⁴

Like the CO for CCPs, UK trading venues could no longer provide services in the EEA after the end of the transition period without an equivalence decision. However, unlike the main UK CCPs, an equivalence decision for UK trading venues was not assessed as necessary for protecting financial stability.¹⁵ Thus, on 1 January 2021 UK trading venues ceased to be able to provide services in the EEA for

³ As EMIR data does not identify the type of clients whose positions are invested by credit institutions or investment firms, total exposures by other counterparty types are likely to be underestimated. Distributions of exposures will also be somewhat biased due to some counterparty exposures being included under those of credit institutions and investment firms rather than their own counterparty type.

⁴ Definition, Article 4(1)(21), Markets in Financial Instruments Directive (MiFID) II.

⁵ The list of third-country markets that can be considered equivalent to regulated markets for the purposes of the definition of OTC derivatives: https://www.esma.europa.eu/sites/default/files/library/equivalent_tcmarkets_under_emir.pdf. As 2020 was during the transition period, contracts executed on UK regulated markets are treated as ETD in this report.

⁶ So, derivatives are counted as OTC where the execution venue is reported with XXXX, XOFF or with a market identifier code (MIC) that is not for an EU regulated market or third-country equivalent.

⁷ A CCP established in a third country (TC-CCP) may only provide clearing services to clearing members and trading venues established in the EU, if that TC-CCP is recognised by ESMA. As part of the recognition process, ESMA is also required to tier each TC-CCP as Tier 1 or Tier 2. This recognition is reviewed when that CCP intends to extend or reduce the range of its activities and services in the Union and in any case at least every five years. Recognition is dependent on the European Commission adopting an equivalence decision for the third-country's legal, supervisory and enforcement framework in relation to CCPs, and ESMA concluding cooperation arrangements or Memoranda of Understanding (MoU) with the relevant authorities to support supervisory cooperation and information exchange. ESMA also monitors the regulatory and

supervisory developments in third-country jurisdictions for which the European Commission has adopted equivalence decisions. See the [ESMA website](#) for further details.

⁸ See [Commission Implementing Decision \(EU\) 2020/1308](#), 21 September 2020 and [ESMA to recognise three UK CCPs from 1 January 2021](#), ESMA Press Release, 28 September 2020.

⁹ See [Commission Implementing Decision \(EU\) 2022/174](#), 8 February 2022 and [ESMA extends UK CCPs' recognition decisions](#), ESMA Press Release, 25 March 2022.

¹⁰ [ESMA concludes Tier 2 CCP assessment under Article 25\(2c\) of EMIR](#), ESMA Public Statement, 17 December 2021.

¹¹ [ESAs propose to adapt the EMIR implementation timelines for intragroup transactions, equity options and novations to EU counterparties](#), ESMA Press Release, 23 November 2020.

¹² [ESAs propose extending temporary exemptions regime for intragroup contracts during EMIR review](#), ESMA Press Release, 13 June 2022.

¹³ In accordance with Article 28(1)(d) of MiFIR, counterparties may also fulfil the DTO by trading on a trading venue established in a third-country in respect of which the European Commission has adopted an equivalence decision and provided that the third country provides for an effective equivalent system for the recognition of trading venues.

¹⁴ [Article 28 MiFIR](#), ESMA Interactive Handbook, accessed 18 August 2023.

¹⁵ [Brexit: Impact of the end of the transition period on 31 December 2020 on the trading obligation for derivatives \(Article 28 of MiFIR\)](#), ESMA Public Statement, 25 November 2020.

the DTO. Moreover, further changes came into effect in May 2022 to the products subject to the DTO as a consequence of the ongoing global transition to risk-free rate benchmarks. As a result, classes of interest rate derivatives denominated in GBP and USD were removed from scope.¹⁶ Thus, for the DTO there were two main developments during the reporting period, the end of UK trading venues providing services in the EEA at the start of 2021 and the removal of GBP and USD interest rate derivatives from DTO scope in May 2022.

However, in addition to regulated markets there are also two other forms of **trading venue**: multilateral trading facilities (MTFs) and organised trading facilities (OTFs). These both offer high levels of market transparency, standardisation and liquidity, similar to regulated markets. So, OTC derivatives on trading venues i.e. on MTFs or OTFs are arguably more like ETDs than conventional OTC contracts executed bilaterally.¹⁷ For this reason, we treat them separately in the statistics below.

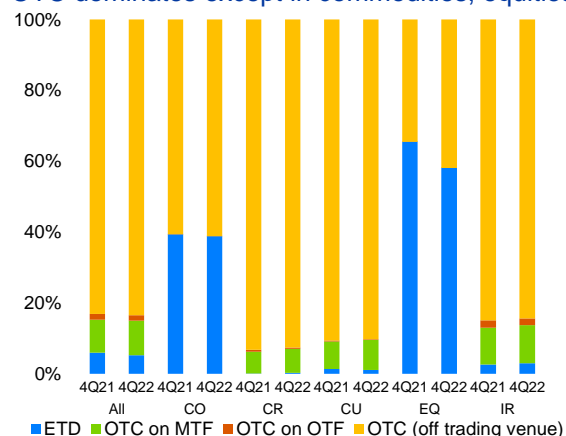
Adding complexity in this reporting period is that following the UK exit from the EU, the recognition of UK trading venues lapsed in 2021 (see MR-DR.2). Thus, in what follows, categorisation of a position executed on UK venues also depends on when that position was executed. Positions executed before 2021 on a UK venue assessed to be equivalent to a regulated market are ETD, while those executed prior to 2021 on a UK venue that was equivalent to an MTF or OTF are on-venue OTC. In contrast, positions executed on UK venues in 2021 or later are classified as off-trading-venue OTC.

Turning to the statistics, the proportion of notional amount in outstanding **OTC** contracts rose over the reporting period, from 92% in 4Q20 to 94% in 4Q21 and to 95% in 4Q22 (MR-DR.3). **ETD** correspondingly fell to 6% in 4Q21 and then to 5% by 4Q22 (-3ppt since 4Q20). On-venue OTC also fell sharply to 11% in 4Q22 (-5ppt since 4Q20).¹⁸ A significant share of the decrease (5ppt) was associated with positions executed on UK trading venues that were no longer being recognised as such after Brexit (1ppt of the fall in

ETD and 4ppt of the fall in OTC on-trading venue). This is in line with expectations and reflects a change of categorisation rather than a substantive change in the nature of trading.

MR-DR.3

ETD vs OTC proportion of total notional amount
OTC dominates except in commodities, equities



Note: Outstanding notional amount by execution venue in percent.
Sources: TRs, ESMA.

Growth in central clearing continues in mandated assets

Following the great financial crisis, the EU took steps, through EMIR, to strengthen financial stability in derivative markets. A key part of this was the introduction of obligations for the centrally clearing certain OTC derivatives contracts through central counterparties (CCPs)¹⁹ Achieving a high degree of central clearing remains a core policy objective, and the ratio of central clearing is the most important indicator for the success of this policy.

There was continued growth in **central clearing**; the share of outstanding notional amount of OTC derivatives that was centrally cleared reached 77% in interest rate derivatives in 4Q22 (+6ppt

¹⁶ [Public Register for the Trading Obligation for derivatives under MiFIR](#), ESMA, 15 September 2022.

¹⁷ In what follows, we described OTC derivatives traded on MTFs or OTFs as 'on trading venue'; other OTC contracts traded bilaterally are described as 'off trading venue'. This terminology follows the EMIR definition of OTC, which may not be consistent with MiFID II usage. In MiFID II contexts, OTC can exclude contracts traded on trading venues. This is the case, for example, in the ESMA Questions and Answers on MiFID II and MiFIR investor protection and intermediaries topics (see p.19, fn.10), available at: <https://www.esma.europa.eu/sites/default/files/library/es>

[ma35-43-349 mifid ii gas on investor protection topics.pdf](#)

¹⁸ Exchange-traded derivatives (ETDs) are standardised contracts with transparent characteristics and prices, whose use encourages market participation, increases liquidity and helps to improve market efficiency. In contrast, OTC derivatives are executed bilaterally with features that can be tailored to the two counterparties and thus are more opaque to the market. For that reason, the split between OTC and ETDs is an important indicator of transparency, standardisation and liquidity in derivatives markets..

¹⁹ See: <https://www.esma.europa.eu/post-trading/clearing-obligation-and-risk-mitigation-techniques-under-emir>

from 4Q20) and 50% for credit derivatives (+4ppt). This continues the trend seen in previous reports, reflecting how uncleared derivatives have continued to be replaced by newer contracts that are centrally cleared for products subject to the clearing obligation.²⁰ Central clearing of OTC derivatives in other asset classes remained lower (currencies: 1% (as in 4Q20), commodities: 9% (+8ppt) and equities: 5% (+3ppt)).

Exposures mostly in a few very connected counterparties

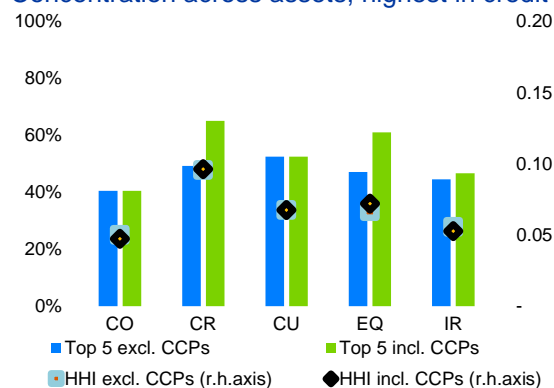
Concentration and interconnectedness remain important features for assessing financial stability risks in derivative markets. Greater concentration, where few counterparties account for a large share of market activity, increases financial stability risks associated with a failure or disruption at one or more of these entities. While greater interconnectedness increases the risk of contagion, that disruption will spread widely and affect large numbers of counterparties.

Concentration remains high across asset classes, as in previous years. The share of outstanding notional amount held by the top five largest counterparties (excluding CCPs) was close to half in all assets in 4Q22 (commodities: 40% (-4ppt from 4Q20), credit 49%: (+4ppt), currencies: 52% (+11ppt), equities: 47% (-1ppt) and interest rates: 45% (+4ppt). When CCPs are included the share for equity, credit and interest rises. For equities this reflects the clearing of ETD derivatives, for credit and interest rates it relates to the clearing of OTC derivatives as mandated by the clearing obligation. A second metric of concentration, the HHI (the normalised sum of the squares of the distribution of notional amounts) also shows similar patterns as the top 5 metric (MR-DR.4).

These metrics show that across all assets, the bulk of outstanding of positions are held by a few, very significant counterparties, with many counterparties having relatively small positions.

MR-DR.4

Concentration: HHI and top-five counterparties Concentration across assets, highest in credit

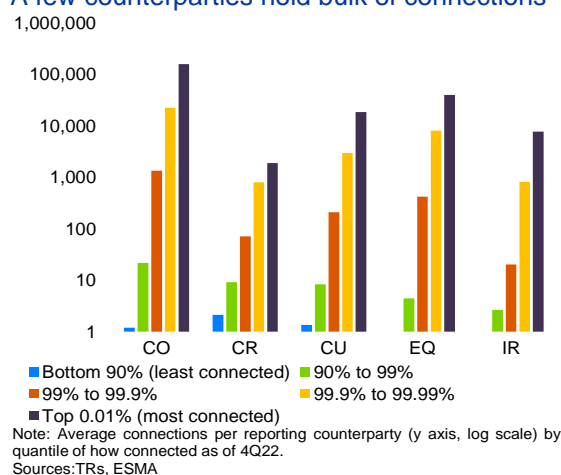


Note: Herfindahl-Hirschman Index (HHI) and notional amount share in % of top-five counterparties calculated on aggregated notional positions of counterparties. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. HHI normalised between 0 and 1, as of 4Q22. Sources: TRs, ESMA.

The patterns of **interconnectedness** in derivative markets aligns with the high concentration. As in previous years, the top 0.01% most connected²¹ reporting counterparties in each asset class have extremely large numbers of connections in all asset classes (MR-DR.5), for example, in commodities the most connected counterparty was a party in 37% of connections.²²

MR-DR.5

Average connections by quantile A few counterparties hold bulk of connections



Looking at the different asset classes, we see that connections are – like notional – concentrated in

²⁰ See Boxes MR-DR.2 above and MR-DR.21 in the article [CDS markets: a 2023 update](#) for further details on the clearing obligation.

²¹ A connection is counted when a reporting counterparty reports an outstanding position with another counterparty.

²² Figures here include non-reporting counterparties so can be exceed those presented earlier, which only included reporting counterparties.

relatively few counterparties. Commodities and equities are most extreme, followed by currencies, interest rate and credit derivatives. And while there is some variation year-by-year, the picture overall, like concentration, remains that of a concentrated market where a few market participants are central to the market, holding the most notional amount, they are highly connected to one-another through numerous positions and also to other very numerous peripheral players, who often have relatively few positions and connections.

UK remains central to European derivative trading

With Brexit, the UK regime for derivative markets started to diverge from that of the EU, increasing risks related to diverging regulatory regimes. The potential for such risks increases the greater the extent to EU derivative markets take place in UK or other third-country jurisdictions with different regulatory regimes. Monitoring the geography of exposures is thus important, particularly the UK, given its historically important role in both EU and global derivative markets.

In terms of the geographical network of derivative market activity, **intra-EEA exposures** in 2021 and 2022 remained similar to 2020 in all asset

classes. France (FR) and Germany (DE) are generally the member states with the largest exposures, with the Netherlands (NL) also relatively significant in equities and currencies.

Exposures between EEA counterparties and those domiciled in **third countries**²³ show that the United Kingdom continues to play a central role in EU derivative markets, with 52% of notional held in EEA-to-UK contracts (+3ppt from 4Q20). EEA exposures to other third countries also grew (to 22%, +3ppt). This is mainly driven by interest rate derivatives (59% of contracts are in EEA-to-UK), though the proportions are also sizeable in other asset classes (commodities: 25%, credit: 41%, currencies: 22%, equities: 31%).

The tables below show that over the whole market, exposures involving third countries accounted for almost three quarters of the total notional outstanding in both 4Q21 and 4Q22 (MR.DR.6-7). Exposures to the UK were the largest, at just over half of the notional amount, up 4ppt at the end of 2022 from the end of 2020. Exposures within the EEA accounted for a quarter, 25% (up 1ppt), while those to other (non-UK) third countries accounted for just over a fifth (22%, +2ppt). The EEA-to-third country share is significant in all asset classes, ranging from just over a half in commodities to over three quarters for interest-rate derivatives.

MR-DR.6

4Q21 and 4Q22 cross-border exposures notional amount as a percentage of total outstanding notional amount
Exposures with third-countries account for almost three quarters of exposures in all asset classes

	All		Commodities		Credit		Currency		Equity		Interest rate	
	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22
Intra EEA	25	25	38	46	20	21	29	30	49	46	22	23
EEA to third country	73	74	54	51	74	76	69	68	48	53	76	76
EEA to UK	51	52	24	25	41	41	25	22	29	31	59	59
EEA to other TC	22	22	30	26	33	36	44	46	19	22	17	17
UK to third country	0	0	1	2	4	2	0	0	0	0	0	0
Unclear	2	1	8	2	3	1	2	1	3	1	1	1

Note: Derivatives that do not fall into the asset classes above are excluded as these are a very small proportion of the total. There are some UK to third country exposures listed because under EMIR some UK entities will still need to report, such as UK AIFs that are managed by an EEA AIF manager.

Source: TRs, GLEIF, ESMA

²³ As EMIR data includes only data reported by EEA counterparties, the global charts presented do not show exposures between third countries.

MR-DR.7

Yearly changes in geographical exposures in percentage points

Shift away from intra-EEA30 exposures to third-country in 2021 driven by interest rate derivatives

Change in proportion over year	All		Commodities		Credit		Currency		Equity		Interest rate	
	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22	4Q21	4Q22
Intra EEA	1	0	3	8	-2	2	1	2	-1	-3	1	0
EEA to third country	5	1	-6	-3	8	2	2	-1	3	4	6	1
EEA to UK	3	1	-5	1	5	-1	0	-3	7	2	4	1
EEA to other TC	2	0	-1	-4	4	3	2	2	-4	3	2	0
UK to third country	-3	0	-1	1	-2	-2	-2	0	0	0	-3	0
Unclear	-4	-1	0	-6	-1	-2	2	0	3	-1	1	-1

Note: Derivatives that do not fall into the asset classes above are excluded as these are a very small proportion of the total. There are some UK to third country exposures listed because under EMIR some UK entities will still need to report, such as UK AIFs that are managed by an EEA AIF manager.

Source: TRs, GLEIF, ESMA

Interest rate derivatives

Summary

The IRD market grew substantially, by 26% in outstanding notional amounts, to EUR 244tn in 4Q22, up EUR 51tn since 4Q20. A third of the growth was in intragroup positions, whose notional amounts grew 121% to EUR 31tn (4Q22) from 14tn (4Q20), mainly in interest rate swaps held with UK and other third-country counterparties subject to the clearing obligation. Shares held by credit institutions (65%, +7ppt from 4Q20) and investment firms grew (23%, +4ppt) while shares for AIFs (1%, -8ppt) and non-financials (2%, -2ppt) fell, with intragroup growth for both credit institutions and investment firms. OTC positions rose significantly, to 97% in 4Q22 from 93% in 4Q20. Both ETD (3%, -4ppt from 4Q20) and in OTC executed on an MTF or OTF fell (13%, -4ppt). A sizeable part of this shift was due to UK venues ceasing to be recognised after 2020, affecting the status of trades subsequently executed on these venues. Central clearing of outstanding IRDs continued since 4Q20, from 71% to 77%, while quarterly clearing rates for the IRDs subject to the clearing obligation, IRDs in G4 currencies and IRDs in NOK, SEK and PLN were both near 100%.

Strong growth, particularly in intragroup positions

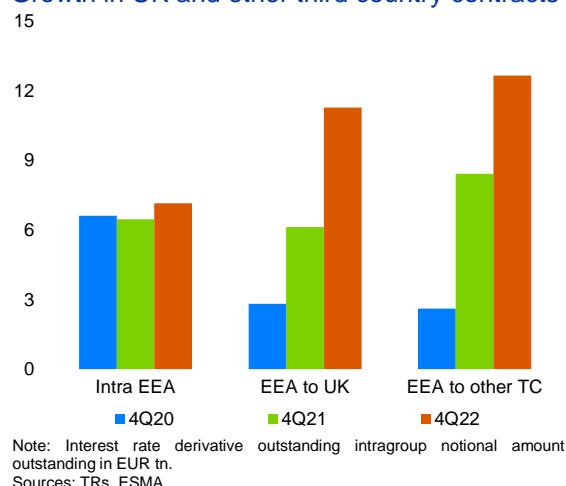
Interest rate derivatives (IRDs) are the largest derivative asset class, consistently accounting for about three quarters of the outstanding notional amount for all derivatives. Over 2021 and 2022, the IRD market **grew substantially in size** in notional amounts outstanding, by 26%, to EUR 244tn in 4Q22, up EUR 51tn since 4Q20. It peaked in 2Q22 at EUR 256tn. The total number of outstanding positions in 4Q22 was 4mn, similar to 4Q20.

Growth was particularly striking for **intragroup** positions, where notional amounts grew 121%, to EUR 31tn (4Q22) from 14tn (4Q20). As shown in the chart below, intragroup growth in 2021 and 2022 occurred in contracts held with UK and other third-country counterparties (MR-DR.8).

At **product** level, the growth in both intragroup and other contracts was driven by interest rate swaps, whose notional amount was up EUR 53tn. Growth in intragroup swap notional amounts was particularly significant, up EUR 18tn. Following this growth, by 4Q22 swaps accounted for 75% of all IRD outstanding notional amounts (+8ppt from 4Q20). Forward rate agreements accounted for 13% (+3ppt), swaptions 5% (unchanged), options 4% (-1ppt), and futures 2% (-2ppt) by 4Q22.

MR-DR.8

Intragroup notional amount split by geography
Growth in UK and other third country contracts



Compared to the strong growth in swaps, and in intragroup swaps in particular, other metrics were generally more stable through the reporting period. Distributions of **maturities**, for example, both remaining and at execution, remained generally stable, with about two fifths of IRD contracts having maturities of over 5 years at execution, two fifths between and one and five years, and the remaining fifth less than one year (MR-DR-S.52-53).

In the distribution of **currency of denomination** for notional amounts, there was a shift to EUR contracts, away from USD and GBP. By 4Q22, 64% (+8ppt) of notional amounts were denominated in EUR, 21% in USD (-4ppt), 3% in GBP (-4ppt), with amounts in other currencies relatively small (MR-DR-S.13-14).

There were also some discernible trends in the notional amounts held by **counterparty** type. The shares held by credit institutions and investment firms both showed clear growth. Credit institutions finished 2022 at 65% (+7ppt from 4Q20), with investment firms at 23% (+4ppt). While there was a shift away from AIFs (1%, -8ppt) and non-financials (2%, -2ppt). The growth in both credit institutions and investment firms was also largely driven by swaps, with intragroup swaps growing strongly for both counterparty types.

Looking at **counterparty exposures to one another** among EU-based counterparties, shows the main exposures in notional amounts to be between credit institutions, between credit institutions and investment firms, and between credit institutions and CCPs. Outstanding positions in these categories accounted for well over half of total outstanding notional amounts between EU counterparties in both 4Q21 and 4Q22 (MR-DR-S.67-68).

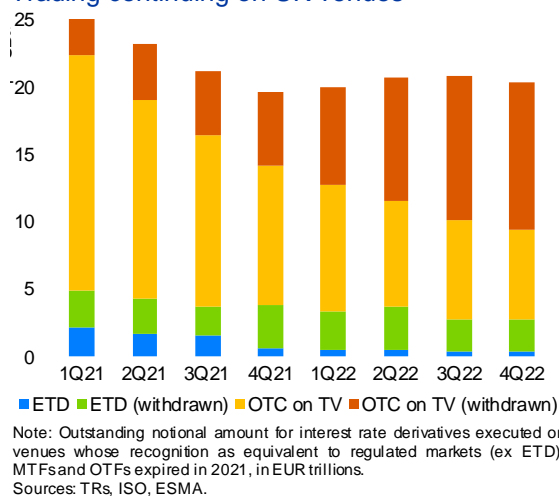
Execution on trading venue falls linked to UK change

In terms of venues of execution, the share of outstanding notional in **OTC** positions rose significantly, to 97% in 4Q22 from 93% in 4Q20. There were falls in both **ETD** (3%, -4ppt from 4Q20) and in OTC executed on a trading venue, an MTF or OTF, (13%, -4ppt). Off-venue OTC rose correspondingly (84%, +7ppt). Much of these changes were due to UK venues ceasing to be recognised after 2020, affecting the status of trades subsequently executed on these venues.

As shown in the chart below (MR-DR.9), there is steadily increasing OTC associated with UK trading venues that were previously assessed as equivalent. The gradual increase likely reflects the fact that contracts that were executed before 2021 remain OTC on-venue, thus OTC off-venue grows as contracts that were executed on UK venues prior to 2021 are gradually replaced by contracts executed after the end of recognition.

MR-DR.9

OTC on previously equivalent venues
Trading continuing on UK venues



The chart also shows a fall in notional outstanding executed on UK venues in 2021, which was driven largely by falls in interest rate swaps executed on venues there. In contrast, notional amounts outstanding for swaps executed on venues located in the EEA or US rose over the reporting period. This drop in notional amounts is consistent with media reports of significant migration of interest rate swaps from UK venues to US SEFs (Swap Execution Facilities) early in 2021, after Brexit came into force and UK venues ceased to be recognised for the purposes of the DTO.²⁴

High central clearing rates, though with intragroup growth

Central clearing of outstanding IRDs continued to grow since 4Q20, from 71% to 77%. Quarterly clearing rates for the IRDs subject to the **clearing obligation** IRDs in G4 currencies and IRDs in NOK, SEK and PLN were both near to 100%. For the IRDs in G4 currencies 88% on average was cleared in the UK, while for IRDs in NOK, SEK, PLN the figure is 96% (MR-DR-S.57-60).

The clearing metrics above do not include intragroup transactions, which are subject to a continuing exemption from the clearing obligation. Interestingly, the chart above shows a significant increase in the outstanding notional amounts of IRDs in G4 currencies in intragroup transactions to both the UK and third countries.

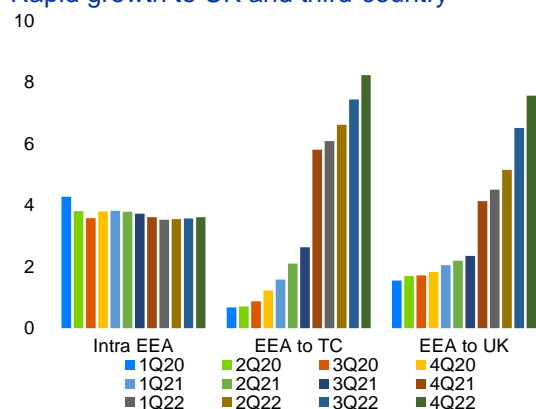
²⁴ See, for example, [‘New York emerges winner as Brexit pushes swaps trading from London’](#), H. Jones (2021).

The increase to the third countries is mainly to the US and driven by one large credit institution, where the UK increases are spread among several large credit institutions. The intragroup increase here also accounts to a large extent for the increase in intragroup notional in interest rate swaps and interest rate derivatives more generally (MR-DR-10).

The growth in intragroup may also represent the microstructure of clearing, where derivatives are cleared by one entity in a group with, depending on the costs and the location of the CCP, the entity doing the clearing either being in the EU, the UK or a third country. The investment banks which are clearing, either voluntarily or mandated, also have incentives to use the cheapest and/or most liquid pool. Thus, for such firms, it makes sense to use intragroup transactions with the entity responsible for clearing to manage its clearing needs for the group with the CCP that the entity clears with.

MR-DR.10

IRD in G4 uncleared intragroup Rapid growth to UK and third-country



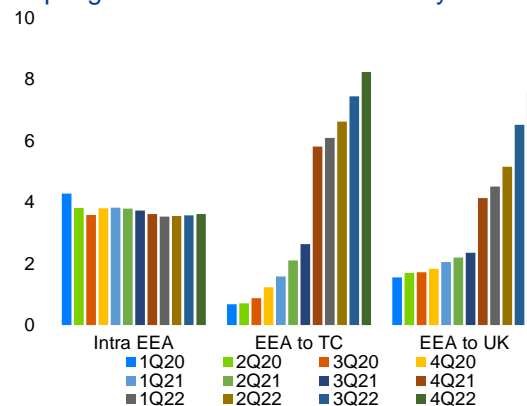
Note: Intragroup uncleared outstanding notional amount for interest rate derivatives in G4 currencies subject to clearing obligation (EUR, USD, GBP, JPY) in EUR tn, by zone of both counterparties.
Sources: TRs, ESMA.

In addition, the intragroup exemption to the **derivative trading obligation** is likely to have enabled actions by global counterparties to continue to comply with the DTO following the expiry of recognition of UK venues with the coming into force of Brexit. For example, a firm which before 2021 could have complied with the DTO by executing at a recognised UK venue. After 2021, with this no longer being an option, it could choose to open an intragroup transaction with a UK subsidiary which in turn could open the position with the original UK venue. In this way, the expiry of the recognition of the UK venues for the purposes of the DTO, alongside the

intragroup exemption, are likely to have contributed to increases in intragroup positions.

MR-DR.11

IRD in G4 uncleared intragroup Rapid growth to UK and third-country



Note: Intragroup uncleared outstanding notional amount for interest rate derivatives in G4 currencies subject to clearing obligation (EUR, USD, GBP, JPY) in EUR tn, by zone of both counterparties.
Sources: TRs, ESMA.

For IRDs in NOK, SEK and PLN, a similar trend is seen for intragroup transactions to third countries rather than the UK, though absolute amounts are much smaller, reflecting of the smaller size of these instruments. It cannot be assessed from EMIR data whether the intragroup entities based in the UK and third countries have corresponding uncleared positions with other non-EEA counterparties as these fall out of the scope of EMIR reporting.

Increasingly concentrated and interconnected market

Concentration showed an upward trend during the reporting period. The share of notional amount held by the top five largest counterparties, excluding CCPs, grew to 45% (+3 ppt from 4Q20), as did the HHI index (excl. CCPs) which grew by 15% to 0.056. There was also a spike in both metrics in 2Q22. (MR-DR-S.61).

In addition, **interconnectedness** also increased slightly. Degree connectedness, a metric based on the number of counterparties every participant has, grew by 1%. While eigenvector centralization, a measure of the tendency of participants to be exposed to other central participants through how well connected participants tend to be, and how many links these connections in turn have, grew by 5% (MR-DR-S.65-66).

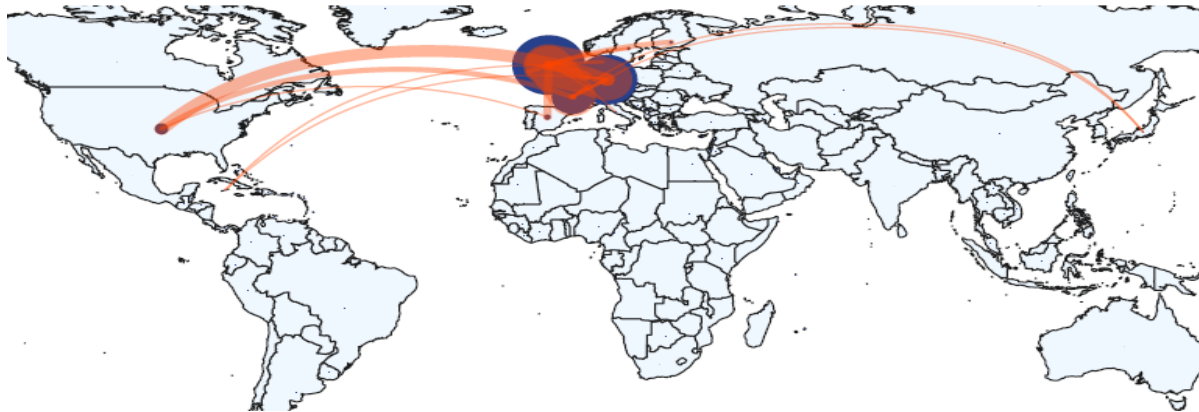
In terms of the **geography of exposures**, 77% of the outstanding notional amount was in contracts

between EEA counterparties and those in third countries, 59% (+4ppt since 4Q20) in EEA-to-UK contracts and 17% (+2ppt) in EEA-to-other-third-countries (MR-DR.12). Of the remaining outstanding notional amount for interest rate derivatives held in contracts between EEA

counterparties (22%, +1ppt), the bulk is among counterparties within and between Germany, France and the Netherlands (MR-DR-S.69-70). The geographical patterns of exposures remained similar in 2021 and 2022.

MR-DR.12

Global network involving an EEA counterparty 4Q22



Note: Undirected network of total notional amount outstanding for interest rate derivatives as of 4Q22. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.
Sources: TRs, GLEIF, ESMA.

Credit derivatives

Summary

Credit derivatives grew significantly, to EUR 7tn in notional amounts outstanding, from EUR 5.7tn in 4Q20. Growth was throughout the reporting period and driven by credit default swaps (CDS) which remain by far the dominant instrument. Growth in intragroup positions was dramatic, quadrupling to EUR 1.1tn (4Q22), accounting for about half of the notional growth overall and almost entirely in swaps, i.e. CDS, and mainly in contracts held with UK (up EUR 0.5tn) and other third-country counterparties (up EUR 0.3tn). The OTC share rose sharply to over 99.7% in 4Q22 from 95% in 4Q20, with falls in both ETD (0.3%, -5ppt from 4Q20) and in on-venue OTC (7%, -2ppt). Again, much of this was related to the change in status of UK venues. Central clearing of outstanding credit derivatives grew from 41% in 4Q20 to 50% in 4Q22 and quarterly clearing rates for the CDS on European indices subject to the clearing obligation averaged around 85%, with clearing predominantly at UK CCPs.

Very strong growth, especially in intragroup

Credit derivatives, relatively small in outstanding notional amount terms at about 2% of total derivative notional amount, **grew significantly** in both 2021 (up 5% from 4Q20 to 4Q21) and 2022 (up 12% from 4Q21). By 4Q22, total notional amount outstanding was EUR 7tn, up from EUR 5.7tn in 4Q20. The total number of outstanding positions in 4Q22 also grew, to 0.39mn from 0.35mn in 4Q20.

Growth was pretty consistent throughout the reporting period and **driven by credit default swaps** (CDS) which remain by far the dominant instrument (Charts MR-DR-S.73-74), accounting for 85% outstanding of notional and 90% of outstanding positions.

Growth in **intragroup** positions was even more dramatic for credit derivatives than for interest rate derivatives. Intragroup notional amounts quadrupled to EUR 1.1tn (4Q22) from EUR 0.2tn (4Q20), accounting about half of the growth in overall credit notional amount. As with interest rate derivatives, the intragroup growth was almost entirely in swaps, i.e. CDS, and in contracts held with UK (up EUR 0.5tn) and other third-country counterparties (up EUR 0.3tn), as shown in the chart above (MR-DR.13). The potential drivers for the growth in intragroup are likely to be similar to those for interest rate derivatives, for example, the expiry of the recognition of the DTO for UK venues is likely to have contributed to growth in intragroup positions used to facilitate indirect transactions to previously recognised UK venues through UK-based subsidiaries.

Distributions of **maturities**, both remaining and at execution, showed stable trends, with about one fifth of contracts having maturities of less than one year at execution, one fifth having maturities of 1-to-5 years and the remaining 15% or so having maturities over five years (MR-DR-S.77).

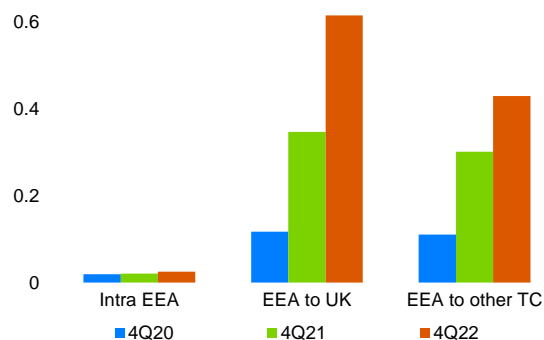
In terms of **currency of denomination**, the split by notional amounts outstanding was about 60% in EUR to 40% in USD by notional amount in 4Q21 and 4Q22, similar to 4Q20 (MR-DR-S.13-14).

In the split by **counterparty type**, the share held by credit institutions grew significantly during the reporting period, to 48% in 4Q22 from 36% in 4Q20, the share held by investment firms also grew from 16% to 18%, and from 14% to 18% for CCPs. The increase in share for credit institutions and investment firms is likely to be in part

MR-DR.13

Intragroup notional amount split by geography
Sharp growth to UK and other third country

0.8



Note: Credit derivative outstanding intragroup notional amount outstanding in EUR tn.
Sources: TRs, ESMA.

associated with the growth in intragroup transactions, which are almost entirely held by these counterparties (MR-DR-S.75).

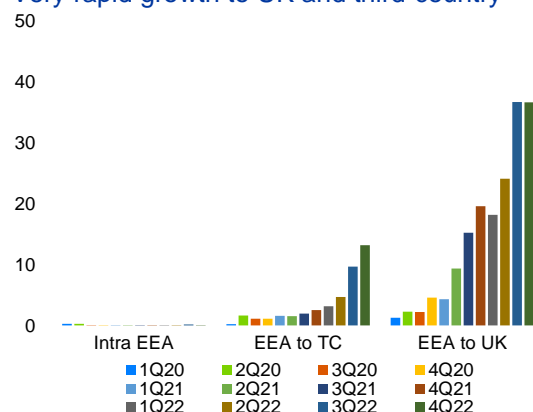
As regards **counterparty exposures to one another** among EU-based counterparties, the main exposures in notional amounts outstanding terms were between credit institutions and CCPs, between credit institutions and investment firms, and among credit institutions themselves. Smaller but still sizeable were exposures between credit institutions and AIFs. Patterns remained similar in both 4Q21 and 4Q22 (MR-DR-S.89-S90).

Central clearing grows, remains mainly at UK CCPs

In terms of **venues of execution**, the share of outstanding notional in OTC positions rose sharply to over 99.7% in 4Q22 from 95% in 4Q20, with falls in both ETD (0.3%, -5ppt from 4Q20) and in on-venue OTC (7%, -2ppt). Off-venue OTC rose correspondingly (93%, +7ppt). About 4% of the outstanding credit notional amount in 4Q22 was traded OTC on UK venues, MTFs and OTFs that are no longer recognised, thus contributing strongly to the drop. In contrast, the ETD trading fall is associated in a drop in the trading of credit futures, rather than a change in the status of venues (MR-DR-14).

MR-DR.14

CDS on EU indices uncleared intragroup
Very rapid growth to UK and third-country



Note: uncleared outstanding notional amount in CDS on Itraxx Europe Main and Itraxx Europe-Crossover in EUR bn, by zone of both counterparties.
Sources: TRs, ESMA.

Central clearing of outstanding credit derivatives grew from 4Q20 to 4Q22, from 41% to 50%. Quarterly clearing rates for the CDS on European indices subject to the clearing obligation averaged around 85% (Charts MR-DR-S.57-60).

Clearing remains largely in UK with 54% on average cleared quarterly in UK vs 13% in EEA. And, as seen with interest rate derivatives, there was a significant increase in the uncleared outstanding notional amounts of CDS on EU indices in intragroup transactions to both the UK and third countries (MR-DR.12). Growth was particularly striking to the UK. However, unlike interest rate derivatives, here the growth in intragroup amount held in products subject to the clearing obligation account for only a relatively small share of the overall intragroup increase.

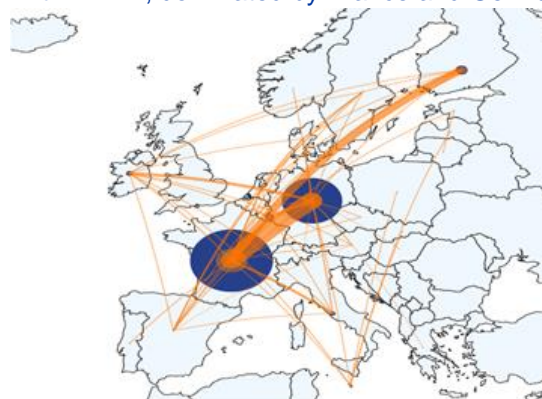
As with interest rate derivatives, EMIR data does not permit an assessment of whether the intragroup entities based in the UK and third countries have corresponding uncleared positions with other non-EEA counterparties, as these fall outside the scope of EMIR reporting.

Concentration grows, inter-connectedness trends mixed

Concentration grew substantially during the reporting period for credit derivatives. The share of notional amount held by the top five largest counterparties, excluding CCPs, grew to 49% (+5ppt from 4Q20), as did the HHI index (excl. CCPs) which grew by 22% to 0.096. Growth in both metrics was gradual throughout the reporting period (MR-DR-S.83).

MR-DR.15

Credit notional amounts intra-EEA 4Q22
Within EEA, dominated by France and Germany



Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.
Sources: TRs, GLEIF, ESMA.

In contrast, interconnectedness metrics were mixed. While degree connectedness grew by 6%, eigenvector centralization fell by 3% (MR-DR-S.87-88). This suggests that while participants

tended to have more connections, the new connections tended not to be with participants who were themselves highly interconnected.

In terms of the **geography of exposures**, 76% of the outstanding notional amount was in contracts between EEA counterparties and those in third countries, 41% (+5ppt since 4Q20) in EEA-to-UK

contracts and 36% (+7ppt) in EEA-to-other-third-countries. For credit derivatives held in contracts between EEA counterparties (21%, unchanged) the bulk is held in contracts with counterparties within and in between France and Germany (MR-DR-15). Geographical patterns of credit derivative exposures within and outside the EEA remained similar in 2021 and 2022.

Equity derivatives

Summary

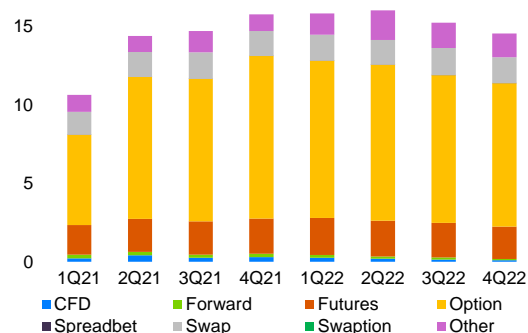
Equity derivative notional amounts increased 36% to EUR 15tn in 4Q22, from EUR 11tn in 4Q20, with growth mostly in equity options. Equity options also drove a significant increase in the share of notional amounts in ETD (58% 4Q22, +8ppt from 4Q20) which, with an increase in central clearing for OTC derivatives to 5%(+3ppt), increased the share held by CCPs (18%, +16ppt) and increased concentration in the market. By the end of 2022, over half of notional amount was also in contracts with third countries, 31% (+9ppt) to the UK and 22% (-2ppt) to other third countries. While among EEA counterparties, most notional amounts were in contracts held between counterparties based in Germany, France, and the Netherlands, with geographical patterns of exposures remaining similar in 2021 and 2022.

Growth driven mainly by equity options

Equity derivative **notional amounts increased** by 36% to EUR 15tn in 4Q22, from EUR 11tn in 4Q20. Numbers of positions, however, fell to 7.6mn from 10mn. Growth in notional amounts occurred throughout most of the reporting period, peaking in 2Q22. In addition, growth was almost entirely due to equity options, which continue to account for the most notional amount (63% as of 4Q22). Equity options grew in notional amounts to EUR 9.1tn from EUR 5.7tn. Futures, the second largest instrument type by notional amount, also grew, though less significantly, from EUR 1.9tn to EUR 2.1tn. Equity swaps likewise grew, from EUR 1.5tn to EUR 1.7tn (MR-DR-16).

MR-DR.16

Equity notional amount outstanding by instrument
Growth in options, futures and swaps
20



Note: Total notional amount outstanding by contract type, in EUR trillions.
CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

Unlike interest rate and credit derivatives, **intragroup** amounts for equity derivatives remained largely unchanged at EUR 3.4tn in 4Q22 (vs EUR 3.3tn in 4Q20).

CFDs increased in number of positions and remain the most numerous instruments, at 5.9mn, almost double the 3mn of 4Q20. These account for 51% of equity positions and 22% of all derivative positions. However, in terms of notional amounts **CFDs** remain relatively small in share and actually shrank in size during the reporting period, from EUR 0.2tn to EUR 0.1tn.

Maturities at execution lengthened, with a shift away from **maturities** of a year or less (48%, -6ppt from 4Q20) and over five years (12%, -2ppt). towards those of between one and five years (40%, +7ppt).

As regards the **currency of denomination** of contracts, the split by outstanding notional amount in 4Q22 was 56% (+9ppt) in EUR, 27% (-4ppt) in USD, 4% (-1ppt) in JPY, and 3% (-1ppt) in GBP (MR-DR-S.13-14).

Increase in ETD share and share held by CCPs

In the split by **counterparty type**, the share held by credit institutions grew during the reporting period, to 38% in 4Q22 (+5ppt from 4Q20), while the share held by investment firms fell to 31% (-9ppt), CCPs share grew very significantly to 18% (+16ppt), while NFCs held 5% (-6ppt). The large increase in CCPs is likely to be due to growth both in ETD (+8ppt), and in the share of cleared OTC (+3ppt). (MR-DR-S.97).

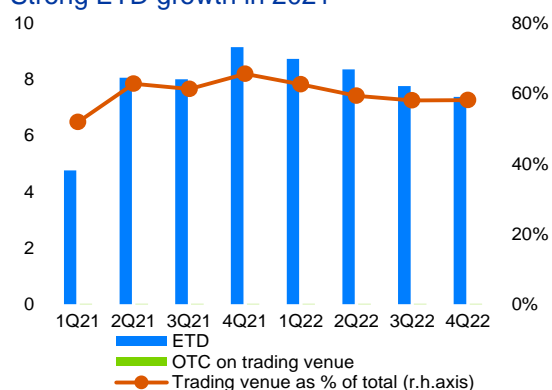
Counterparty exposures to one another among EU-based counterparties, were dominated by exposures among credit institutions and between credit institutions and investment firms, and between credit institutions and CCPs accounting for over half of all notional amounts in 4Q21 and 4Q22. There was,

however, a notable shift away from exposures between credit institutions, to exposures between credit institutions and investment firms in 2022. (MR-DR-S.109-S110).

Exchanges were the dominant **venue of execution**, with the ETD proportion of outstanding notional amount rising over the reporting period (58% 4Q22, +8ppt), driven by the large increase in equity options in 2021. ETD's accounted for almost all of the share executed on trading venues, with the share of on-venue OTC remaining negligible (MR-DR.17).

MR-DR.17

Equity notional amount on trading venue Strong ETD growth in 2021



Note: Notional outstanding ETD and OTC on trading venue in EUR trillions, and trading venue notional as proportion of total outstanding notional in % (r.h. axis). ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

Central clearing of OTC equity derivatives also rose in 2021, with the share of OTC notional cleared rising to 5% by 4Q22 (+3ppt from 4Q20). The increase in the rate of cleared notional amounts for OTC equity derivatives was associated with CCPs in the UK and in other third countries, rather than with CCPs in the EU.

Greater concentration, partly linked to CCP growth

Concentration grew during the reporting period. While the share of notional amount held by the top five largest counterparties, excluding CCPs, fell slightly to 47% (-1 ppt from 4Q20), the HHI index (excl. CCPs) which takes into account all counterparties, grew by 35% to 0.067. Moreover, the share of top 5 including CCPs grew substantially, to 61% (+13ppt). So, with the exception of a fall in the top-5 share excluding CCPs at the beginning of the reporting period, concentration metrics also grew throughout 2021 and 2022. (MR-DR-S.103).

Interconnectedness metrics were mixed. Degree connectedness grew by 23%, indicating a marked increase in the number of connections market participants tended to have with others. However, eigenvector centralization fell by 6%, suggesting that these increasing connections did not generally increase the wider connectivity of participants across the network (MR-DR-S.107-108).

In terms of the **geography of exposures**, 53% of the outstanding notional amount was in contracts between EEA counterparties and those in third countries, 31% (+9ppt since 4Q20) in EEA-to-UK contracts and 22% (-2ppt) in EEA-to-other-third-countries. Of the remaining outstanding notional amount for equity derivatives held in contracts between EEA counterparties (46%, -4ppt), the bulk is among counterparties within and between Germany, France and the Netherlands, and to a lesser extent Luxembourg and Spain (MR-DR-S.111-112). The geographical patterns of exposures remained similar in 2021 and 2022.

Currency derivatives

Summary

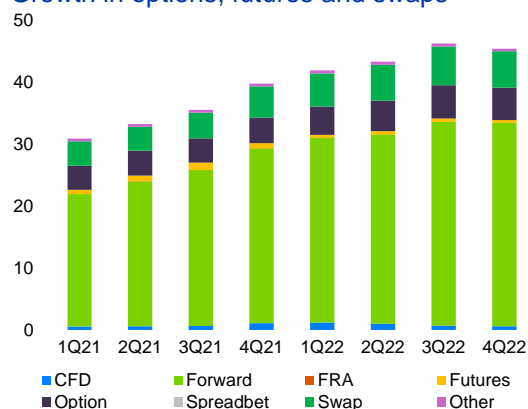
Currency derivative notional amounts grew by 41% to EUR 45tn in 4Q22, from EUR 32tn in 4Q20. Growth occurred throughout most of the reporting period, peaking in 3Q22 and was mainly from forwards, which continue to be the largest instrument by notional amount (72% as of 4Q22). Swaps and options likewise grew. Their growth was accompanied by a shift to credit institutions, 62% in 4Q22 (+10ppt from 4Q20) and investment firms (17%, +1ppt) away from other firm types. The shift was accompanied by increasing concentration throughout the period. There was also a slight shift towards notional in contracts with non-UK third countries (46%, +3ppt) while those with UK counterparties remained unchanged (22%). Patterns within the EEA remained relatively dispersed compared to other assets, and dominated by Germany, France and the Netherlands.

Growth in forwards, swaps and options

Like other assets, currency derivative **notional amounts grew** significantly, increasing by 41% to EUR 45tn in 4Q22, from EUR 32tn in 4Q20. Numbers of positions, also grew, to 7.5mn from 7.2mn. Growth in notional amounts occurred throughout most of the reporting period, peaking in 3Q22 (MR-DR-18).

MR-DR.18

Currency notional amount outstanding by instrument
Growth in options, futures and swaps



Note: Total notional amount outstanding by contract type, in EUR trillions.
CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

In addition, growth was **largely due to growth in currency forwards**, which continue to account for the most notional amount (72% as of 4Q22). Currency forwards in notional amounts to EUR 9.1tn from EUR 5.7tn. Swaps, the second largest instrument type by notional amount, also grew, though less significantly, from EUR 4.4tn to EUR 5.9tn. Currency options likewise grew, from EUR 3.8tn to EUR 5.2tn.

Intragroup amounts for currency derivatives grew by 38% to EUR 6.9tn in 4Q22 from EUR 5tn in 4Q20. Unlike interest rate derivatives and credit derivatives, the intragroup growth was similar in scale to growth in non-intragroup derivatives.

Maturities showed little change, with a slight shift in **maturities** at execution towards those of a year or less (84%, +1ppt from 4Q20) from those with maturities of over five years (2%, -1ppt).

The **currencies of denomination** of contracts was broadly unchanged from 4Q20. The split by outstanding notional amounts in 4Q22 was 66% in EUR (unchanged), 32% in USD (+1ppt) (MR-DR-S.13-14).

In the split by **counterparty type**, the share held by credit institutions grew substantially during the reporting period, to 62% in 4Q22 (+10ppt from 4Q20), a shift from non-financial firms (9%, -5ppt), UCITs (5%, -3ppt), AIFs (2%, -3ppt) and pension funds (1%, -1ppt), investment firms grew to 17% (+2ppt). (MR-DR-S.117).

Counterparty exposures to one another among EU-based counterparties, were dominated by exposures among credit institutions, between credit institutions and CCPs, and between credit institutions and investment firms. These accounted for over two thirds of all notional amounts in positions between EU counterparties, in both 4Q21 and 4Q22. (MR-DR-S.129-S130).

ETD remains very small, OTC on trading venue falls

In terms of **execution**, the ETD proportion remained low and unchanged over the reporting period (1.1% in 4Q22), though it rose higher in

2021, peaking at 2.2% in 3Q21 before falling back down (MR-DR-S.121). The share of on-trading-venue OTC fell from 16% in 4Q20 to 9% in 4Q22. The fall was attributable to OTC contracts continuing to be traded on UK MTFs and OTFs that lost recognition as equivalent trading venues at the start of 2021.

Central clearing of OTC currency derivatives rose slightly over the reporting period, though remained very low. It had risen to 1.3% by 4Q22 (+0.2ppt from 4Q20, MR-DR-S.122).

Increased concentration

Concentration grew steadily throughout the reporting period. The share of notional amount held by the top five largest counterparties grew strongly to 52% (+11 ppt from 4Q20) and the HHI index (excl. CCPs) also grew by 35% to 0.068. (MR-DR-S.123). **Interconnectedness** metrics, however, were mixed. Degree connectedness grew by 7%, while eigenvector centralization fell by 8%, suggesting increasing connections that did not translate into greater wider connectivity of participants through being more connected in turn to more highly-connected participants (MR-DR-S.127-128).

In terms of the **geography of exposures**, 68% of the outstanding notional amount was in contracts between EEA counterparties and those in third countries, 22% (unchanged since 4Q20) in EEA-to-UK contracts and 46% (+3ppt) in EEA-to-

other-third-countries. Of the remaining outstanding notional amount for currency derivatives held in contracts between EEA counterparties (30%, +3ppt). While positions are more dispersed across Europe than in other assets, the bulk is again among counterparties within and between Germany, France and the Netherlands (MR-DR-19, MR-DR.S131). Also, as with other derivative asset classes, geographical patterns of exposures remained similar in 2021 and 2022.

MR-DR.19

Currency notional amounts intra-EEA 4Q22
Positions widely spread across Europe



Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.
Sources: TRs, GLEIF, ESMA.

Commodity derivatives

Summary

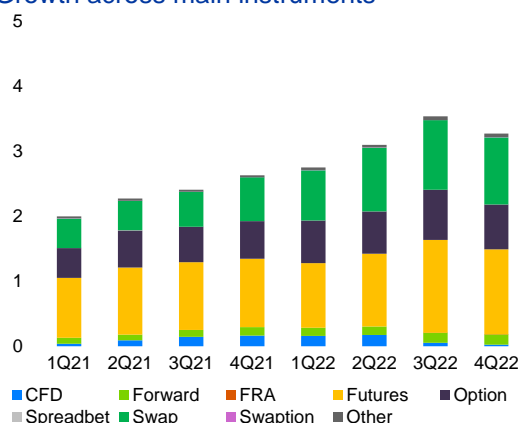
Commodity derivative notional amounts grew 65% in the reporting period, to EUR 3.3tn in 4Q22 from about EUR 2tn in 4Q20. Growth was steady, peaking at 3Q22 at EUR 3.6tn, and was across the largest instruments: swaps, futures, and options. This was fuelled by the Russian invasion of Ukraine in February 2022 increasing commodity prices in 2022, particularly natural gas, and correspondingly increasing notional amounts of new contracts. The share of ETD fell over the reporting period (39% in 4Q22, -10ppt from 4Q20), OTC grew correspondingly to 61%. OTC trading activity grew as prices rose in 2022, part of which may be due to higher margin costs at CCPs during periods of higher prices. Central clearing of OTC finished unchanged at 9% by 4Q22 (unchanged from 4Q20). Central clearing was predominantly in the UK (averaging 91% cleared in the UK).

Growth in main instruments: swaps, futures and options

Commodity²⁵ derivative **notional amounts grew** very significantly in the reporting period, to EUR 3.3tn in 4Q22 from about EUR 2tn in 4Q20. Growth was steady throughout, peaking at 3Q22 at EUR 3.6tn. The 65% growth in notional amounts over 2021 and 2022 was across the largest instruments: commodity swaps (+EUR 0.5tn), futures (+EUR 0.5tn) and options (+EUR 0.2tn). (MR-DR-19).

MR-DR.20

Commodity notional amount outstanding by instrument
Growth across main instruments



Note: Total notional amount outstanding by contract type, in EUR tn. CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

Intragroup notional amounts grew even more proportionally, to EUR 1.1tn from EUR 0.6tn, with almost all of the increase due to intragroup commodity swaps, which grew by EUR 0.4tn.

CFDs also increased in number to 1.5mn positions, up from 1mn of 4Q20, with 2.2mn peak (1Q22), but fell by 23% in notional amount size, down to EUR 21bn.

Russian invasion drove prices and notional amounts up

The growth in notional amounts was partly driven by the Russian invasion of Ukraine in February 2022 which impacted commodity prices in 2022, and in particular, **natural gas**, which experienced price surges in March and August 2022, and reached record prices in late summer.²⁶ As the notional amounts of new contracts rise with price, part of the notional amount growth is due to the price rises in the underlying commodities.²⁷

For contract **maturities**, there was a shift away from contracts with maturities of a year or less. By 4Q22, 49% (-3ppt) of contracts had a maturity at execution of a year or less, 44% (unchanged) had maturity of between one and five years, and 7% (+3ppt) had maturities of over five years (MR-DR-S.139).

In terms of the **currency of denomination**, there was a very sizeable shift from USD contracts to

²⁵ Commodities here include the full range of commodities, where these fall under EMIR reporting requirements, including for example, energy, agricultural, metals in addition to others.

²⁶ See the TRV article, [The August 2022 surge in the price of natural gas futures](#).

²⁷ See [TRV 2-22](#), ESMA (September 2022) and [TRV 1-23](#), ESMA (February 2023) for detailed discussions of financial market impacts of the Russian invasion and its associated risks.

EUR contracts in 2022, likely associated with the large increase in natural gas prices in EUR denominated contracts in 2022. By 4Q22, 46% (+23ppt) of outstanding notional amounts were in contracts denominated in EUR, 40% (-19ppt) in USD and 4% (-4ppt) in GBP (MR-DR-S.13-14).

As regards **counterparty type**, investment firms, NFCs and credit institutions continued to hold the most notional at 38% (+8ppt) 37% (-1ppt) and 18% (-5ppt) of overall notional amounts respectively, with a noticeable shift in holdings from credit institutions to investment firms.

Counterparty exposures to one another among EU-based counterparties were dominated by exposures between credit institutions and non-financial companies, followed by exposures between credit institutions and investment firms, NFCs and investment firms and between NFCs themselves. Despite dramatic changes in the commodity markets in 2022, relative exposures remained similar across 2021 and 2022. (MR-DR-S.150-151).

ETD share fell over the period

As regards **venues of execution**, the share of notional amounts outstanding that were executed as ETD fell sharply over the period (39% in 4Q22, -10ppt from 4Q20, MR-DR-20). OTC grew correspondingly to 61%, with the increase in OTC due in part to sharp price rises in commodity derivative markets, observed until end-August 2022, and the corresponding increase in margin requirements on regulated markets, which were associated with a migration of derivative transactions to non-cleared OTC markets.²⁸

Another likely part of the growth in OTC share is that OTC contracts tend to have longer maturities than ETD, so the price effect of notional amounts is more persistent for these than for ETD and so raises their notional amount share outstanding.

The share of on-trading-venue OTC also fell from 16% in 4Q20 to 0% in 4Q22. As seen with currencies and many other assets, the fall was also attributable to OTC continuing to be traded on UK MTFs and OTFs that lost their recognition as equivalent trading venues at the start of 2021.

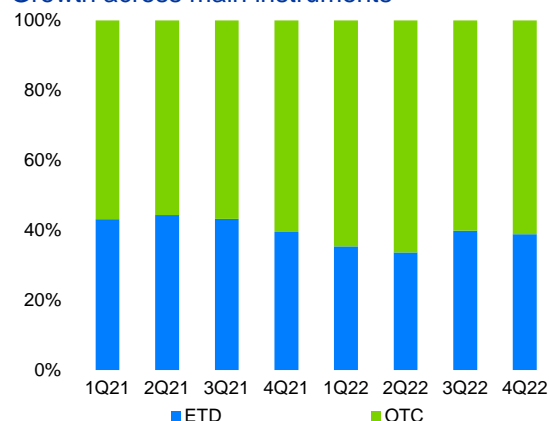
Central clearing of OTC finished 2022 at 9% (as in 4Q20). OTC central clearing remained predominantly in the UK throughout the reporting

period (averaging 91% of cleared OTC notional being cleared in the UK).

Concentration metrics were mixed. The top 5 share of notional amounts ended 2022 at 40% (-4ppt from 4Q20). In contrast, the HHI metric (excluding CCPs) grew 17% to 0.05. (MR-DR-S.143) So, there is no clear concentration trend in the reporting period for commodity derivatives.

MR-DR.21

Commodity notional amount outstanding by instrument
Growth across main instruments



Note: Shares of gross notional amount outstanding, in %. ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.

Sources: TRs, ESMA.

Interconnectedness grew during the reporting period. Degree connectedness grew strongly, by 39% over the reporting period, indicative perhaps of growth in market activity following the Russian invasion (MR-DR-S.147). Eigenvector centralization, however, grew just by 1%, suggesting the increased connections did not translate to much greater interconnectivity of the network as a whole (MR-DR-S.148).

In terms of the **geography of exposures**, 51% of the outstanding notional amount was in contracts between EEA counterparties and those in third countries, 25% (-4ppt since 4Q20) in EEA-to-UK contracts and 26% (-5ppt) in EEA-to-other-third-countries. Of the remaining outstanding notional amount for commodity derivatives held in contracts between EEA counterparties (46%, +11ppt), the bulk of exposures are among counterparties within France and Germany, between Germany and France, between France and Spain, and also between Denmark and Sweden (MR-DR-S.152-153). As with other derivative asset classes, geographical patterns of exposures remained similar in 2021 and 2022

²⁸ [Effects Assessment of the impact of the market correction mechanism on financial markets](#), ESMA, March 2023.

Market analysis

EU CDS markets: a review after the 2023 US banking turmoil

Summary

This chapter provides an update on the Credit Default Swap (CDS) market analysis conducted in 2020, with a specific focus on single-name CDS contracts for the EU banks and insurance companies. This is done in the context of the March 2023 market fluctuations in both these CDS and the underlying issuer's stock prices, at the time of the US regional bank crisis. The EU CDS market gross notional amount now stands at EUR 5tn, up from EUR 3tn in 4Q19, with a noticeable shift towards multi-name CDS contracts. Concerning trading practices, some market participants have migrated from bilateral to multilateral trading systems, while levels of central clearing are now significant, these remain concentrated among a few CCPs and clearing members. Finally, this chapter explores 'wrong-way' risk, where a counterparty's credit exposure to an entity increases as that entity's credit quality deteriorates and finds that the incidence of such risk in the context of EU banks appears to be relatively low.

Introduction

Credit Default Swap (CDS) markets allow participants to transfer credit risk through derivative contracts. These have emerged as an important tool to reallocate credit risk and to enhance financial stability. Nevertheless, the CDS market came under scrutiny after the Global Financial Crisis where they were considered to have to been playing a role in exacerbating the crisis, in particular in the bailout of AIG.

More recently, in March 2023, the collapse of US Silicon Valley Bank caused significant volatility in bank shares in the USA and EU. At the time, single-name CDS on certain EU banks were identified in the media as a potential cause of mispricing, raising concerns regarding their lack of transparency and limited liquidity.²⁹ The events revealed that the single-name CDS market remains opaque and, in consequence, subject to a high degree of uncertainty and speculation as to the actual trading activity and its drivers³⁰.

This article focuses on the EU CDS market, and in particular that for EU banks single-name CDSs, in light of the March 2023 events. It aims to inform on the evolution of the market in terms of trading, clearing and concentration since the last ESMA analysis on EU CDS markets

conducted in 2020.³¹ The scope of the article is at the market level, and so refrains from discussing individual entities or transactions related to these.

MR-DR.22

[Regulatory environment](#)

[Clearing and trading obligations](#)

In the EU regulatory framework, certain derivatives are subject to a clearing obligation and a trading obligation.

The Derivative Trading Obligation (DTO) mandates the trading of specific liquid derivatives, such as on-the-run and first off-the-run 5Y iTraxx Europe Main and iTraxx Europe Crossover, on regulated platforms, so promoting market transparency, efficient price discovery, and risk mitigation to safeguard financial markets (Commission Delegated Regulation (EU) 2022/749).

Similarly, the Clearing Obligation mandates the clearing of similar products (on-the run 5Y iTraxx Europe Main and iTraxx Europe Crossover) at an authorised EU CCP or a recognised third country CCP with the aim to reducing counterparty risk, increasing transparency, and ensure stability in the financial system (Commission Delegated Regulation (EU) 2016/1178).

Both regulations cover financial counterparties (FCs), including investment firms and credit institutions as well as non-financial counterparties (NFCs) that exceed certain thresholds.

²⁹ [“A Single Bet on Deutsche Bank’s Credit Default Swaps Is Seen Behind Friday’s Rout”](#), Bloomberg.

³⁰ [ESMA’s Letter to the European Commission on the MiFIR review – transparency regime for single name-CDS and standardised OTC-derivatives.](#)

³¹ [ASR on EU derivatives markets – 2020](#). “The EU CDS market in 2019”.

Identification of CDS instruments

CDS are reported in EMIR as a credit derivative and as a swap contract type. The underlying of the CDS is reported through one of the two fields, the underlying identification (Field 8 of Table 2 of Commission Implementing Regulation (EU) 2017/105) or the reference entity (Field 84 of Table 2).

For this section, the identification of different CDS types (single-name vs multi-name) was done manually using the ISIN reported under the underlying identification for single-names, the name of the index for indices, or simply a “B” to denote usage of a basket of securities, as well as the LEI provided for the reference entity.

Accordingly, in the “Bank and insurance single-name CDS” section below, where ISINs were reported these were used. Where no ISIN was reported, we looked at the LEI reported under the reference entity field. Entities were then identified manually using their names. The resulting sample is made up of 18 EU banks and insurance companies.³² In charts where countries are displayed, only countries where there is more than one entity in the sample are displayed in order to avoid revealing information on specific entities (MR.DR.24).

CDS market overview

At the end of 2019, the total notional amount outstanding for CDS in the EU excluding UK was about EUR 3tn (EUR 10tn including the UK), a market highly concentrated among a few, mainly non-CCP, counterparties, and with the multi-name segment (i.e. those that refer to more than one underlying entity such as index CDS and CDS on baskets of securities) rising in share in a market that once was fully dominated by single-name instruments.

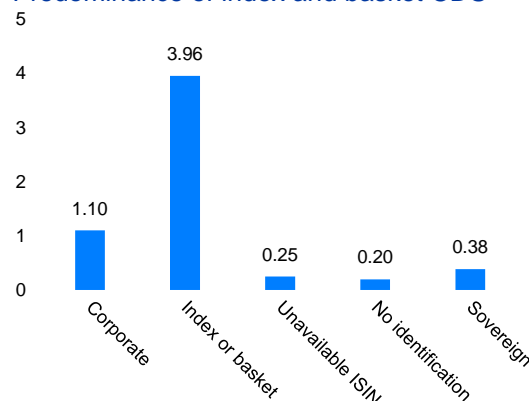
As of April 2023, the EU CDS market stood at EUR 5tn in terms of gross notional amount outstanding. Most of this notional outstanding (EUR 4tn) is now either in index or basket CDS, thus showing how this market has kept growing through widely-used CDS indices, such as iTraxx or CDX, and CDS that reference more bespoke

baskets of securities. Corporate CDS (defined as non-sovereign single-name CDS) amounted to EUR 1.1tn and sovereign CDS to EUR 384bn (MR-DR.23).

MR-DR.23

Notional amounts outstanding

Predominance of index and basket CDS



Note: Notional amounts outstanding by CDS type, including cases where the type was not identified, as of 23 April 2023, in EUR tn. Sources: TRs, ESMA.

Trading venues

Historically, a majority of CDS, and single-name CDS in particular, were traded bilaterally. Index CDS, such as iTraxx in Europe or CDX, were generally traded on venues or multilateral systems such as OTFs, MTFs or systematic internalizers.

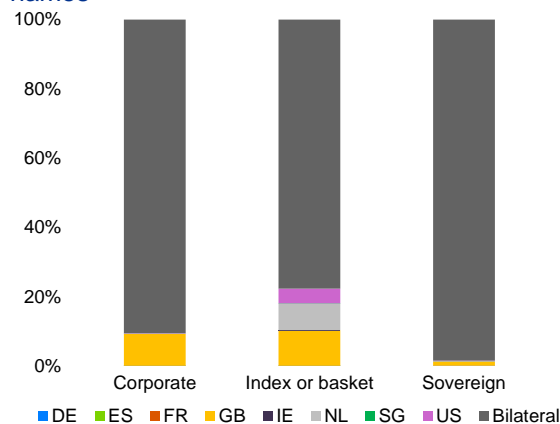
However, recent data show that for corporate single-names, amounts outstanding that were traded on one of these facilities now add up to 9% of the total outstanding for this category, most of which was traded in the UK.

For indices and baskets, the share is higher, at 22% of the total, in part reflecting the fact that some of these products are subject to the DTO (MR-DR.24). While for sovereign CDS only marginal amounts are traded on OTFs or MTFs.

³² List of institutions: Deutsche Bank AG, Commerzbank AG, Danske Bank A/S, Mediobanca Banca di Credito Finanziario SPA, Banco Bilbao Vizcaya Argentaria SA, Santander International Debt SA, Santander Issuances SAU, AXA SA, BNP Paribas SA, Societe Generale SA,

Credit Agricole SA, Assicurazioni Generali SPA, Intesa Sanpaolo SPA, UniCredit SPA, Aegon NV, ING Groep NV, Cooperatieve Rabobank UA, Svenska Handelsbanken.

MR-DR.24

On-venue trading by CDS type**Some on-venue trading for corporates and multi-names**

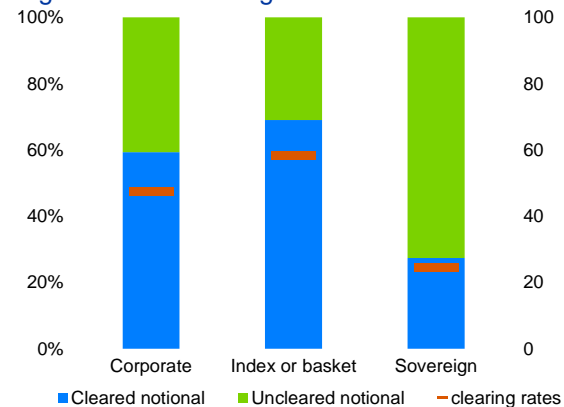
Note: Share of the notional traded on venues (incl. OTF/MTF) by CDS type and country of the venue.
Sources: TRs, ESMA.

Central clearing

The level of central clearing is also now relatively high for corporate single-names, with 47% of the total notional outstanding cleared³³. For sovereign single-names, it is at 24%. Even though single-name CDS are not subject to the clearing obligation, those single-names that are part of CDS on indices are generally offered for clearing. For indices or baskets, the share of the outstanding notional centrally cleared is 58%, partly reflecting the fact that some of these products are subject to the clearing obligation.

The high level of central clearing on CDS markets brings with it some features specific to this market. First, clearing is concentrated at a few CCPs, mainly one located in the EU and one outside the EU. Second, clearing membership is also highly concentrated at a limited number of banks, who make up the bulk of the notional, also in the non-cleared segment.

MR-DR.25

Central clearing by CDS type**High levels of clearing**

Note: CDS share of cleared notional, and clearing rates.
Sources: TRs, ESMA

Another distinctive feature of the clearing environment is that most of the main underlying reference entities are only partly cleared, as opposed to a situation where big references, subject to a greater market depth and liquidity would be mostly cleared while the rest would not. This indicates that the drivers of central clearing have to be found elsewhere than the risk characteristics of the underlying, for example, in the risk characteristics of the counterparties to the trade themselves.

In addition, intragroup trades, largely uncleared and very often between EEA and non-EEA counterparties, grew substantially in recent years (MR-DR.13), in line with the findings on credit derivatives in the main report. The fact that a substantial portion of non-cleared trades are intragroup (56% of the non-cleared notional for corporate CDS, 43% for sovereigns) also reinforce this argument above, that the drivers of central clearing have to be found elsewhere than the risk characteristics of the underlying. In particular, on single-name CDS markets, the decision to clear centrally seems to be driven by counterparty risk rather than underlying entity risk factors.

The picture might be different when looking at volumes or trade numbers. Nevertheless, the EMIR reporting where counterparties can report aggregated positions as

well as individual trades doesn't allow to see the number of trades.

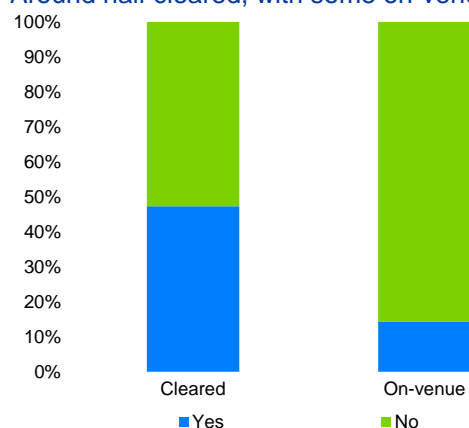
Bank and insurance single-name CDS

In this final section, we focus on some of these main underlying corporate reference entities, those affected by the recent US regional bank turmoil. In particular, during the few weeks following the closure of SVB and Signature Bank in the US and the write-down of Credit Suisse AT1 bonds, EU markets saw a sharp increase in volatility, and single-name CDS on certain EU banks were cited in the media as a potential source of instability. We thus focus on a representative sample of 18 EU banks and (a few) insurance companies are the underlying of single-name CDS. The outstanding notional for single-name CDS with underlyings in this sample of banks and insures amount to EUR 195bn.

The bank and insurance CDS markets are not structurally different from other corporate single-names. In particular, in terms of trading, 14% of the notional outstanding was traded at OTFs or MTFs, including a large majority traded at one previously recognised UK OTF. Central clearing is also substantial, with 47% of the notional held within a CCP (MR-DR.26).

MR-DR.26

Bank CDS clearing and on-venue trading Around half cleared, with some on-venue trading



Note: Share the notional amounts outstanding of cleared and on-venue.
Sources: TRs, ESMA.

Finally, one key risk aspect of CDS markets, especially when linked to underlying reference entities that can be deemed to be systemic like big EU banks, is the potential for 'wrong way' risk³⁴. Wrong-way risk refers to a situation where the creditworthiness of the reference entity and

the counterparty's financial health are positively correlated, meaning that as the credit quality of the reference entity deteriorates, the counterparty's ability to honour the protection obligation also weakens, thus worsening the overall credit risk. This can happen when for example, a bank sells the CDS of another bank located in the same country where, for example, events worsening the credit quality of the reference entity bank entity are also liable to adversely affect the counterparty bank.

In the chart below, we display the share of the notional amount outstanding excluding CCPs (leaving a total notional amount remaining of EUR 103bn), where EU banks or insurance companies are sold by counterparties located in the same country (MR-DR.27). In our sample, this only occurs in a few countries and at a moderate level.

MR-DR.27

Wrong-way risk Share of bank CDS sold by sellers in same country



Note: Share of the notional outstanding sold by counterparties based in the same country as the underlying.
Sources: TRs, ESMA.

This amount is largest in Germany, but here most of it is due to intragroup transactions, where the direct contagion risk of the wrong-way risk is limited to the confines of the group. However, it still presents potential risks, such as more challenging recovery and resolution processes in the event of a failure. In France, the member state with the second largest share, the wrong-way risk appears more limited, although here it is not dominated by intragroup transactions.

³⁴ Wrong way risk is monitored as per [Article 291 of Regulation \(EU\) No 575/2013](#).

Conclusion

This article briefly examined the European Credit Default Swap (CDS) market, specifically focusing on single-name CDS contracts for EU banks. The market has seen an increase in gross notional amount outstanding, with a shift towards multi-name CDS contracts.

Trading has partially moved from bilateral trading to multilateral systems, while central clearing has become more prevalent, albeit concentrated among a few central clearing counterparties and

clearing members. This speaks against the view that single-name CDS are not standardised, liquid or more generally fit enough for organised trading and central clearing.

The article also briefly explored the potential for wrong-way risk, where the creditworthiness of the reference entity and the counterparty's financial health are positively correlated. It finds that the occurrence of such risk within the EU bank sample, as regards wrong-way risk related to CDS being sold in the same country as the underlying, is relatively low.

Statistical methods

EMIR trade-state data explained

Summary

EMIR data are vast and contain detailed information about European derivatives markets. The data are based on reports from EEA counterparties that are provided to trade repositories (TRs), which in turn report to ESMA. TRs prepare and pre-aggregate the data for authorities at different levels of granularity. One of these datasets, the trade-state data which offers a view on all outstanding EEA transactions, was used for as the basis for this report. In this section, we detail how we prepared and cleaned the data. In addition, we also provide an overview how these cleaning steps affected the underlying dataset.

Introduction

This year's methodological section provides a short overview of the methodology employed and data-quality-enhancing measures taken by ESMA and the national competent authorities (NCAs).³⁵ Given the continued prevalence of cleaning and preparation steps, it explains how each step affects the data used for the report.

EMIR data overview

This report is based on data reported under Article 9 of EMIR, which requires all counterparties concluding derivatives positions located in the EEA³⁶ to report their trades (double-sided reporting regime) to a trade repository (TR). The information is reported by both counterparties separately but with the same identifier (i.e. trade ID) to a TR. The TRs provide access to data to the regulatory authorities based on their mandates, based on the jurisdiction the reporting counterparty is in (the national competent authority and ESMA).

The three main types of EMIR reports provided by TRs to the regulatory authorities are trade-activity, trade-state and position data. Trade-activity data are very granular, showing each lifecycle event of a transaction (e.g. conclusion, valuation, modification, termination). Trade-state data (also referred to as stock data) are at the next level of aggregation.

To produce the trade-state dataset, the TRs apply trade-activity messages to create or update records that represent the outstanding derivatives. However, once the derivative is closed or matures (as indicated in the Maturity Date field) the TRs removes the respective record. This means that these data show a snapshot of the latest information available on each outstanding derivative contract in the EEA.

The third type of report, position data provides information on outstanding derivatives between two counterparties at instrument level. Furthermore, initial cleaning steps are also included in the preparation, such as the removal of outliers. In essence, this dataset is mainly used for analysing cross-counterparty exposures in a quick and efficient manner.³⁷

As in previous editions, we use trade state data, and as in last year's report, we look at an observation time-span of two years, 2021 and 2022. The data captures all open derivatives within the EEA, and derivatives between an EEA counterparty and to a third country or UK counterparty.

We again use quarterly data, and for each of the quarterly datapoints we select a Friday in the middle of the month to avoid potential effects caused by the expiry dates of ETDs and the regular compression exercises that are more likely to happen on the last Friday of the month.

As we use quarterly data, our four datapoints for 2021/2022 are based on the following four

³⁵ Previous year's reports provide more extensive descriptions of the steps we take to prepare data for our annual report. These are available here: <https://www.esma.europa.eu/esmas-activities/risk-analysis/risk-monitoring#esma-market-reports>

³⁶ This also includes the AIFs that are managed by AIFM authorised or registered under Directive 2011/61/EU

³⁷ For more information please see the guidelines here: https://www.esma.europa.eu/sites/default/files/library/esma70-151-1272_guidelines_on_position_calculation_by_trade_repositories_under_emir_final_report.pdf

months: March, June, September and December. The number of records in 2021/2022, after the rigorous cleaning exercise explained below, ranges from 31mn to 37mn per quarter and totals 278mn records, aggregated over the eight quarterly dates of this report.

Regarding the overall data quality, we continue to see improvements. Nonetheless, we also identified several cases of counterparties over-reporting to the EMIR data set in the observation period, which required a special treatment given double reporting. First, records reported by the overreporting entities were removed (in so far these were self-reported). Second, derivatives reported by other counterparties against the overreporting entity were then duplicated. Third, for these duplicated records the 'Counterparty ID' and 'Other Counterparty' field were switched, and similarly, the 'Counterparty Side' field was negated. In this way, double reports where one side was an overreporting entity were artificially re-constructed based on the other, more accurate report. In contrast, single-reported positions of overreporting entities could not be corrected in this way and so were instead removed from the data set, highlighting a limitation of the approach.

Results from cleaning and correction process

To ensure a high level of data quality and to correct for specific factors within the EMIR reporting regime we again employed a multi-step data preparation procedure this year.

The first step, the **outlier removal** method was the same as in previous editions of this report.³⁸ Our outlier removal procedure relies on two thresholds: a dynamic and a fixed one. The fixed threshold excludes reports whose notional amount is above EUR 10bn, while the dynamic threshold excludes reports whose log of the notional amount exceeds the median plus four standard deviations of the distribution of the log of the notional amounts.

As the market is very heterogenous the dynamic threshold is calculated for each derivative type where the derivative type is defined by the characteristics of the asset class, contract type, intragroup, compression and notional currency. This segmentation into derivative types leads to

2,124 different calculations with associated thresholds. With the same methodology as described in the last report the segments with less than 30 observations are treated differently. For these, the statistical parameters for the outlier detection are estimated using a regression model.

After the thresholds were calculated the outliers were identified and removed. This operation reduced the notional amount significantly, down to EUR 2,836tn while keeping 99.943% of the records (MR-DR.28).

MR-DR.28

Cleaning and reconciliation results

EMIR data require complex cleaning steps

	Raw	Outliers removed	Double reporting removed
Commodity	15,976	31	22
Credit	84	59	49
Currency	17,784,069	412	317
Equity	5,669	173	117
Interest rate	36,212,085	2,158	1,752
Other	9	4	4
Total	54,017,892	2,836	2,260

Note: Total notional amounts in EUR trillion, aggregated over the eight quarters in 2021 and 2022. 'Raw' indicates the total notional amount before any outlier identification and treatment. 'Outliers removed' indicates the total notional amount after the removal of the outliers. 'Double reporting removed' indicates the total notional amount after the removal of double reporting. As the totals in this table aggregate the four quarters in 2020, the total notional amount for the fully cleaned data is about four times larger than the quarterly notional amount totals presented in the main body of the report.

Sources: TRs, ESMA.

In the next step, we took account of the double reporting nature of EMIR where one derivative between two counterparties results in two reports. Considering both reports would overstate the market size if calculated for the whole EEA area. As a large proportion of derivatives are conducted between EEA counterparties, and hence subject to the double reporting, we see a significant decline in the notional amount from this step also, down to EUR 2,260tn, in aggregate for the eight quarters in 2021/2022.

Interestingly, the relatively large notional amount removed at this step also indicates how much is traded among EEA counterparties relative to the other categories. We can observe that interest rate and credit derivatives, for which less of the notional amount is removed at this step, are traded mostly with counterparties located in third

³⁸ For more information see previous editions here: <https://www.esma.europa.eu/esmas-activities/risk-analysis/risk-monitoring>

countries (e.g. US or UK). In contrast for currency, commodity, and equity more of the notional amount is removed. This makes sense given these are traded more within the EEA and less with third countries. However, as these statistics apply to the whole observation period and are calculated on a gross notional basis which limits their explanatory power.

Conclusion and outlook

This article introduced the EMIR data set and its different level of aggregations. The main cleaning and correction steps were also highlighted along with presentation of statistics on how the different aggregates are affected.

ESMA continues to improve the data quality with several initiatives in cooperation with the NCAs. In 2022, for example, ESMA performed analysis of the full EMIR data set and published a data quality report (MR-DR.29). Another initiative is the 2014-established 'Data Quality Action Plan' (DQAP) which is a joint effort by NCAs and ESMA to improve data quality in several highly important areas. Looking forward, ESMA expects further improvements to data quality, as a result of its supervision and the continuing work of the NCAs.

MR-DR.29

EMIR and SFTR data quality report 2022 Need for increased efforts on data supervision

In April 2023 ESMA published its third report which focuses solely the data quality within the EMIR and SFTR reported data.³⁹ The report covers the progress made in improving EMIR data quality for regulatory and supervisory uses.

In respect of EMIR, the report addresses discrepancies in outstanding derivatives between counterparties, which hinder authorities' ability to assess relevant exposures. The discrepancies fluctuated, peaking at 26.1% in September 2021, but gradually decreasing since then. It also focuses on outstanding derivatives positions, which similarly affect accuracy. Here the analysis revealed a decreasing trend in errors, starting at 27.6% and declining to a low of 7.8%, with minor fluctuations. Overall, there has been a consistent decrease in the percentage of discrepancies in position reporting.

Additionally, the report focuses on the number of outstanding derivatives with timely and late valuations. Insufficient valuation information limits authorities' monitoring capability. The percentage of late valuations also exhibits a significant downward trend, starting at 38.3% end of 2019 and declining rapidly. It reached a low of 13.2% in the observations at end of 2022, thus indicating the outcomes of the efforts to enhance data quality. This improvement enhances the usability of valuation information, crucial for EMIR data users.

The data quality report concludes that while good progress has been made, additional efforts are needed by national competent authorities (NCAs) and ESMA to further improve EMIR data quality.

³⁹ For more information please see the press statement and link to the report here: <https://www.esma.europa.eu/press-news/esma->

[news/esma-finds-data-quality-significantly-improves-under-new-monitoring-approach](https://www.esma.europa.eu/press-news/esma-news/esma-finds-data-quality-significantly-improves-under-new-monitoring-approach)

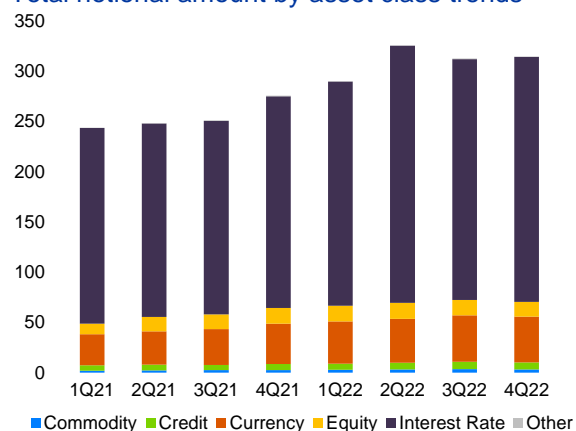
Statistics

The EU derivatives market

Size and composition

MR-DR-S.1

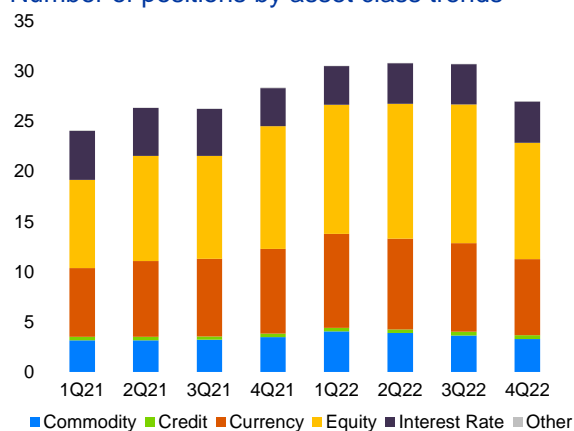
Total notional amount by asset class trends



Note: Total notional amount outstanding by asset class in EUR trillions.
Sources: TRs, ESMA.

MR-DR-S.2

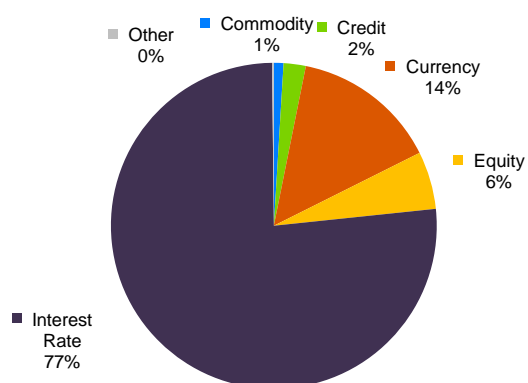
Number of positions by asset class trends



Note: Total number of outstanding transactions by asset class in millions.
Sources: TRs, ESMA.

MR-DR-S.3

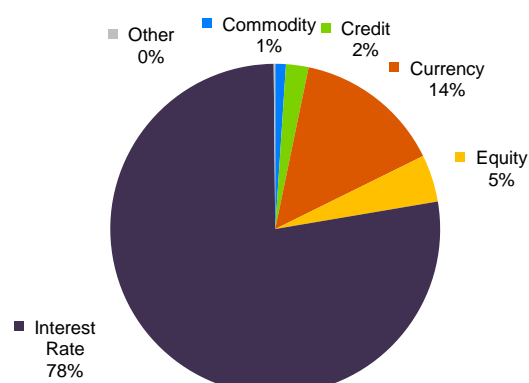
Total notional amount by asset class 4Q21



Note: Percentages of total notional amount outstanding as of 4Q21 by asset class as of 4Q21, may not sum to 100% due to rounding error.
Sources: TRs, ESMA.

MR-DR-S.4

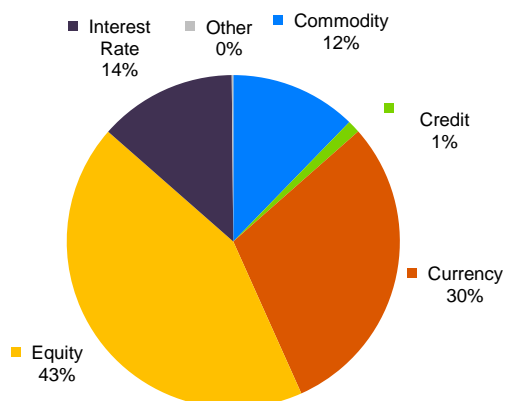
Total notional amount by asset class 4Q22



Note: Percentages of total notional amount outstanding as of 4Q22 by asset class as of 4Q22, may not sum to 100% due to rounding error.
Sources: TRs, ESMA.

MR-DR-S.5

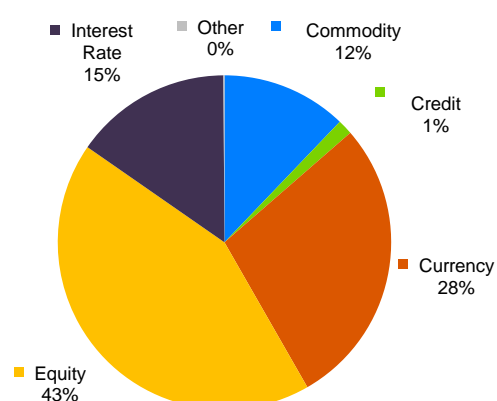
Number of positions by asset class 4Q21



Note: Percentages of outstanding derivative contracts as of 4Q21 by asset class as of 4Q21, may not sum to 100% due to rounding error.
Sources: TRs, ESMA.

MR-DR-S.6

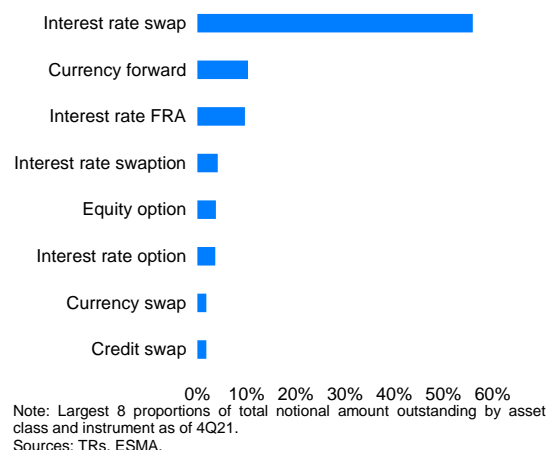
Number of positions by asset class 4Q22



Note: Percentages of outstanding derivative contracts as of 4Q22 by asset class as of 4Q22, may not sum to 100% due to rounding error.
Sources: TRs, ESMA.

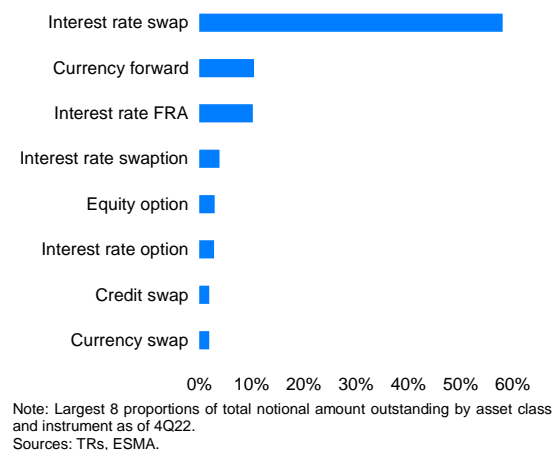
MR-DR-S.7

Notional by asset class and underlying 4Q21



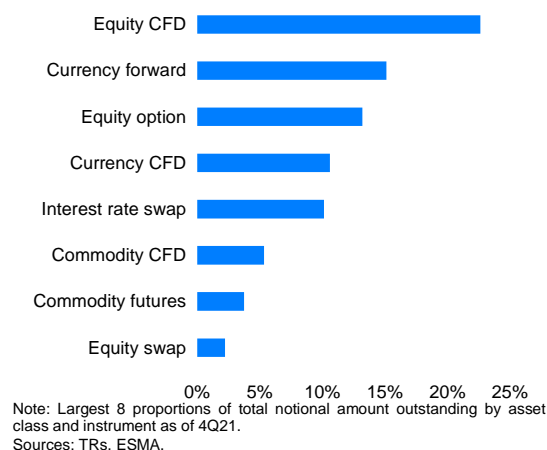
MR-DR-S.8

Notional by asset class and underlying 4Q22



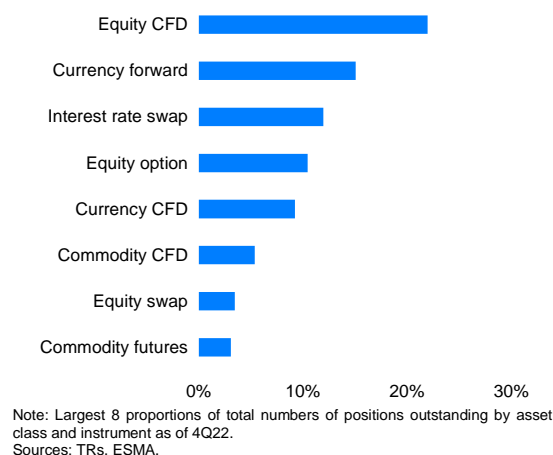
MR-DR-S.9

Positions by asset class and underlying 4Q21



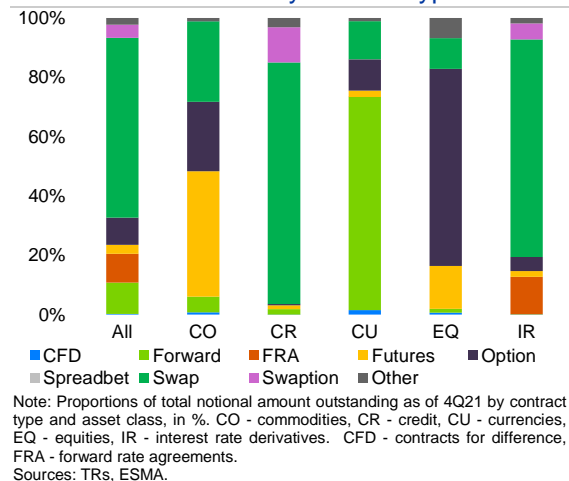
MR-DR-S.10

Positions by asset class and underlying 4Q22



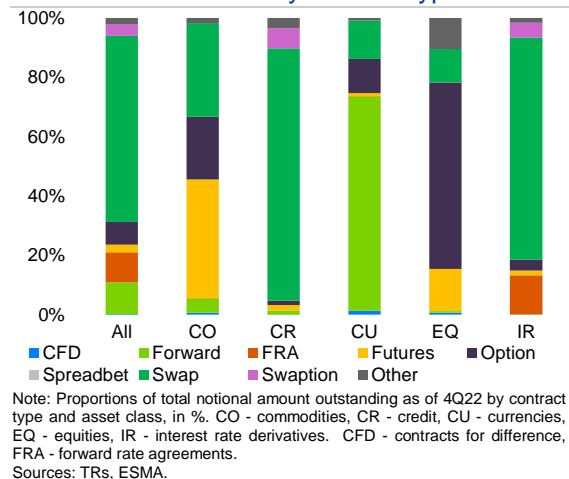
MR-DR-S.11

Total notional amount by contract type 4Q21



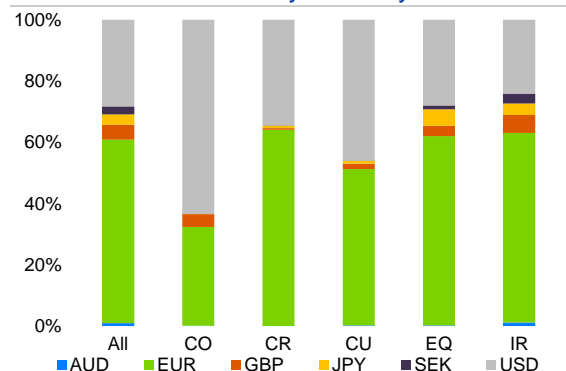
MR-DR-S.12

Total notional amount by contract type 4Q22



MR-DR-S.13

Total notional amount by currency 4Q21

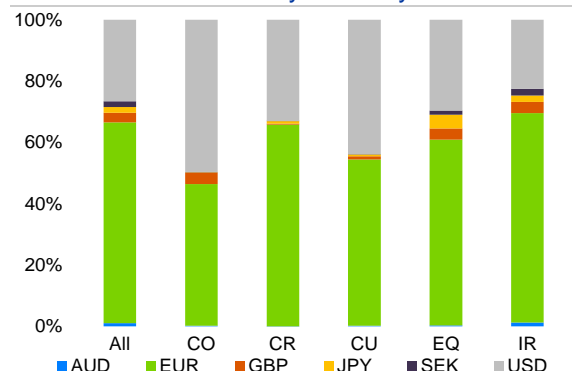


Note: Proportions of total notional amount outstanding as of 4Q21 by currency and asset class, for six largest currencies by notional amount, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AUD- Australian dollar, EUR - euro, GBP - pound sterling, JPY - Japanese yen, SEK = Swedish Kroner, USD - US dollar.

Sources: TRs, ESMA.

MR-DR-S.14

Total notional amount by currency 4Q22

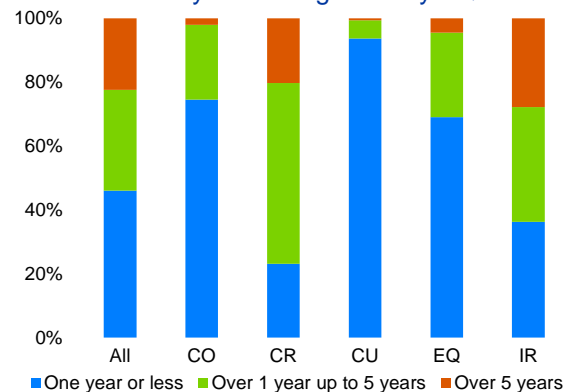


Note: Proportions of total notional amount outstanding as of 4Q22 by currency and asset class, for six largest currencies by notional amount, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AUD- Australian dollar, EUR - euro, GBP - pound sterling, JPY - Japanese yen, SEK = Swedish Kroner, USD - US dollar.

Sources: TRs, ESMA.

MR-DR-S.15

Total notional by remaining maturity 4Q21

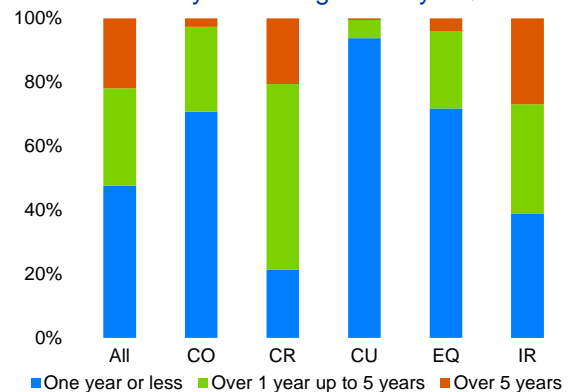


Note: Proportions of total notional amount outstanding as of 4Q21 by remaining maturity of the contract and by asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.

Sources: TRs, ESMA.

MR-DR-S.16

Total notional by remaining maturity 4Q22

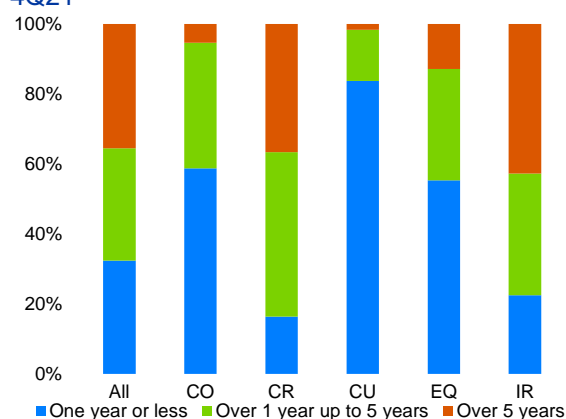


Note: Proportions of total notional amount outstanding as of 4Q22 by remaining maturity of the contract and by asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.

Sources: TRs, ESMA.

MR-DR-S.17

Total notional amount by maturity at execution 4Q21

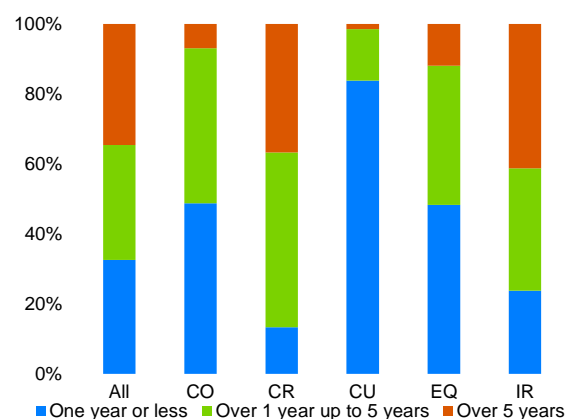


Note: Proportions of total notional amount outstanding as of 4Q21 by maturity at execution of the contract and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.

Sources: TRs, ESMA.

MR-DR-S.18

Total notional amount by maturity at execution 4Q22

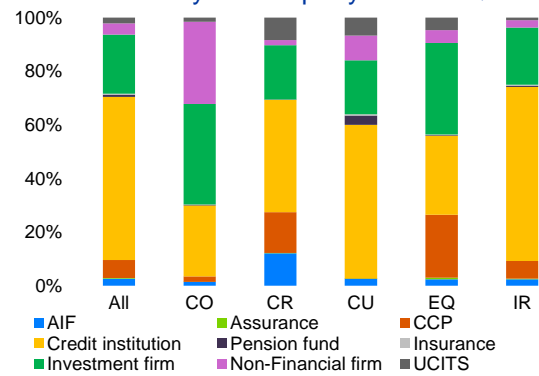


Note: Proportions of total notional amount outstanding as of 4Q22 by maturity at execution of the contract and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.

Sources: TRs, ESMA.

MR-DR-S.19

Total notional by counterparty sector 4Q21

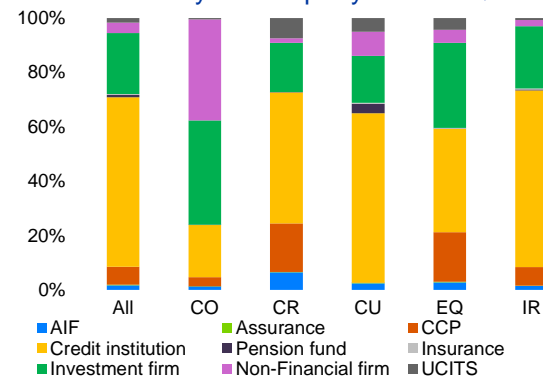


Note: Proportions of total notional amount outstanding as of 4Q21 (not reconciled) by counterparty and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

MR-DR-S.20

Total notional by counterparty sector 4Q22

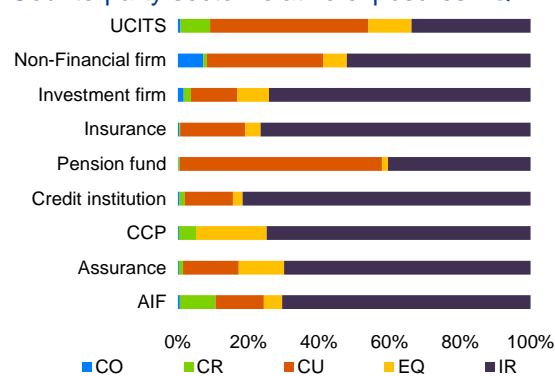


Note: Proportions of total notional amount outstanding as of 4Q22 (not reconciled) by counterparty and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

MR-DR-S.21

Counterparty sector relative exposures 4Q21

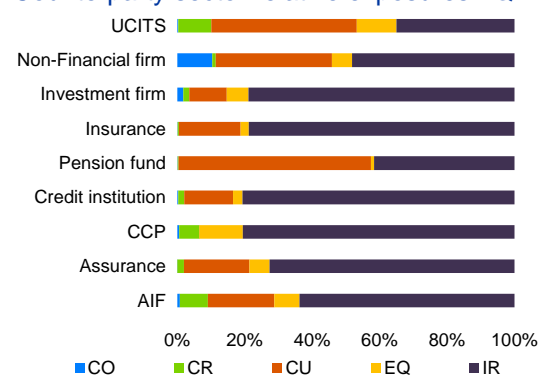


Note: Proportions of total notional amount outstanding as of 4Q21 (not reconciled) by counterparty and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

MR-DR-S.22

Counterparty sector relative exposures 4Q22



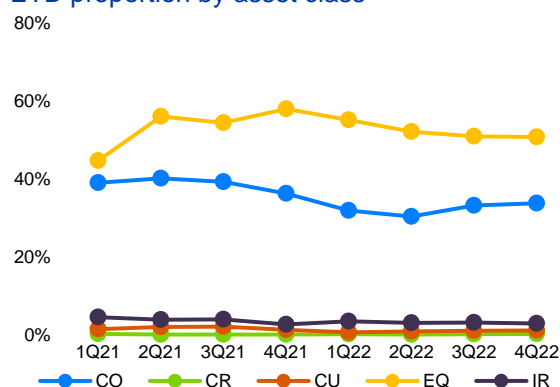
Note: Proportions of total notional amount outstanding as of 4Q22 (not reconciled) by counterparty and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

Execution and clearing

MR-DR-S.23

ETD proportion by asset class

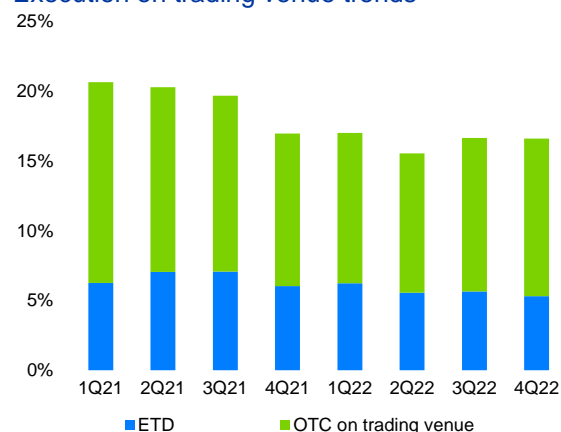


Note: Proportion of notional amount outstanding that is ETD by asset class. Trades not executed as ETD are OTC. CO - commodities, CR - credit, CU - currency, EQ - equity, IR - interest rate derivatives. ETD - exchange traded derivatives, OTC - over the counter derivatives.

Sources: TRs, ESMA.

MR-DR-S.24

Execution on trading venue trends

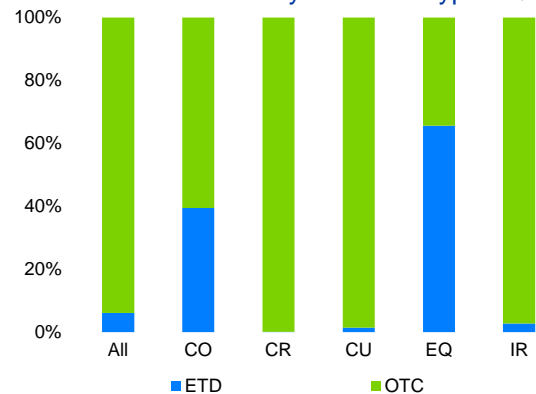


Note: ETD, OTC on trading venue and other OTC share of outstanding notional

Sources: TRs, ISO, ESMA.

MR-DR-S.25

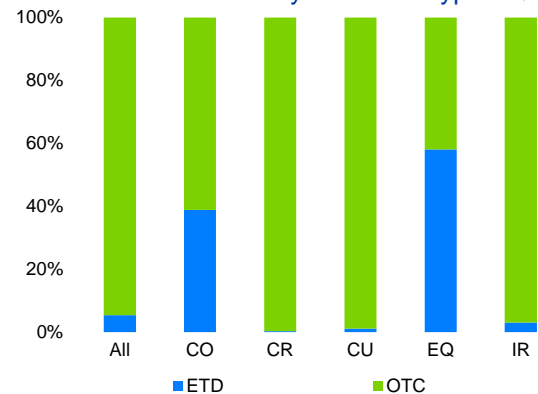
Total notional amount by execution type 4Q21



Note: Percentages of total notional amount outstanding as of 4Q21 by ETD and OTC by asset class. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ESMA.

MR-DR-S.26

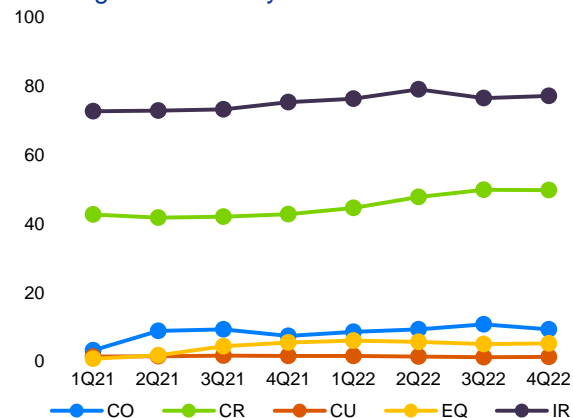
Total notional amount by execution type 4Q22



Note: Percentages of total notional amount outstanding as of 4Q22 by ETD and OTC by asset class. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ESMA.

MR-DR-S.27

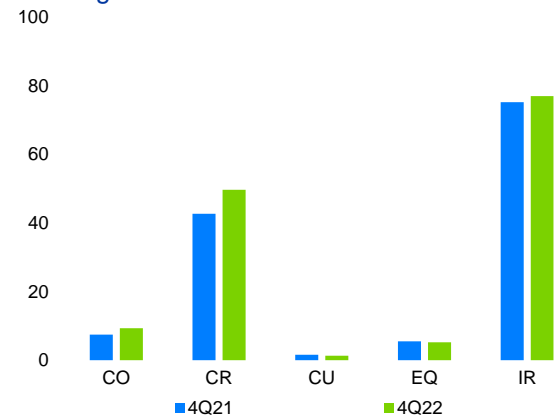
Clearing rate trends by asset class



Note: Percentage of OTC notional amount centrally cleared by asset class.
Sources: TRs, ESMA.

MR-DR-S.28

Clearing rates 4Q21 and 4Q22

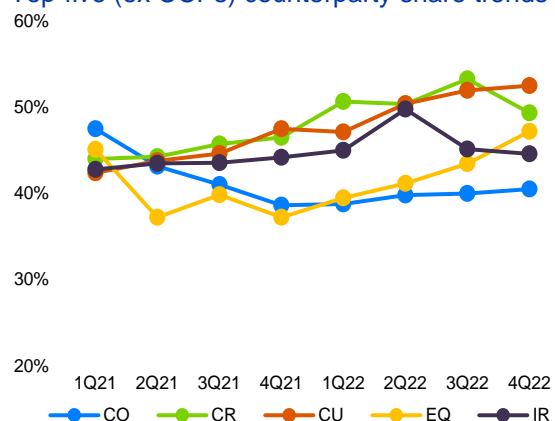


Note: Central clearing rate of total notional amount outstanding by asset class in percent. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources: TRs, ESMA.

Concentration and connectedness

MR-DR-S.29

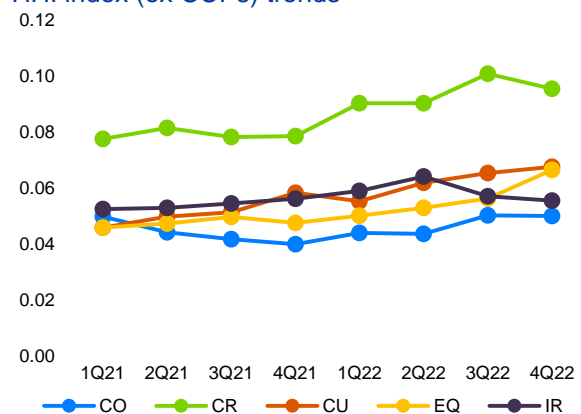
Top-five (ex CCPs) counterparty share trends



Note: The share of the total notional amount held by the Top 5 largest counterparties (excl. CCPs) by asset class.
Sources: TRs, ESMA.

MR-DR-S.30

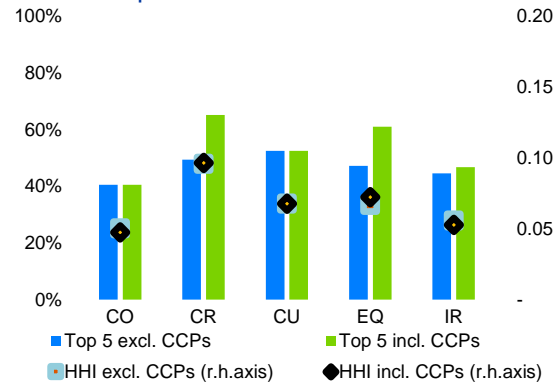
HHI index (ex CCPs) trends



Note: Herfindahl-Hirschman Index (HHI) of concentration of outstanding notional amounts (excl. CCPs) by asset class.
Sources: TRs, ESMA.

MR-DR-S.31

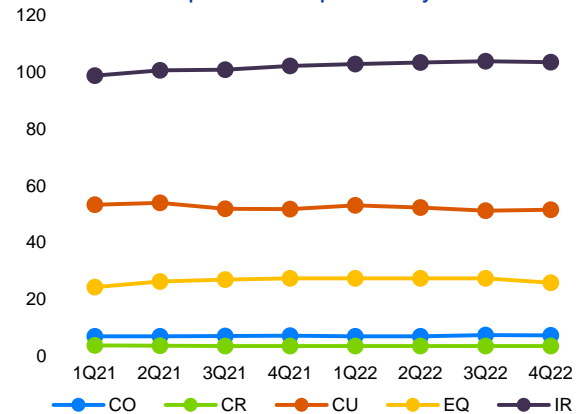
HHI and top-five share 4Q22



Note: Herfindahl-Hirschman Index (HHI) and notional amount share in % of top-five counterparties calculated on aggregated notional positions of counterparties. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. HHI normalised between 0 and 1, as of 4Q22. Sources: TRs, ESMA.

MR-DR-S.32

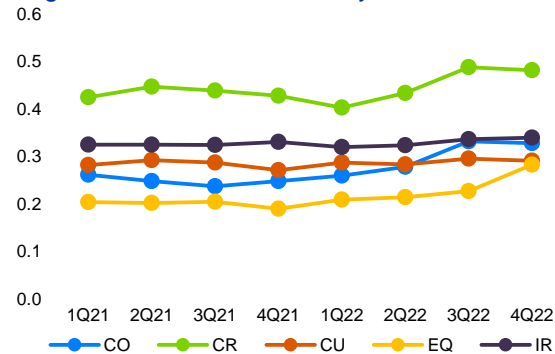
Number of unique counterparties by asset



Note: Number of unique counterparties by asset class in thousands.. Sources: TRs, ESMA.

MR-DR-S.33

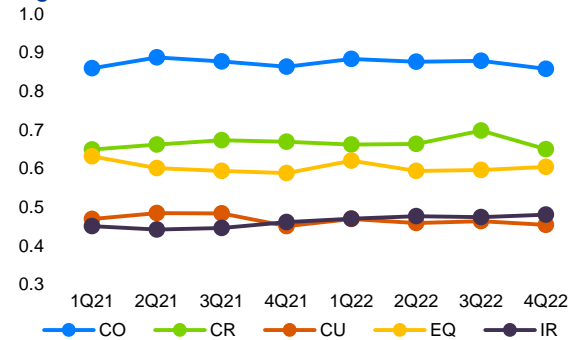
Degree interconnectedness by asset



Note: Degree interconnectedness indicator by asset. This measures a participant's influence based on the number of links it has to other participants within the network. It ranges from 0 (lowest) to 1 (highest interconnectedness). CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. Sources: TRs, ESMA.

MR-DR-S.34

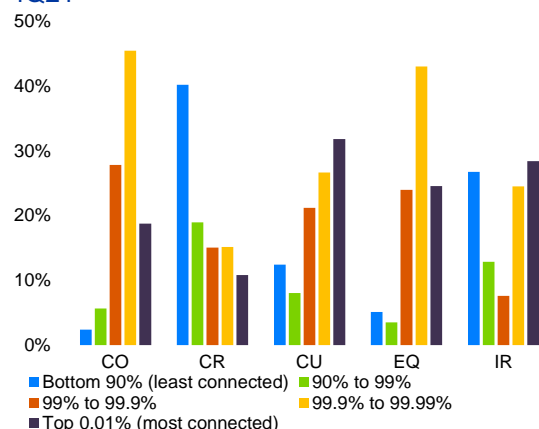
Eigenvector interconnectedness



Note: Eigenvector interconnectedness indicator by asset. This measures a participant's influence based on the number of links it has to other participants within the network and takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness). CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. Sources: TRs, ESMA.

MR-DR-S.35

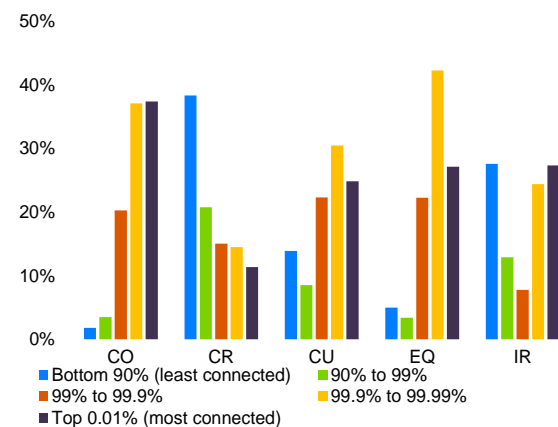
Distribution of connections by how connected 4Q21



Note: Proportion of all counterparty connections (y axis) in quantiles of reporting counterparties ranked by connectedness as of 4Q21. Sources: TRs, ESMA.

MR-DR-S.36

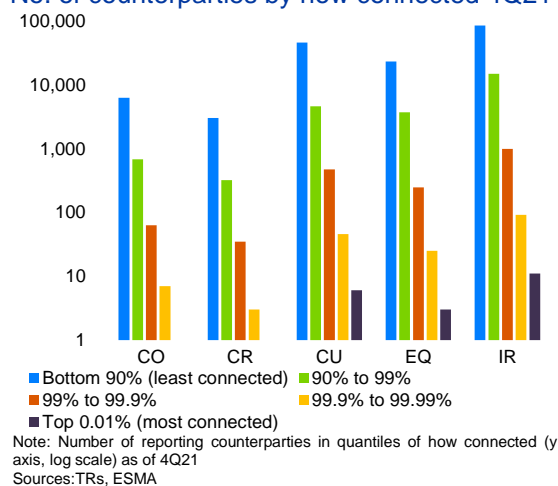
Distribution of connections by how connected 4Q22



Note: Proportion of all counterparty connections (y axis) in quantiles of reporting counterparties ranked by connectedness as of 4Q22. Sources: TRs, ESMA.

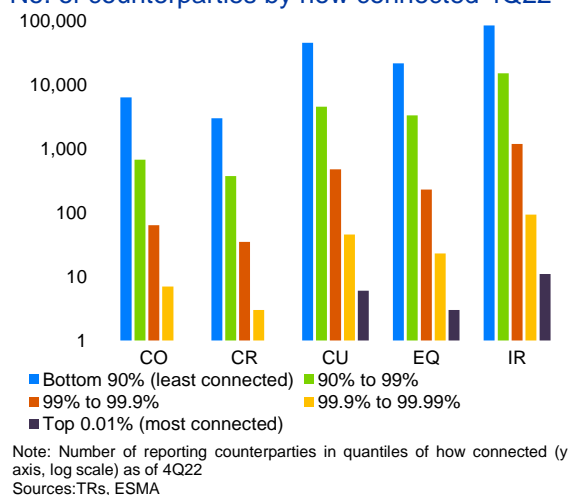
MR-DR-S.37

No. of counterparties by how connected 4Q21



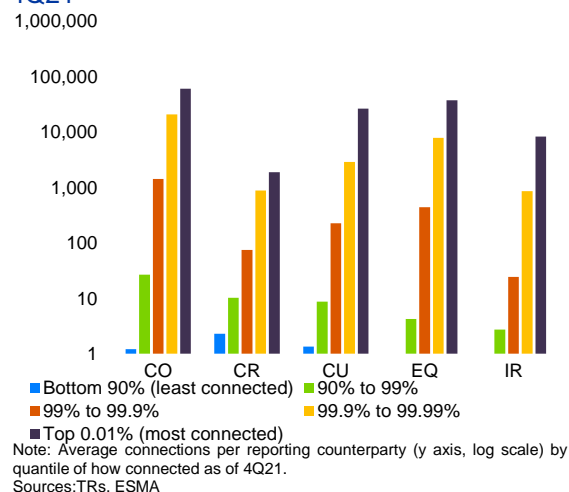
MR-DR-S.38

No. of counterparties by how connected 4Q22



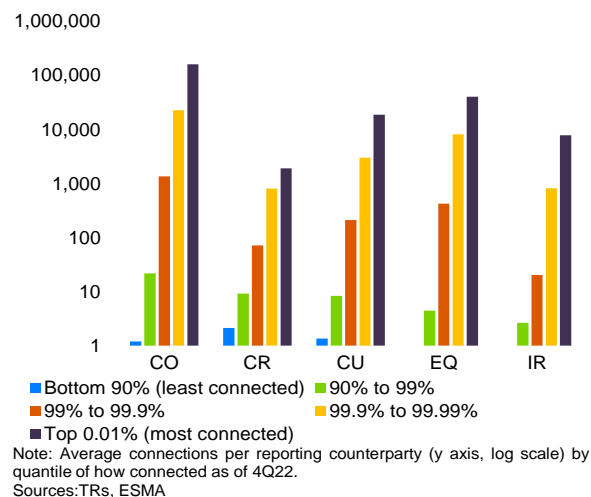
MR-DR-S.39

Average no. of connections by how connected 4Q21



MR-DR-S.40

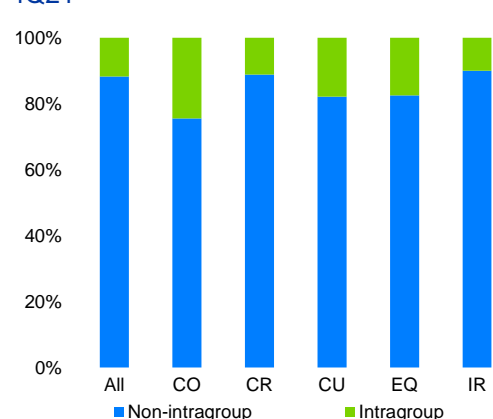
Average no. of connections by how connected 4Q22



Intragroup size and composition

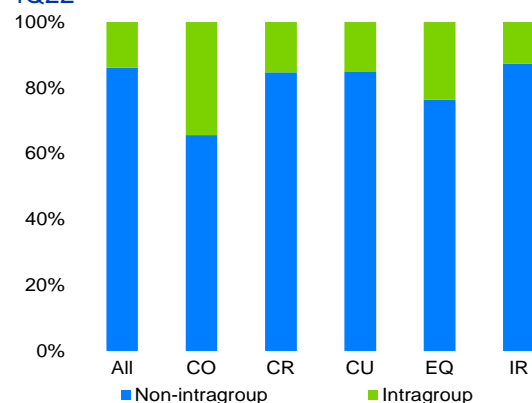
MR-DR-S.41

Intragroup notional amount share by asset class 4Q21



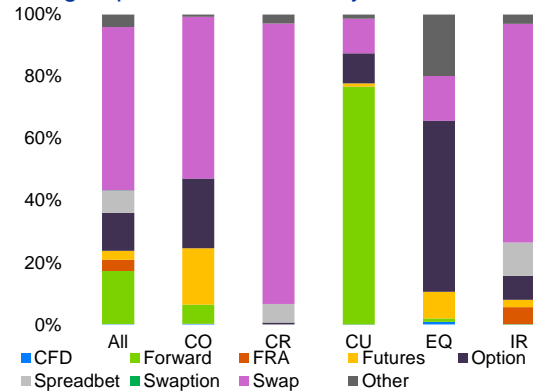
MR-DR-S.42

Intragroup notional amount share by asset class 4Q22



MR-DR-S.43

Intragroup notional amount by instrument 4Q21

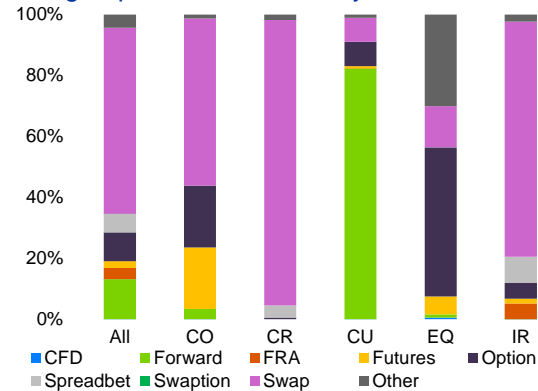


Note: Proportions of intragroup notional amount outstanding as of 4Q21 by contract type and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. CFD - contracts for difference, FRA - forward rate agreements.

Sources: TRs, ESMA.

MR-DR-S.44

Intragroup notional amount by instrument 4Q22

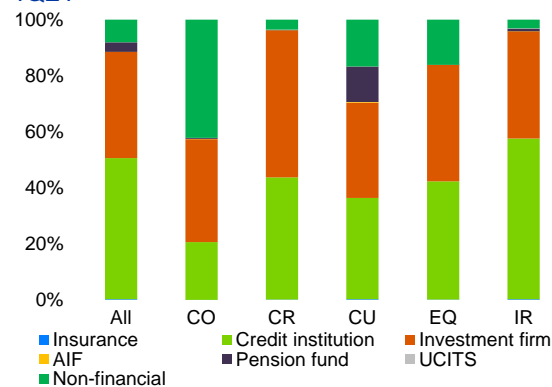


Note: Proportions of intragroup notional amount outstanding as of 4Q22 by contract type and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. CFD - contracts for difference, FRA - forward rate agreements.

Sources: TRs, ESMA.

MR-DR-S.45

Asset class intragroup notional by counterparty 4Q21

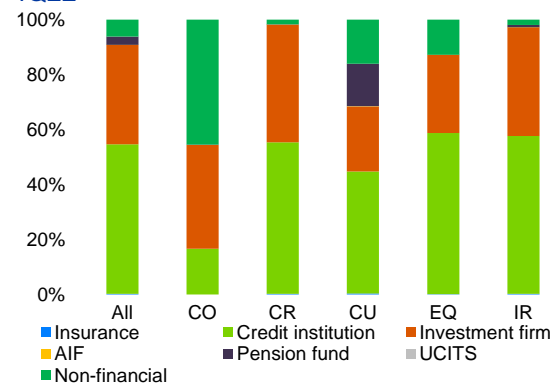


Note: Total notional intragroup amounts by sector of the reporting counterparty and asset class as of 4Q21 in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

MR-DR-S.46

Asset class intragroup notional by counterparty 4Q22

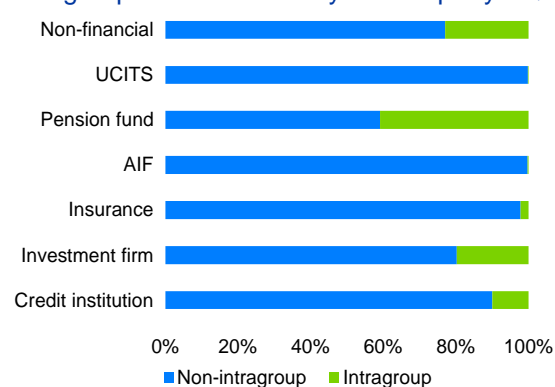


Note: Total notional intragroup amounts by sector of the reporting counterparty and asset class as of 4Q22 in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

MR-DR-S.47

Intragroup notional share by counterparty 4Q21

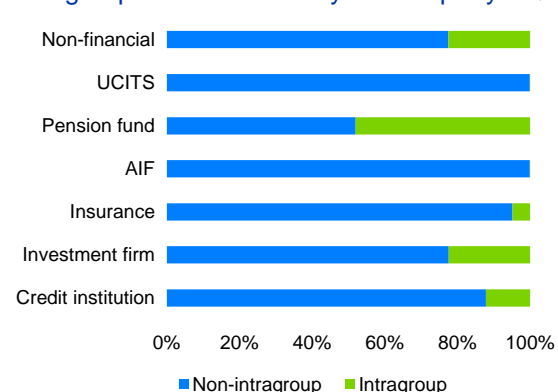


Note: Total notional intragroup versus non-intragroup amounts outstanding by sector of the counterparty as of 4Q21, in %. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

MR-DR-S.48

Intragroup notional share by counterparty 4Q22



Note: Total notional intragroup versus non-intragroup amounts outstanding by sector of the counterparty as of 4Q22, in %. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.

Sources: TRs, ESMA.

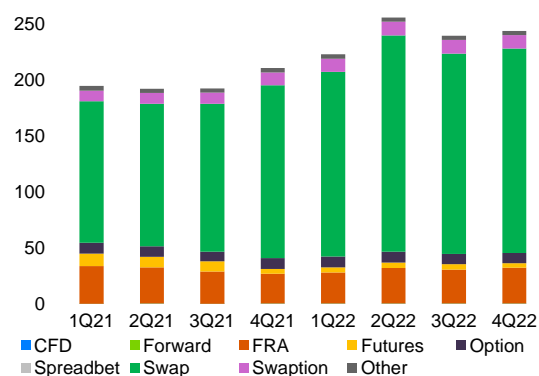
Interest rate derivatives

Size and composition

MR-DR-S.49

Total notional amount by contract type

300

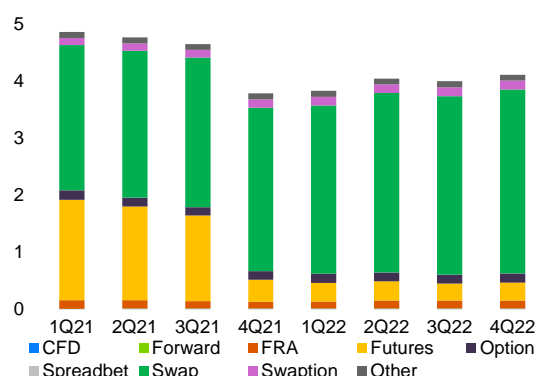


Note: Total notional amount outstanding by contract type, in EUR tn. CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

MR-DR-S.50

Number of positions by contract type

6

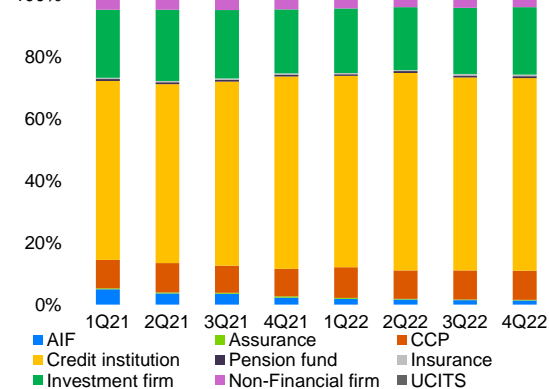


Note: Number of derivatives by contract type, in millions. CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

MR-DR-S.51

Total notional amount by sector of counterparty

100%

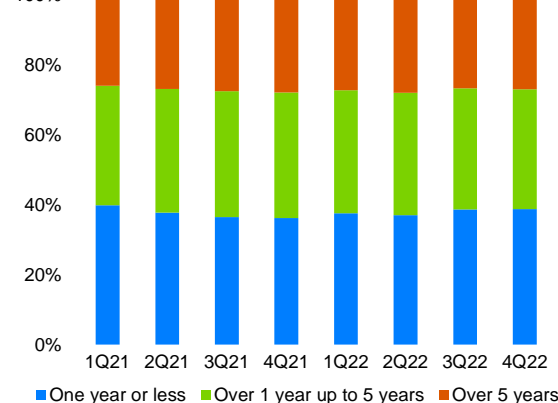


Note: Shares of total notional amount outstanding (not reconciled) by counterparty, in %. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.
Sources: TRs, ESMA.

MR-DR-S.52

Total notional amount by remaining maturity

100%

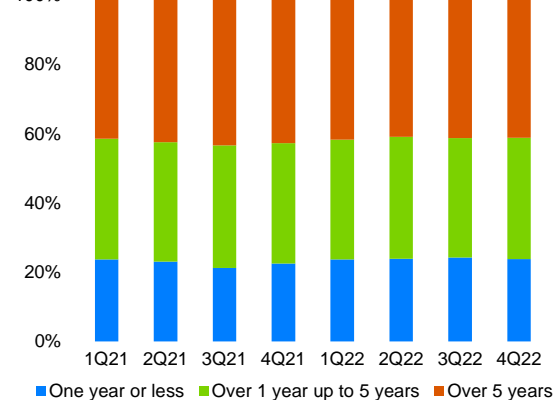


Note: Shares of total notional amount outstanding by remaining maturity of the contract, in %.
Sources: TRs, ESMA.

MR-DR-S.53

Total notional amount by maturity at execution

100%

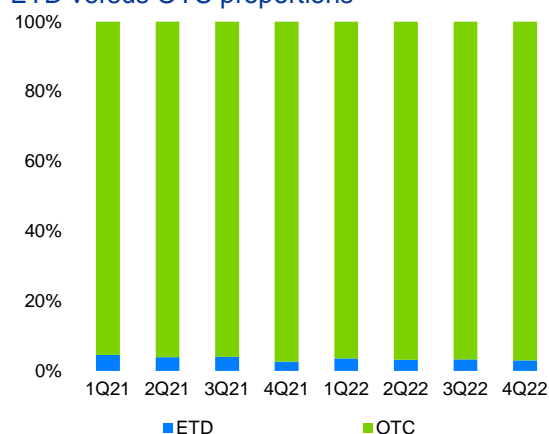


Note: Shares of total notional amount outstanding by maturity at execution of the contract, in %.
Sources: TRs, ESMA.

Execution and clearing

MR-DR-S.54

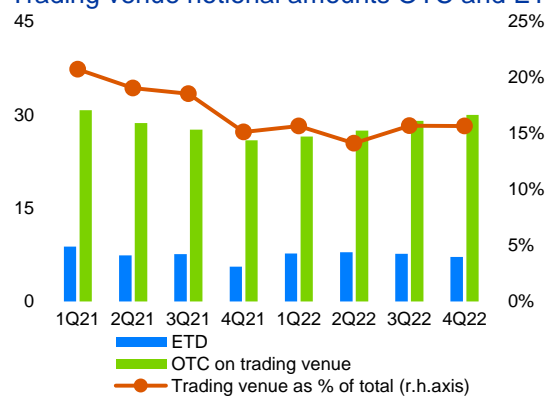
ETD versus OTC proportions



Note: Shares of total notional amount outstanding, in %. ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

MR-DR-S.55

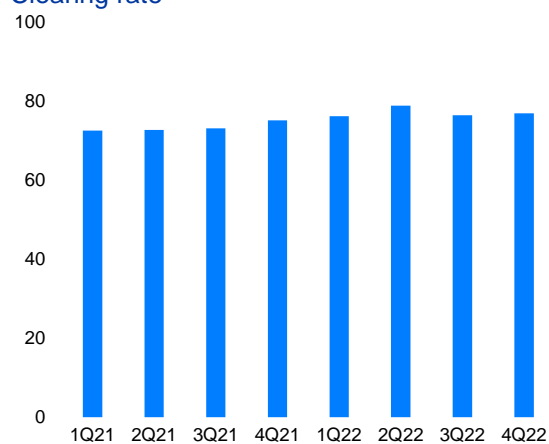
Trading venue notional amounts OTC and ETDs



Note: Notional outstanding ETD and OTC on trading venue in EUR trillions, and trading venue notional amount as a proportion of total outstanding notional amount in % (r.h. axis). ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

MR-DR-S.56

Clearing rate



Note: Central clearing rate of gross notional amount outstanding, in %.
Sources: TRs, ESMA.

MR-DR-S.57

IRDs in G4 currencies clearing per quarter



Note: Quarterly cleared notional amounts in EUR trillions and clearing rate in percent for interest rate derivatives in G4 currencies.
Sources: TRs, ESMA.

MR-DR-S.58

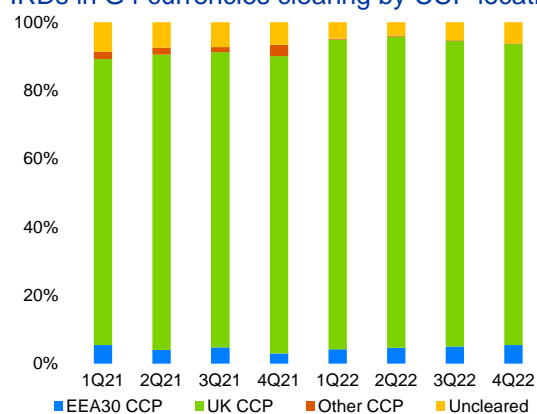
IRDs in NOK, SEK, PLN clearing per quarter



Note: Quarterly cleared notional amounts in EUR billions and clearing rate in percent for interest rate derivatives in NOK, SEK and PLN.
Sources: TRs, ESMA.

MR-DR-S.59

IRDs in G4 currencies clearing by CCP location



Note: Percentages of cleared and uncleared quarterly notional amounts by location of CCP for interest rate derivatives in G4 currencies.
Sources: TRs ESMA.

MR-DR-S.60

IRDs in NOK, SEK, PLN clearing by CCP location

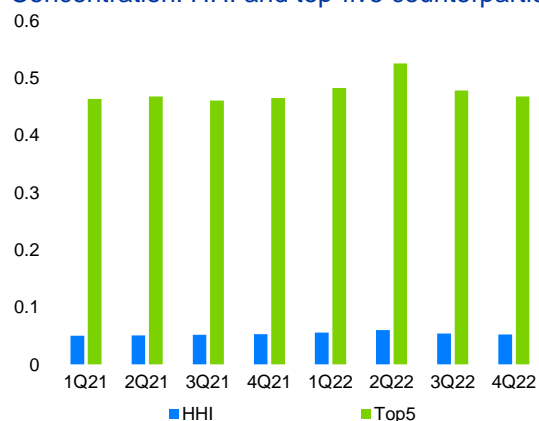


Note: Percentages of cleared and uncleared quarterly notional amounts by location of CCP for interest rate derivatives in NOK, SEK and PLN.
Sources: TRs ESMA.

Concentration and connectedness

MR-DR-S.61

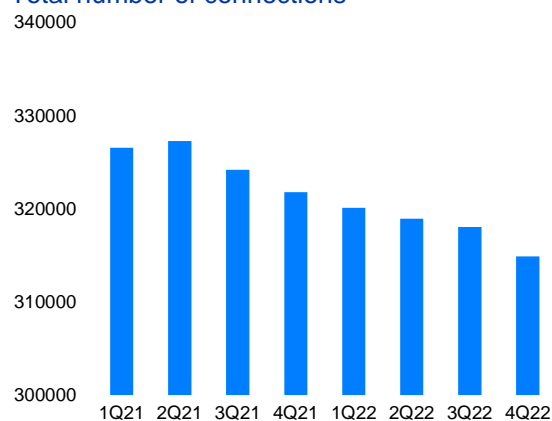
Concentration: HHI and top-five counterparties



Note: HHI and total notional amount of top-five counterparties as a proportion of the total notional amount. HHI normalised between 0 and 1.
Sources: TRs, ESMA.

MR-DR-S.63

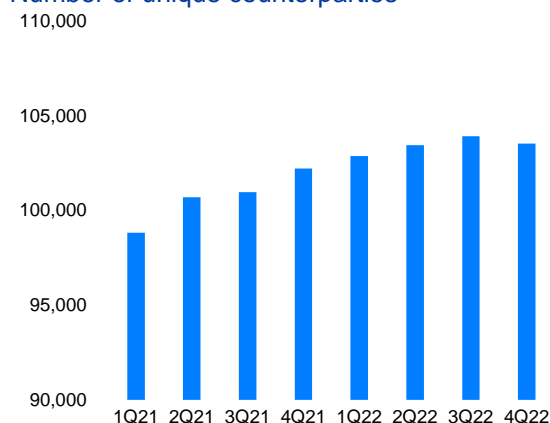
Total number of connections



Note: Total number of connections for interest rate derivatives. The number of connections for a reporting counterparty is the number of counterparties it holds a position with.
Sources: TRs, ESMA.

MR-DR-S.62

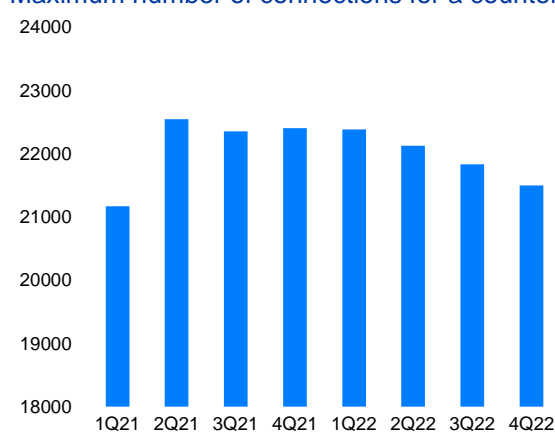
Number of unique counterparties



Note: Number of unique counterparties.
Sources: TRs, ESMA.

MR-DR-S.64

Maximum number of connections for a counterparty

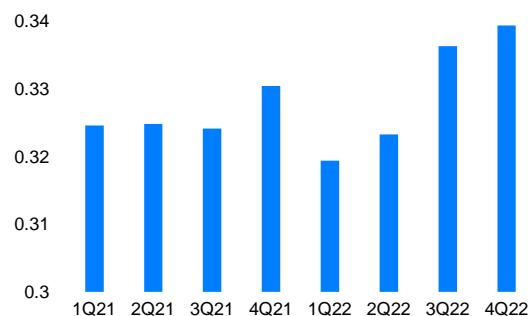


Note: Maximum number of connections into a counterparty for interest rate derivatives.
Sources: TRs, ESMA.

MR-DR-S.65

Degree interconnectedness

0.35



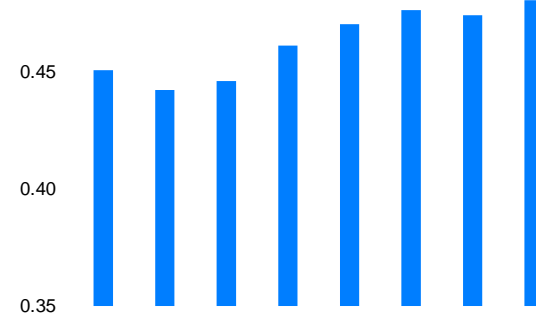
Note: The degree-interconnectedness indicator measures the number of counterparties every market participant has. It ranges from 0 (lowest) to 1 (highest interconnectedness).

Sources: TRs, ESMA.

MR-DR-S.66

Eigenvector interconnectedness

0.50



Note: The eigenvector-interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).

Sources: TRs, ESMA.

Counterparty and geographical exposures

MR-DR-S.67

EU counterparty exposures matrix 4Q21

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		2.3	0.6					
CI		27.8	13.0	5.6	1.2	1.3	25.4	8.6
IF			3.8	1.8	0.7	0.6	3.5	2.7
AIF								
PF								
UCITS								
CCP								0.6
NFC								0.5

Note: Interest rate derivative cross sectoral notional amounts between EU counterparties as of 4Q21, as percent of the total. Empty cells are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.

MR-DR-S.68

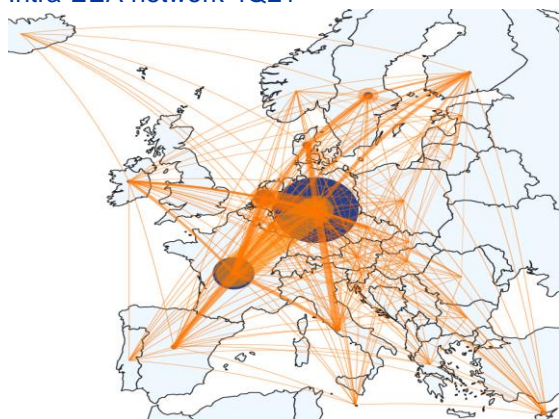
EU counterparty exposures matrix 4Q22

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		1.9	0.6					
CI		17.4	21.9	4.5	1.4	0.9	27.2	8.1
IF			4.6	1.1	0.5	0.7	5.4	2.5
AIF								
PF								
UCITS								
CCP								0.9
NFC								0.4

Note: Interest rate derivative cross sectoral notional amounts between EU counterparties as of 4Q22, as percent of the total. Empty cells are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.

MR-DR-S.69

Intra-EEA network 4Q21

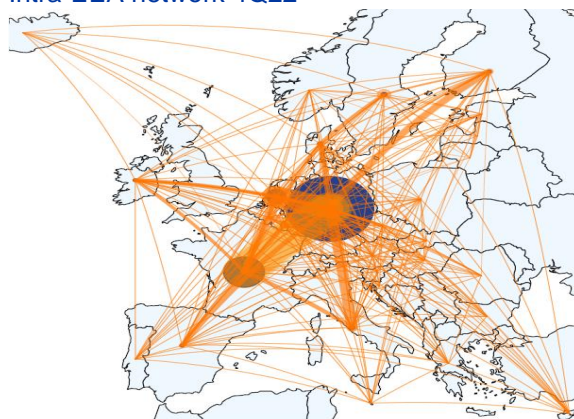


Note: Undirected network of total notional amount outstanding for interest rate derivatives as of 4Q21. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.70

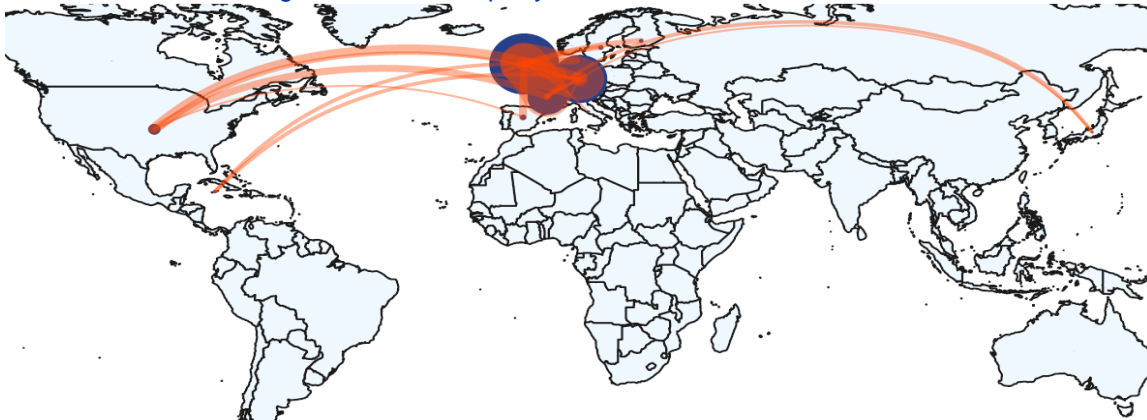
Intra-EEA network 4Q22



Note: Undirected network of total notional amount outstanding for interest rate derivatives as of 4Q22. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

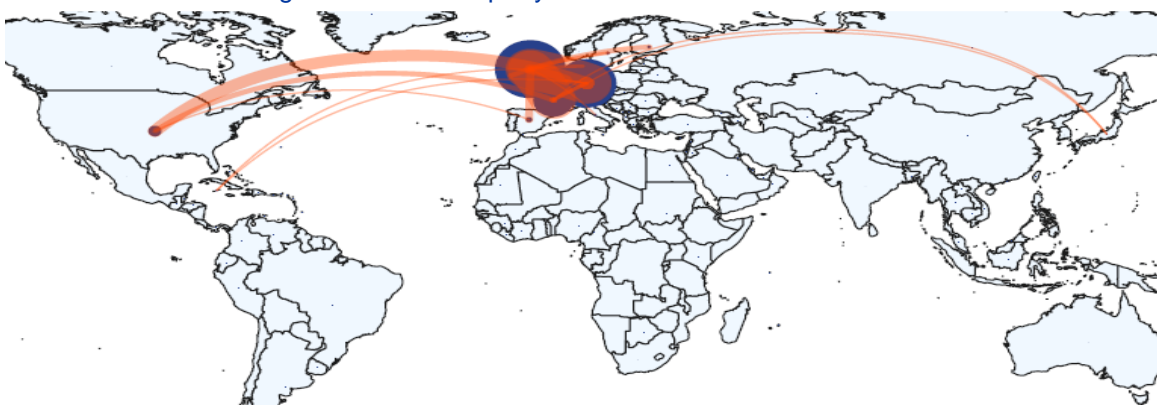
MR-DR-S.71

Global network involving an EEA counterparty 4Q21

Note: Undirected network of total notional amount outstanding for interest rate derivatives as of 4Q21. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.72

Global network involving an EEA counterparty 4Q22

Note: Undirected network of total notional amount outstanding for interest rate derivatives as of 4Q22. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

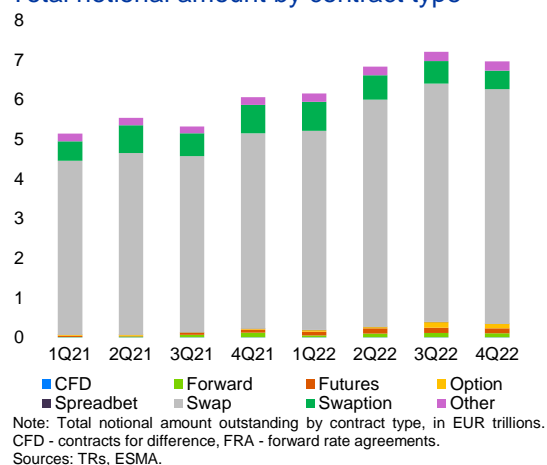
Sources: TRs, GLEIF, ESMA.

Credit derivatives

Size and composition

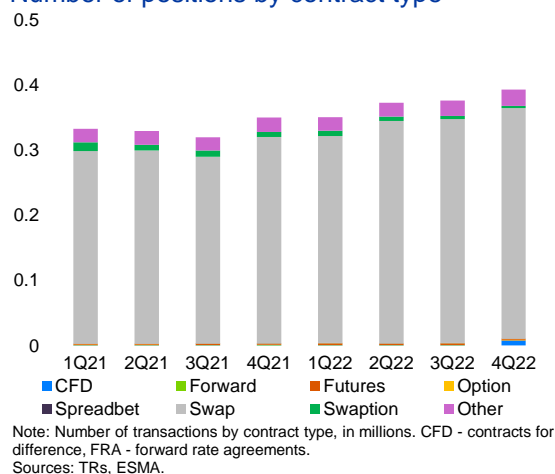
MR-DR-S.73

Total notional amount by contract type



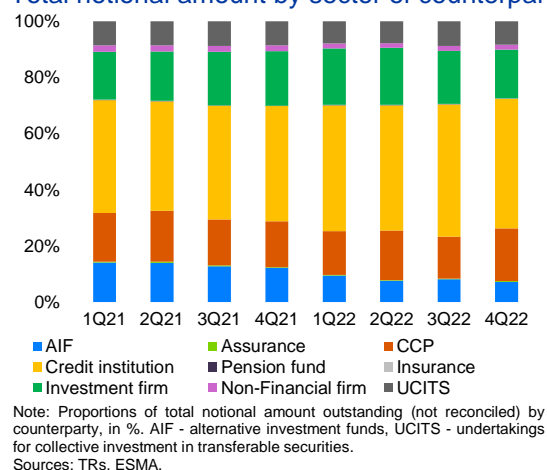
MR-DR-S.74

Number of positions by contract type



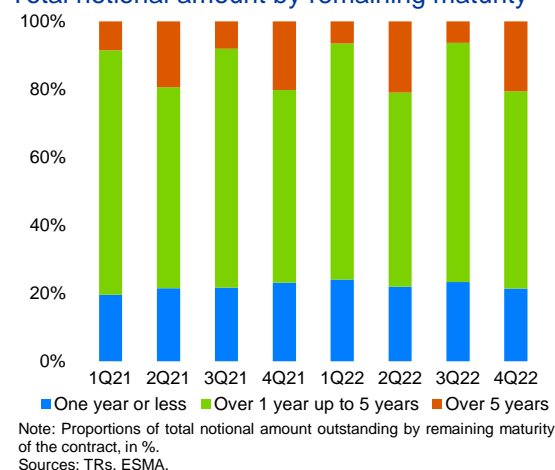
MR-DR-S.75

Total notional amount by sector of counterparty



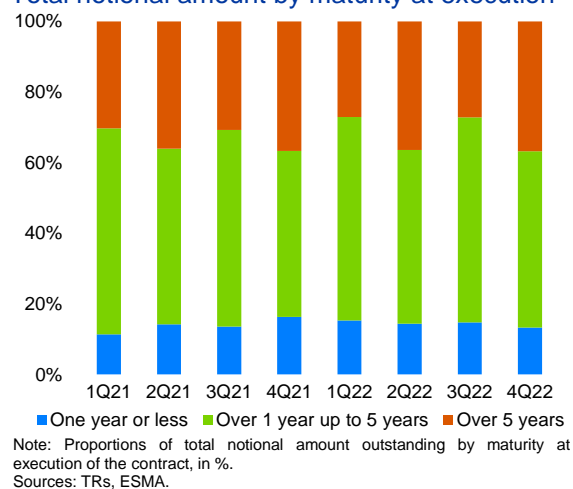
MR-DR-S.76

Total notional amount by remaining maturity



MR-DR-S.77

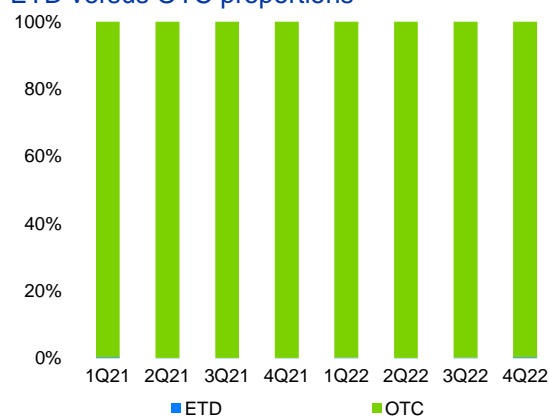
Total notional amount by maturity at execution



Execution and clearing

MR-DR-S.78

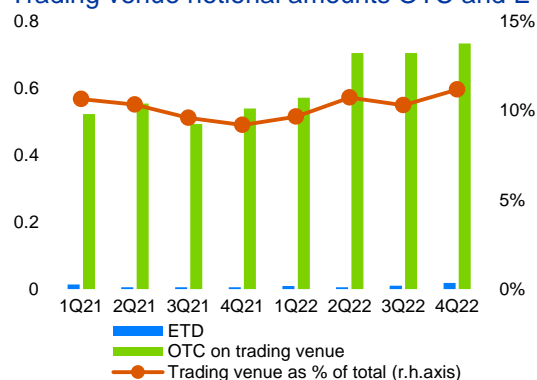
ETD versus OTC proportions



Note: Shares of gross notional amount outstanding, in %. ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ESMA.

MR-DR-S.79

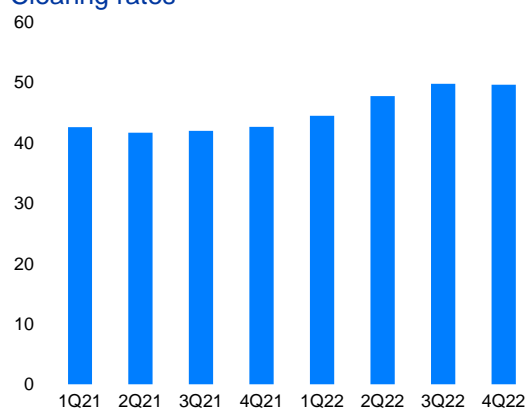
Trading venue notional amounts OTC and ETDs



Note: Notional outstanding ETD and OTC on trading venue in EUR trillions, and trading venue notional as proportion of total outstanding notional in % (r.h. axis). ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

MR-DR-S.80

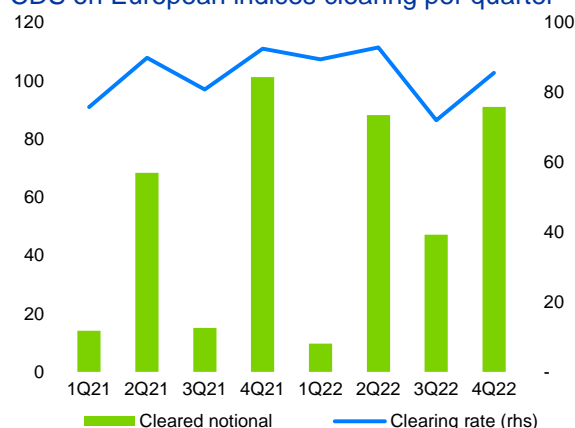
Clearing rates



Note: Central clearing rate of total notional amount outstanding, in %.
Sources: TRs, ESMA.

MR-DR-S.81

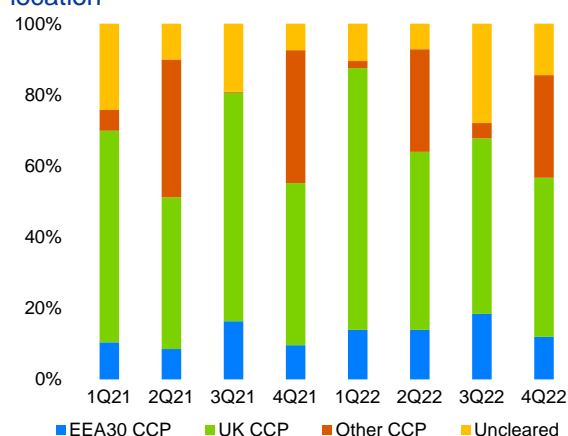
CDS on European indices clearing per quarter



Note: Quarterly cleared notional amounts in EUR billions and clearing rate in percent of CDS on European indices in percent.
Sources: TRs, ESMA.

MR-DR-S.82

CDS on European indices clearing by CCP location

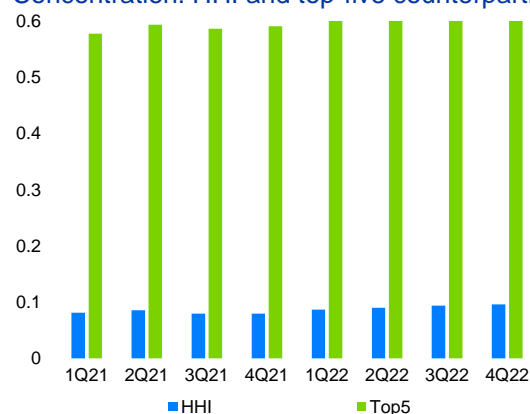


Note: Percentages of cleared and uncleared quarterly notional amounts by location of CCP for CDS on European indices.
Sources: TRs ESMA.

Concentration and connectedness

MR-DR-S.83

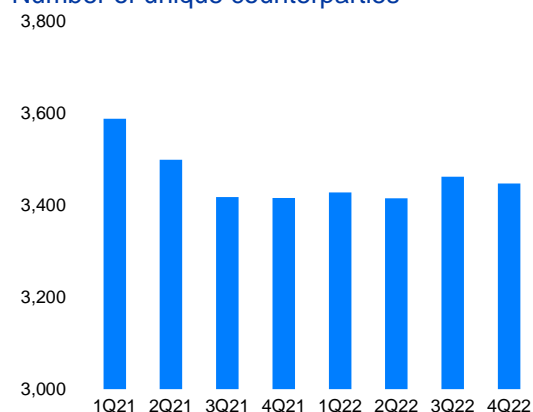
Concentration: HHI and top-five counterparties



Note: HHI and total notional amount of top-five counterparties as a proportion of the total notional amount. HHI normalised between 0 and 1.
Sources: TRs, ESMA.

MR-DR-S.84

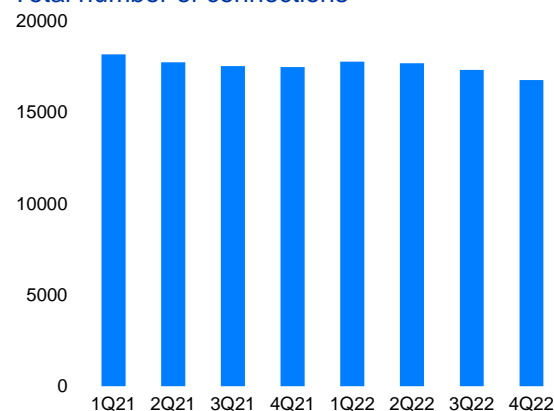
Number of unique counterparties



Note: Number of unique counterparties.
Sources: TRs, ESMA.

MR-DR-S.85

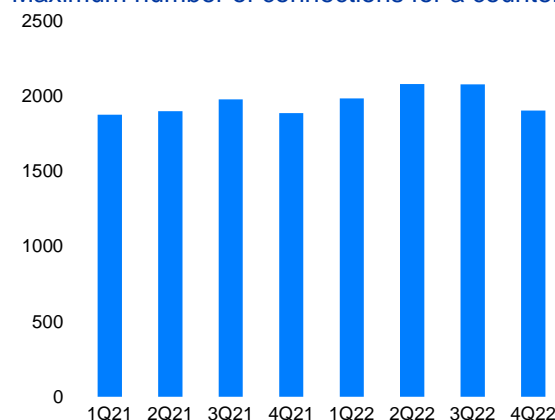
Total number of connections



Note: Total number of connections for credit derivatives. The number of connections for a reporting counterparty is the number of counterparties it holds a position with.
Sources: TRs, ESMA.

MR-DR-S.86

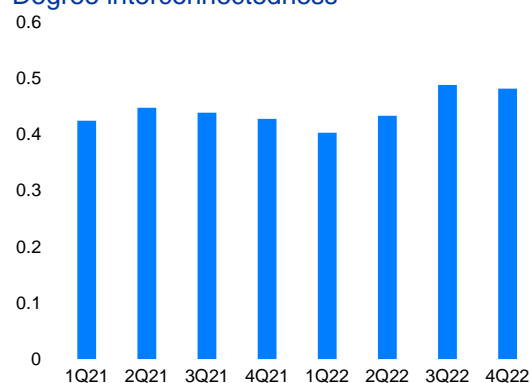
Maximum number of connections for a counterparty



Note: Maximum number of connections into a counterparty for credit derivatives.
Sources: TRs, ESMA.

MR-DR-S.87

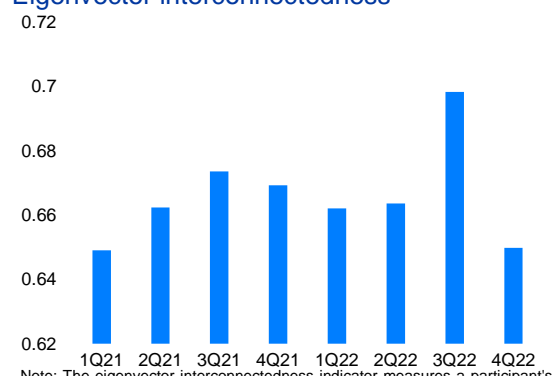
Degree interconnectedness



Note: The degree-interconnectedness indicator measures the number of counterparties every market participant has. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

MR-DR-S.88

Eigenvector interconnectedness



Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

Counterparty and geographical exposures

MR-DR-S.89

EU counterparty exposures matrix 4Q21

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		0.4	0.2					
CI		18.3	6.0	10.4		4.0	38.7	2.6
IF			1.0	5.1	0.1	6.8	2.3	1.0
AIF							1.9	0.6
PF								
UCITS							0.1	0.1
CCP								
NFC								0.3

Note: Credit derivative cross sectoral notional amounts between EU counterparties as of 4Q21, as percent of the total. Empty cells are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.

MR-DR-S.90

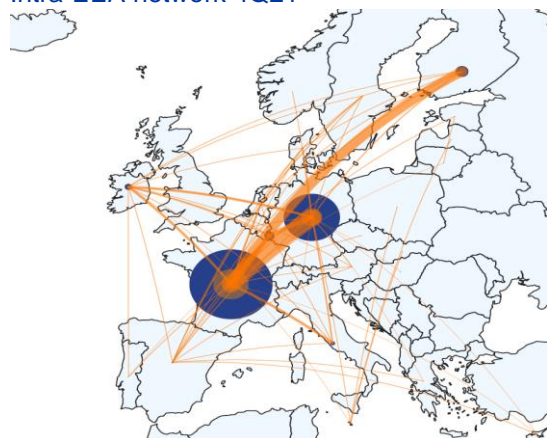
EU counterparty exposures matrix 4Q22

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		0.5	0.2					
CI		9.7	14.6	8.2		4.6	42.8	2.5
IF			1.3	3.4		6.0	3.9	1.1
AIF								0.3
PF								
UCITS								
CCP								0.2
NFC								0.4

Note: Credit derivative cross sectoral notional amounts between EU counterparties as of 4Q22, as percent of the total. Empty cells are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.

MR-DR-S.91

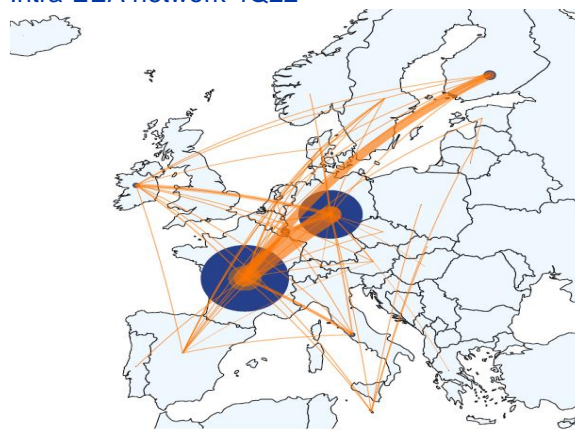
Intra-EEA network 4Q21



Note: Undirected network of total notional amount outstanding for credit derivatives as of 4Q21. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States. Sources: TRs, GLEIF, ESMA.

MR-DR-S.92

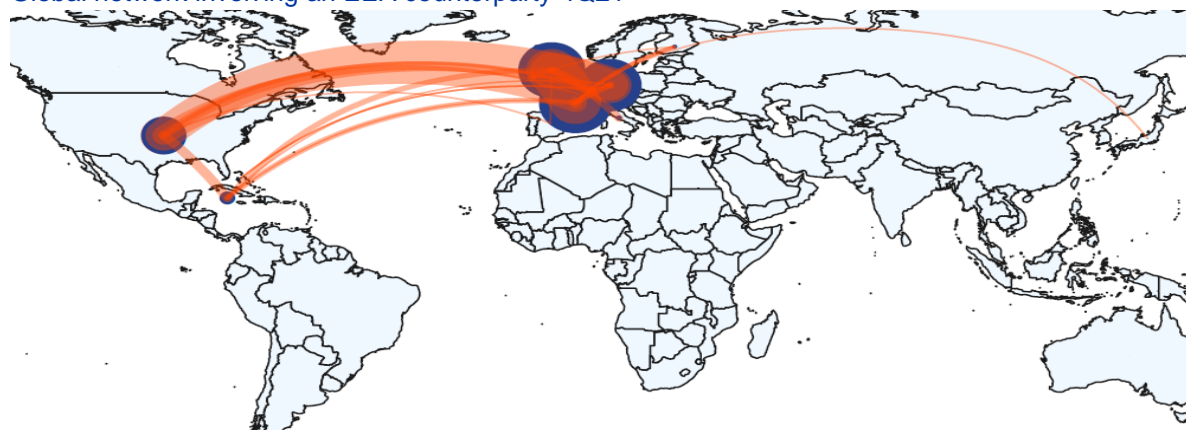
Intra-EEA network 4Q22



Note: Undirected network of total notional amount outstanding for credit derivatives as of 4Q22. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States. Sources: TRs, GLEIF, ESMA.

MR-DR-S.93

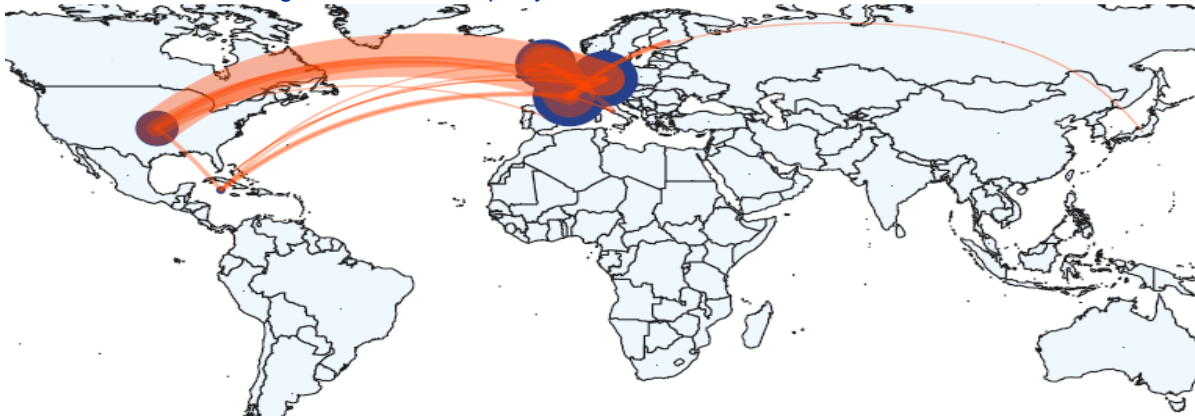
Global network involving an EEA counterparty 4Q21



Note: Undirected network of total notional amount outstanding for credit derivatives as of 4Q21. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States. Sources: TRs, GLEIF, ESMA.

MR-DR-S.94

Global network involving an EEA counterparty 4Q22



Note: Undirected network of total notional amount outstanding for credit derivatives as of 4Q22. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

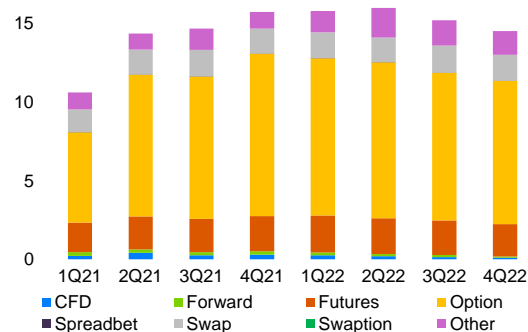
Equity derivatives

Size and composition

MR-DR-S.95

Total notional amount by contract type

20

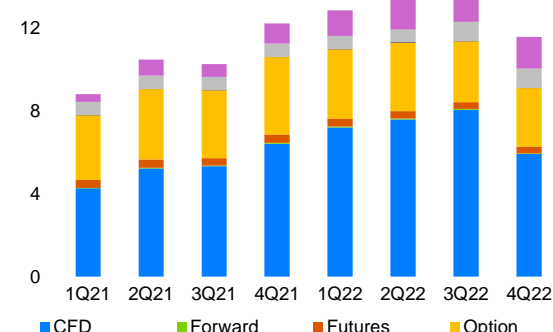


Note: Total notional amount outstanding by contract type, in EUR trillions. CFD - contracts for difference, FRA - forward rate agreements. Sources: TRs, ESMA.

MR-DR-S.96

Number of positions by contract type

16

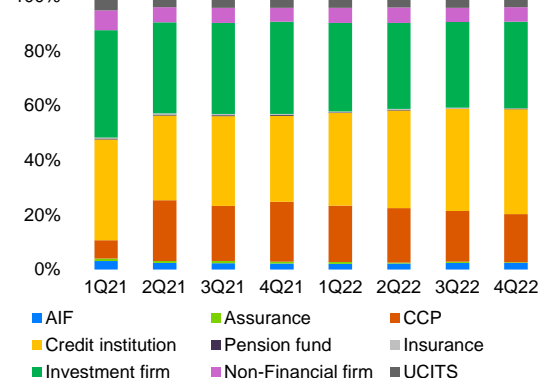


Note: Number of transactions by contract type, in millions. CFD - contracts for difference, FRA - forward rate agreements. Sources: TRs, ESMA.

MR-DR-S.97

Total notional amount by sector of counterparty

100%

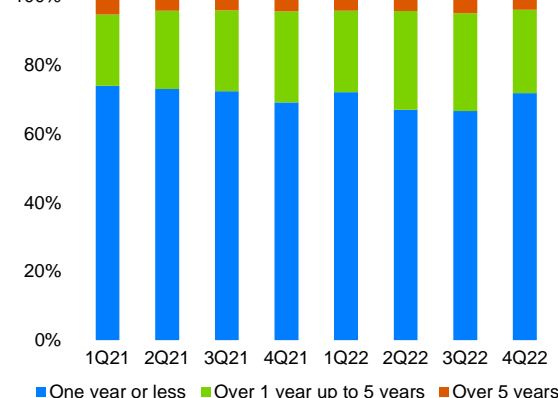


Note: Proportions of total notional amount outstanding (not reconciled) by counterparty, in %. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities. Sources: TRs, ESMA.

MR-DR-S.98

Total notional amount by remaining maturity

100%

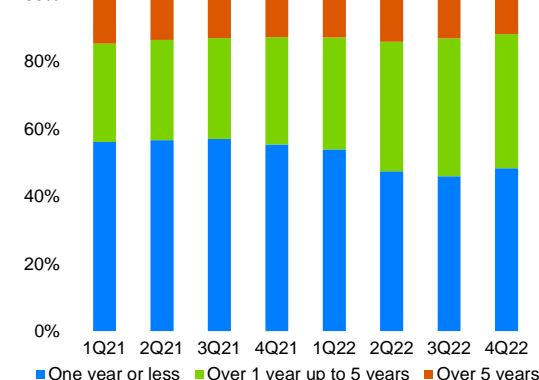


Note: Proportions of total notional amount outstanding by remaining maturity of the contract, in %. Sources: TRs, ESMA.

MR-DR-S.99

Total notional amount by maturity at execution

100%

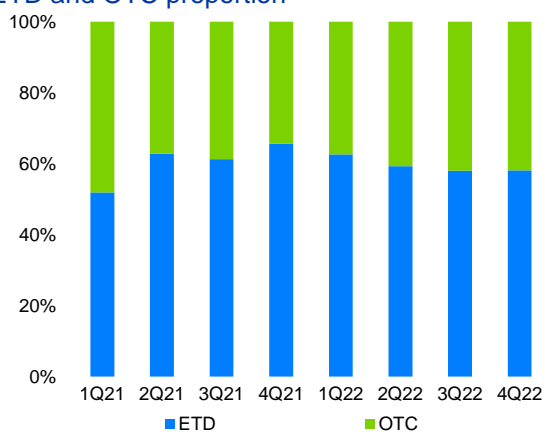


Note: Proportions of total notional amount outstanding by maturity at execution of the contract, in %. Sources: TRs, ESMA.

Execution and clearing

MR-DR-S.100

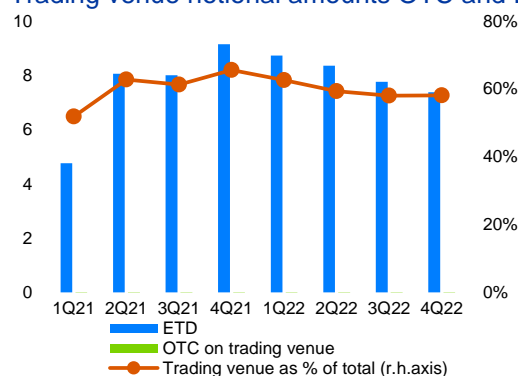
ETD and OTC proportion



Note: Shares of gross notional amount outstanding, in %. ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ESMA.

MR-DR-S.101

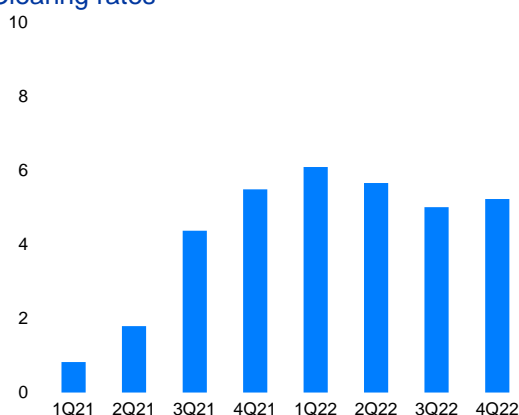
Trading venue notional amounts OTC and ETDs



Note: Notional outstanding ETD and OTC on trading venue in EUR trillions, and trading venue notional as proportion of total outstanding notional in % (r.h. axis). ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

MR-DR-S.102

Clearing rates



Note: Central clearing rate of gross notional amount outstanding in %.
Sources: TRs, ESMA.

Concentration and connectedness

MR-DR-S.103

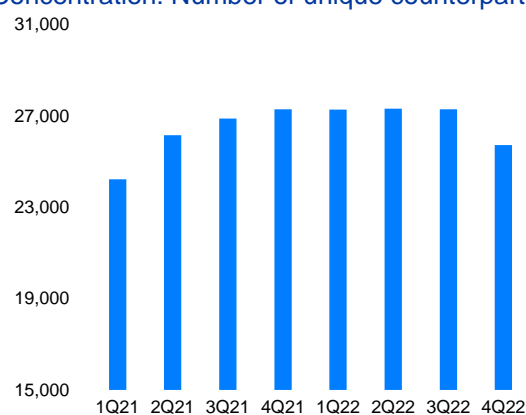
Concentration: HHI and top-five counterparties



Note: HHI and total notional amount of top-five counterparties as a proportion of the total notional amount. HHI normalised between 0 and 1.
Sources: TRs, ESMA.

MR-DR-S.104

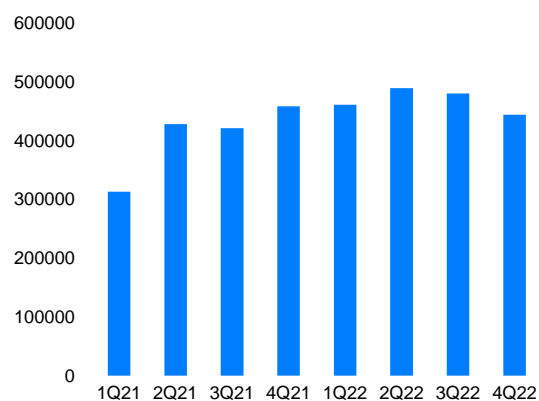
Concentration: Number of unique counterparties



Note: Number of unique counterparties.
Sources: TRs, ESMA.

MR-DR-S.105

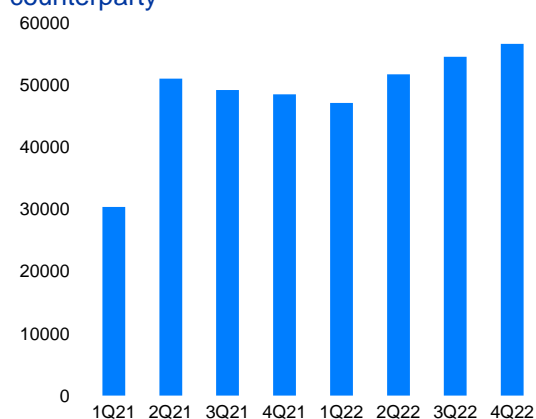
Total number of connections



Note: Total number of connections for equity derivatives. The number of connections for a reporting counterparty is the number of counterparties it holds a position with.
Sources: TRs, ESMA.

MR-DR-S.106

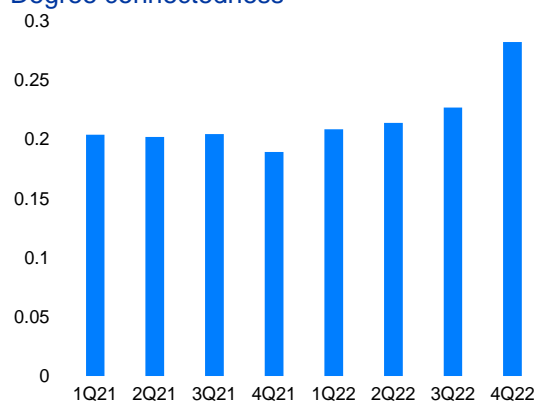
Maximum number of connections for a counterparty



Note: Maximum number of connections into a counterparty for equity derivatives.
Sources: TRs, ESMA.

MR-DR-S.107

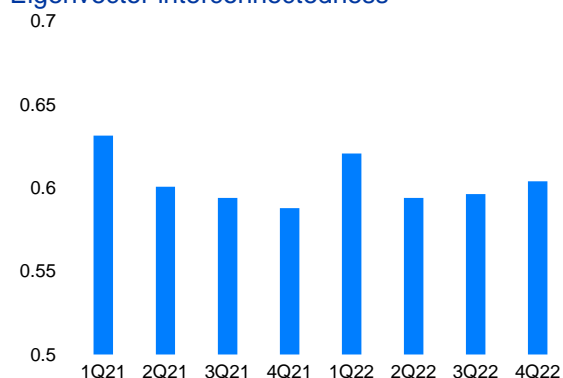
Degree connectedness



Note: The degree-interconnectedness indicator measures the number of counterparties every market participant has. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

MR-DR-S.108

Eigenvector interconnectedness



Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

Counterparty and geographical exposures

MR-DR-S.109

EU counterparty exposures matrix 4Q21

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		2.3	0.6					
CI		27.8	13.0	5.6	1.2	1.3	25.4	8.6
IF			3.8	1.8	0.7	0.6	3.5	2.7
AIF								
PF								
UCITS								
CCP								0.6
NFC								0.5

Note: Cross sectoral notional amounts between EU counterparties, as percent of the total. Empty cases are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.
Sources: TRs, GLEIF, ESMA.

MR-DR-S.110

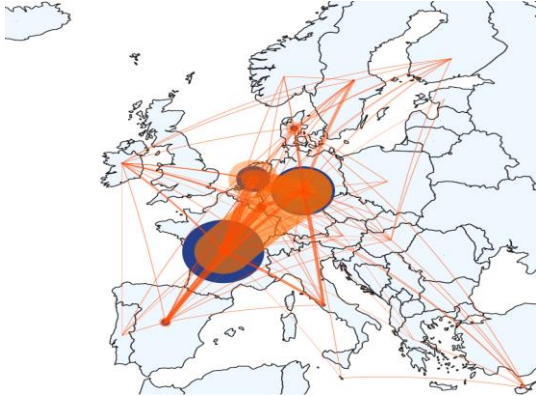
EU counterparty exposures matrix 4Q22

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		1.5	0.3					
CI		6.6	22.3	3.1	0.3	4.9	22.2	8.3
IF			11.4	1.1	0.2	2.8	10.5	4.3
AIF								
PF								
UCITS								
CCP								
NFC								0.1

Note: Cross sectoral notional amounts between EU counterparties, as percent of the total. Empty cases are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.
Sources: TRs, GLEIF, ESMA.

MR-DR-S.111

Intra-EEA network 4Q21

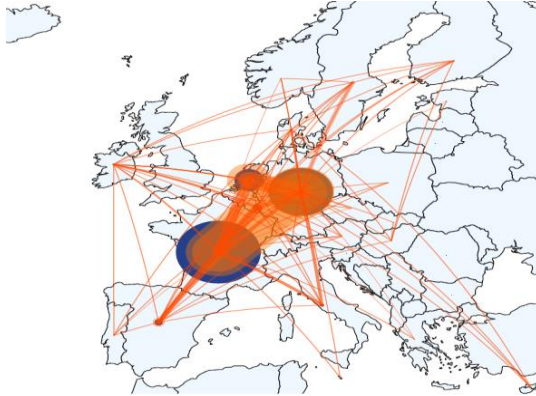


Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.112

Intra-EEA network 4Q22

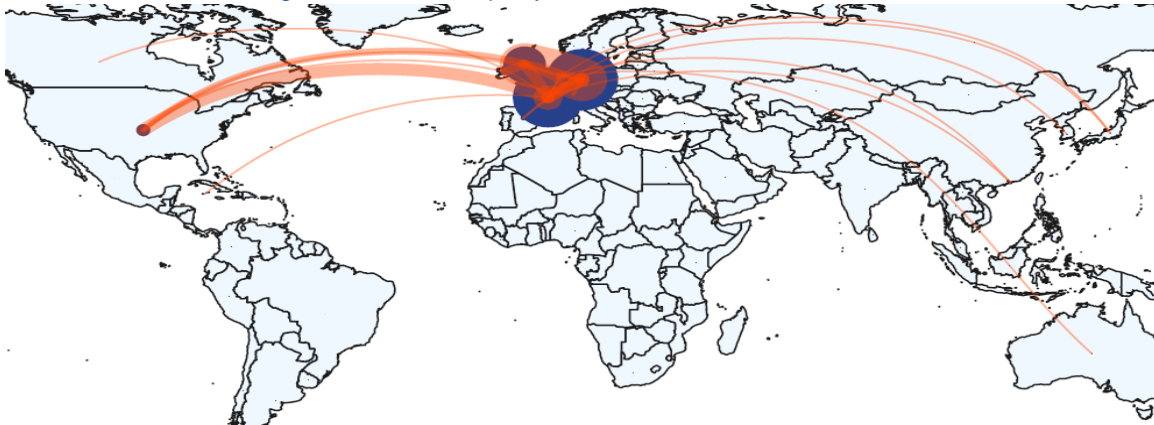


Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.113

Global network involving an EEA counterparty 4Q21

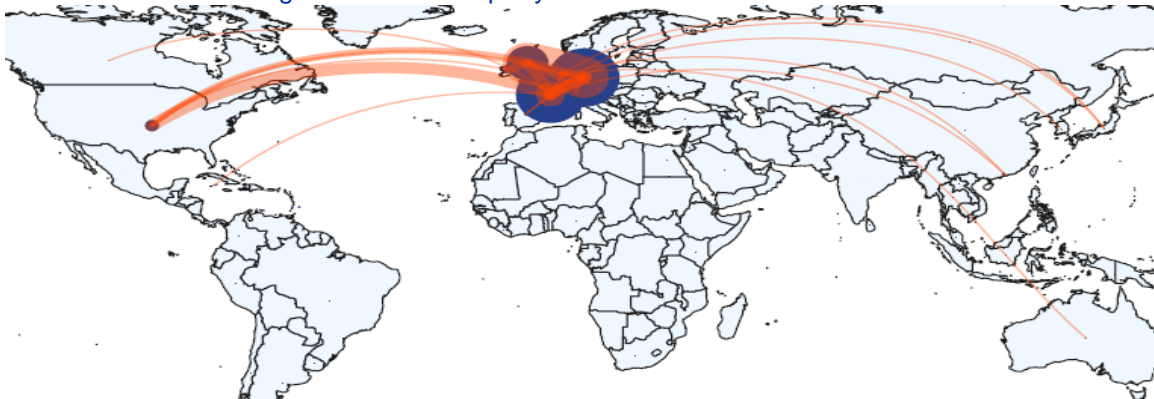


Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.114

Global network involving an EEA counterparty 4Q22



Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

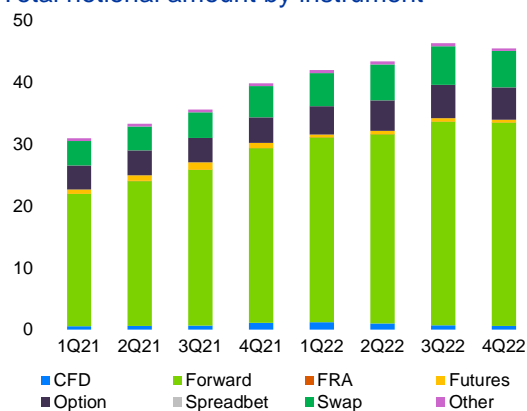
Sources: TRs, GLEIF, ESMA.

Currency derivatives

Size and composition

MR-DR-S.115

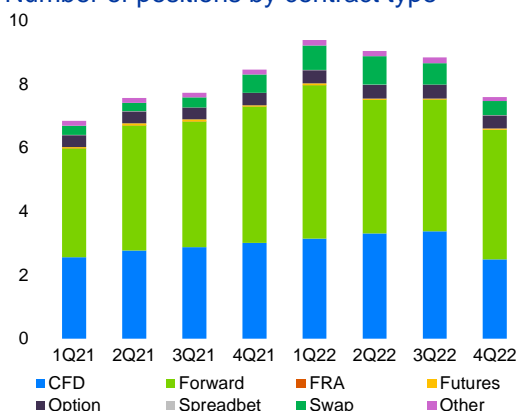
Total notional amount by instrument



Note: Total notional amount outstanding by contract type, in EUR trillions. CFD - contracts for difference, FRA - forward rate agreements. Sources: TRs, ESMA.

MR-DR-S.116

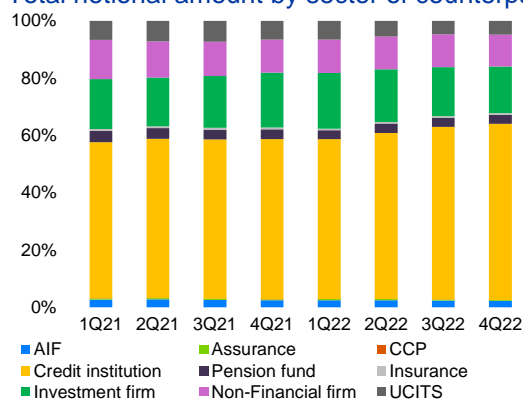
Number of positions by contract type



Note: Number of transactions by contract type, in millions. CFD - contracts for difference, FRA - forward rate agreements. Sources: TRs, ESMA.

MR-DR-S.117

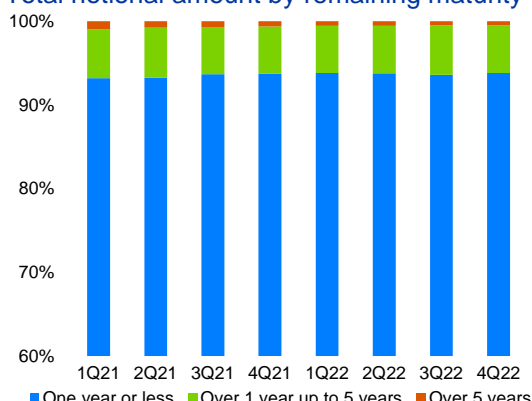
Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty, in %. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities. Sources: TRs, ESMA.

MR-DR-S.118

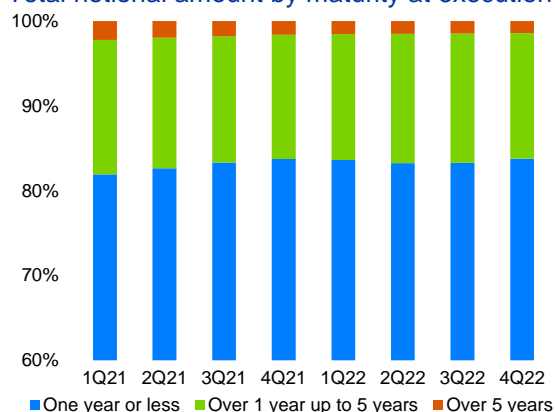
Total notional amount by remaining maturity



Note: Proportions of total notional amount outstanding by remaining maturity of the contract, in %. Sources: TRs, ESMA.

MR-DR-S.119

Total notional amount by maturity at execution

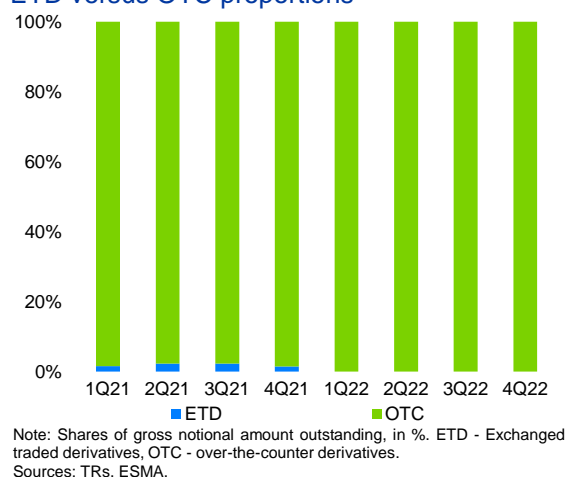


Note: Proportions of total notional amount outstanding by maturity at execution of the contract, in %. Sources: TRs, ESMA.

Execution and clearing

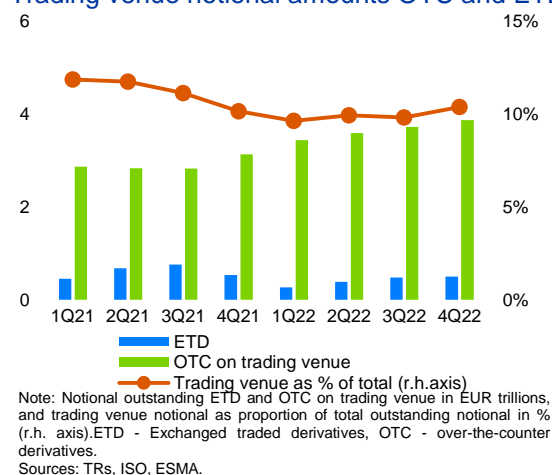
MR-DR-S.120

ETD versus OTC proportions



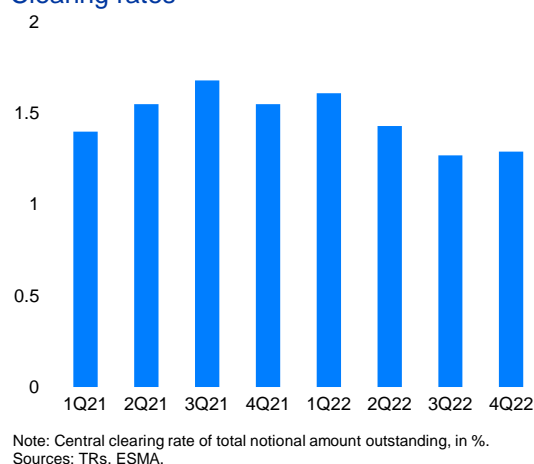
MR-DR-S.121

Trading venue notional amounts OTC and ETDs



MR-DR-S.122

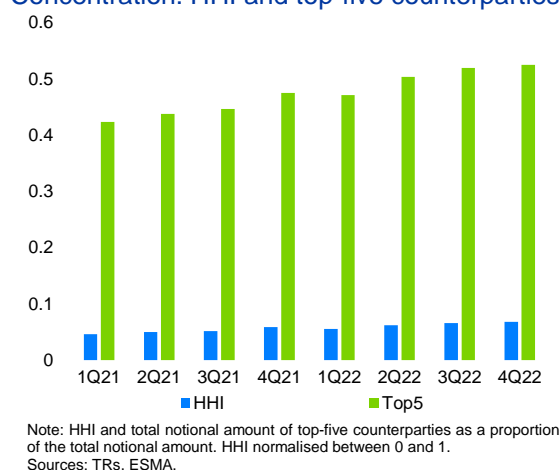
Clearing rates



Concentration and connectedness

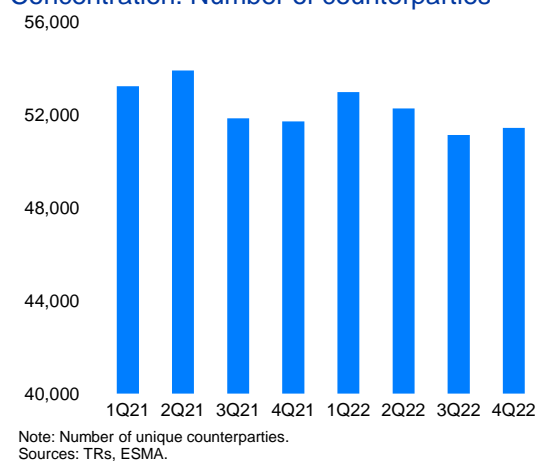
MR-DR-S.123

Concentration: HHI and top-five counterparties



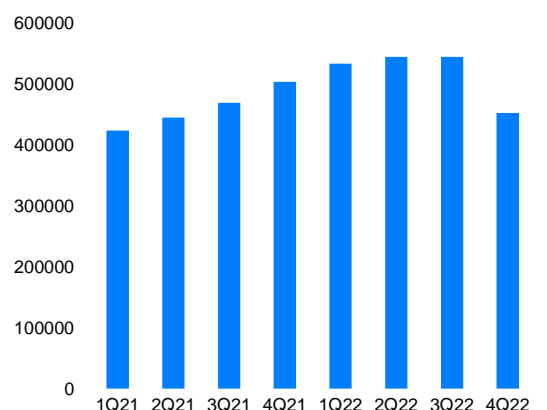
MR-DR-S.124

Concentration: Number of counterparties



MR-DR-S.125

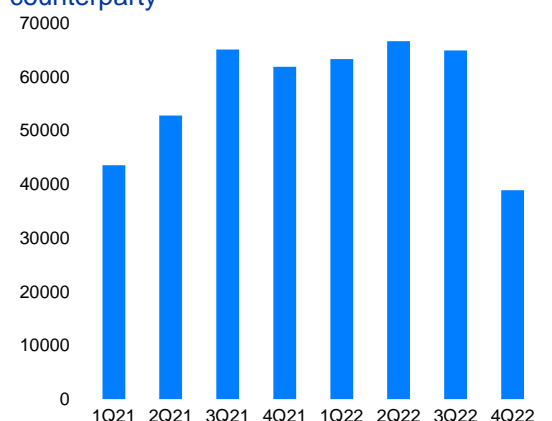
Total number of connections



Note: Total number of connections for currency derivatives. The number of connections for a reporting counterparty is the number of counterparties it holds a position with.
Sources: TRs, ESMA.

MR-DR-S.126

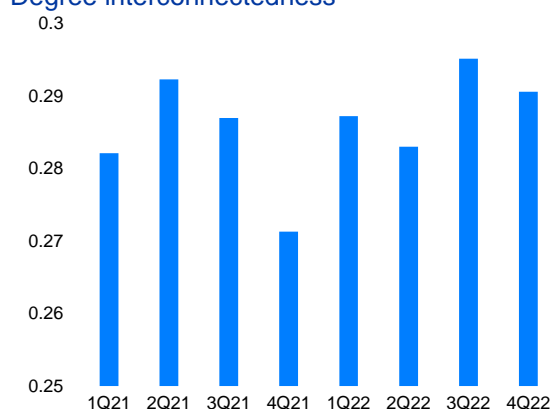
Maximum number of connections for a counterparty



Note: Maximum number of connections into a counterparty for currency derivatives.
Sources: TRs, ESMA.

MR-DR-S.127

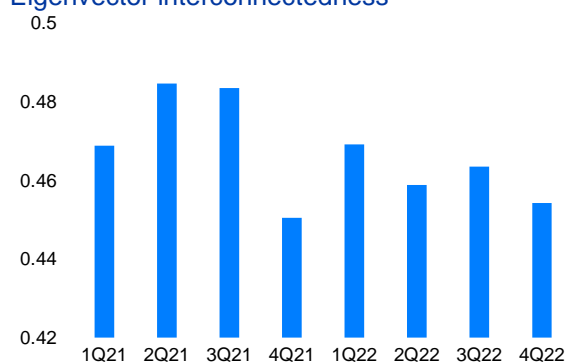
Degree interconnectedness



Note: The degree-interconnectedness indicator measures the number of counterparties every market participant has. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

MR-DR-S.128

Eigenvector interconnectedness



Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

Counterparty and geographical exposures

MR-DR-S.129

EU counterparty exposures matrix 4Q21

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		1.9	0.6					
CI		39.7	10.7	3.8	2.4	7.2		18.3
IF			2.4	0.8	0.9	1.7		5.3
AIF								0.3
PF								
UCITS								0.3
CCP								
NFC								3.7

Note: Cross sectoral notional amounts between EU counterparties, as percent of the total. Empty cases are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.
Sources: TRs, GLEIF, ESMA.

MR-DR-S.130

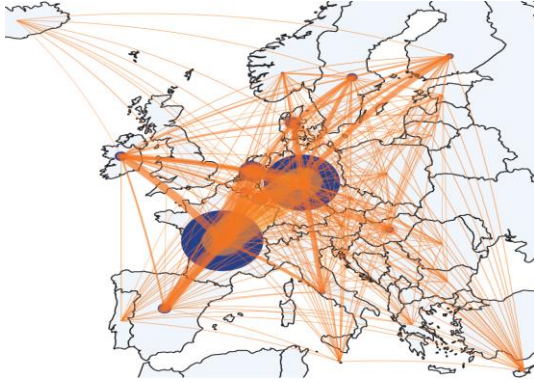
EU counterparty exposures matrix 4Q22

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins		2.0	0.5					
CI		28.0	20.1	5.0	1.9	4.3		23.4
IF			2.8	0.8	0.6	1.7		4.7
AIF								0.3
PF								
UCITS								0.3
CCP								
NFC								3.4

Note: Cross sectoral notional amounts between EU counterparties, as percent of the total. Empty cases are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.
Sources: TRs, GLEIF, ESMA.

MR-DR-S.131

Intra-EEA network 4Q21



Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.132

Intra-EEA network 4Q22

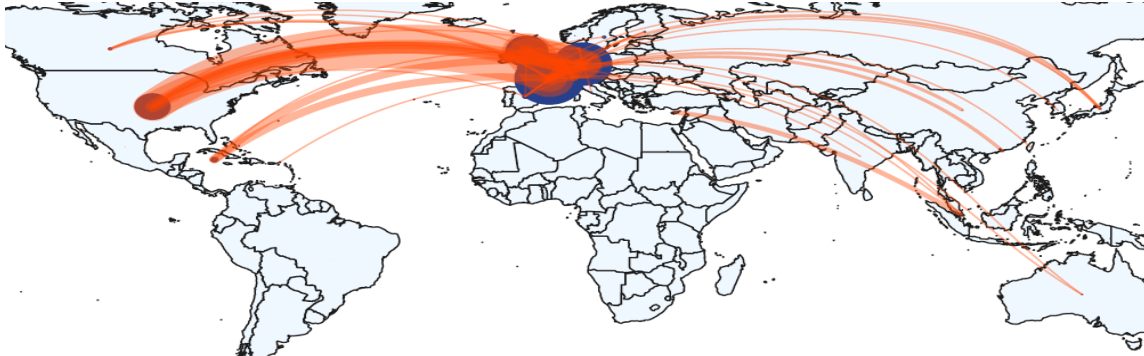


Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.133

Global network involving an EEA counterparty 4Q21

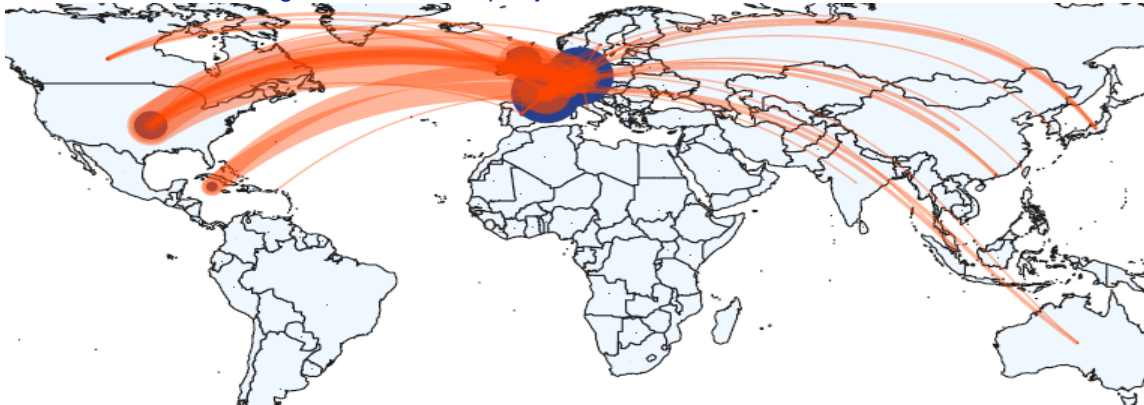


Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.134

Global network involving an EEA counterparty 4Q22



Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

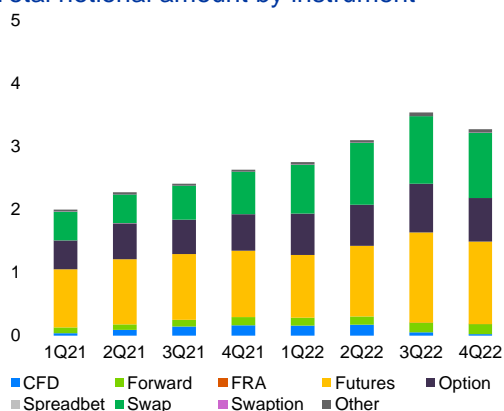
Sources: TRs, GLEIF, ESMA.

Commodity derivatives

Size and composition

MR-DR-S.135

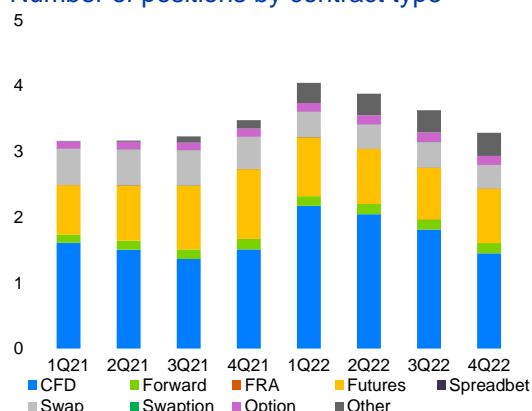
Total notional amount by instrument



Note: Total notional amount outstanding by contract type, in EUR tn. CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

MR-DR-S.136

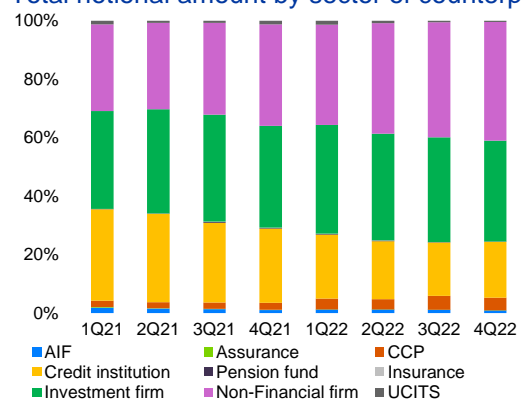
Number of positions by contract type



Note: Number of derivatives by contract type, in million. CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

MR-DR-S.137

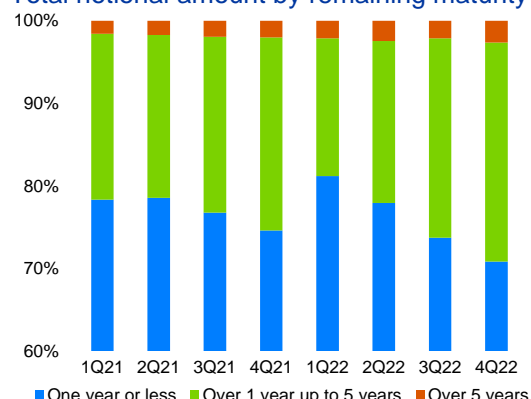
Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty, in %. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.
Sources: TRs, ESMA.

MR-DR-S.138

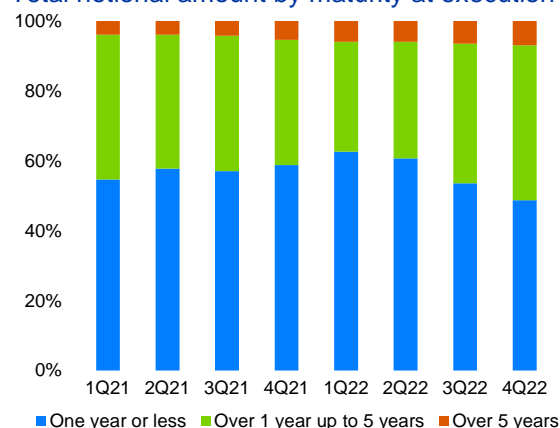
Total notional amount by remaining maturity



Note: Proportions of total notional amount outstanding by remaining maturity of the contract, in %.
Sources: TRs, ESMA.

MR-DR-S.139

Total notional amount by maturity at execution

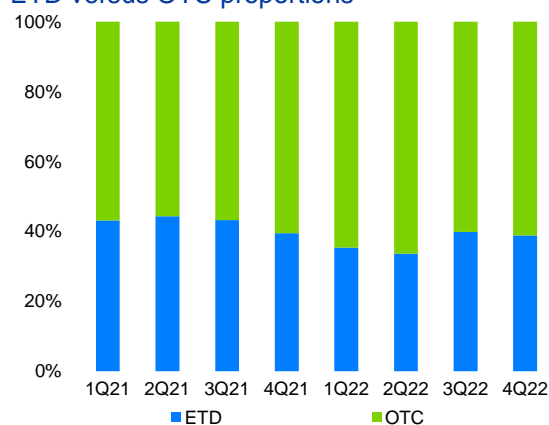


Note: Proportions of total notional amount outstanding by maturity at execution of the contract, in %.
Sources: TRs, ESMA.

Execution and clearing

MR-DR-S.140

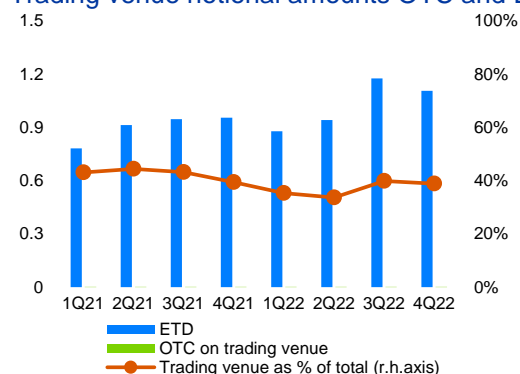
ETD versus OTC proportions



Note: Shares of gross notional amount outstanding, in %. ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ESMA.

MR-DR-S.141

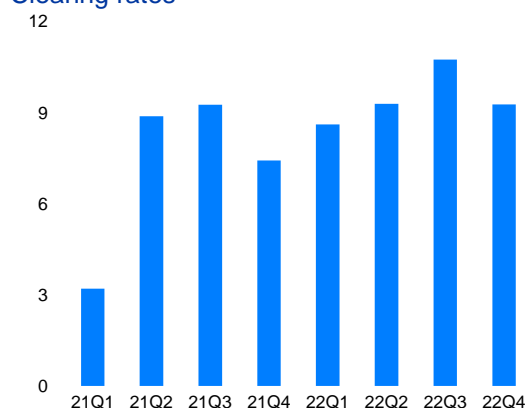
Trading venue notional amounts OTC and ETDs



Note: Notional outstanding ETD and OTC on trading venue in EUR trillions, and trading venue notional as proportion of total outstanding notional in % (r.h. axis). ETD - Exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

MR-DR-S.142

Clearing rates

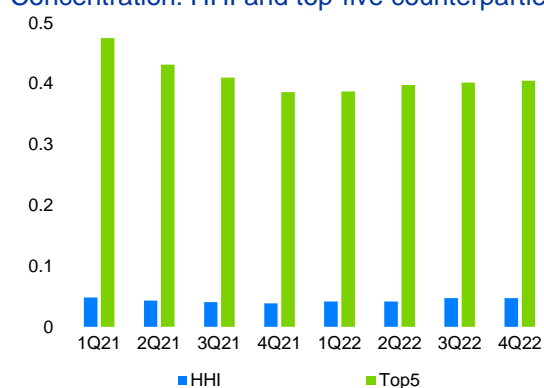


Note: Central clearing rate of gross notional amount outstanding, in %.
Sources: TRs, ESMA.

Concentration and connectedness

MR-DR-S.143

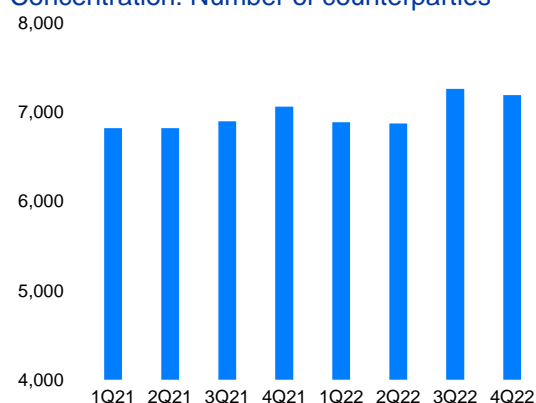
Concentration: HHI and top-five counterparties



Note: HHI and gross exposure of top-five counterparties calculated on aggregated gross notional positions of counterparties. HHI normalised between 0 and 1.
Sources: TRs, ESMA.

MR-DR-S.144

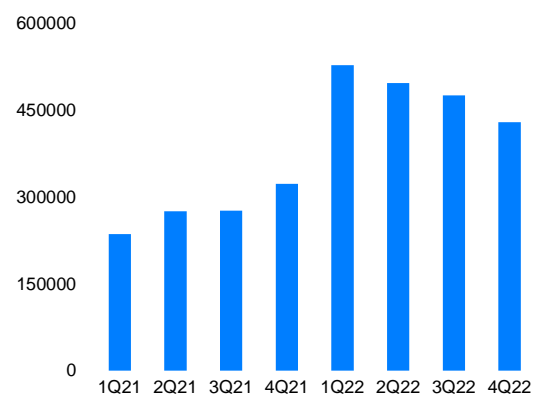
Concentration: Number of counterparties



Note: Number of unique counterparties.
Sources: TRs, ESMA.

MR-DR-S.145

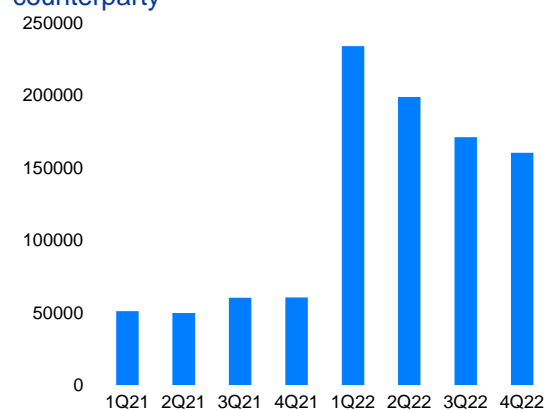
Total number of connections



Note: Total number of connections for commodity derivatives. The number of connections for a reporting counterparty is the number of counterparties it holds a position with.
Sources: TRs, ESMA.

MR-DR-S.146

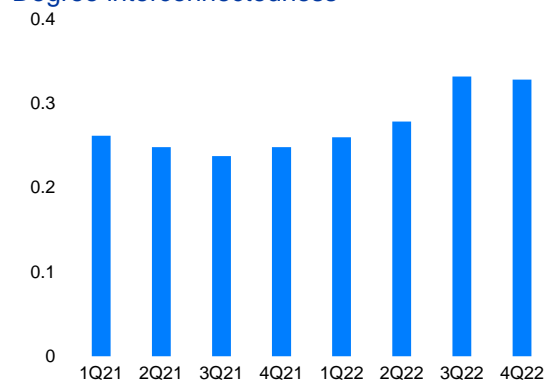
Maximum number of connections for a counterparty



Note: Maximum number of connections into a counterparty for commodity derivatives.
Sources: TRs, ESMA.

MR-DR-S.147

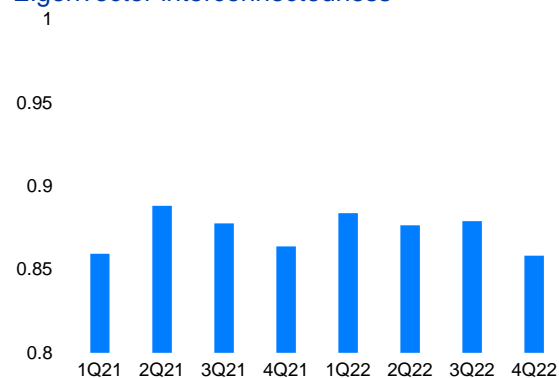
Degree interconnectedness



Note: The degree-interconnectedness indicator measures the number of counterparties every market participant has. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

MR-DR-S.148

Eigenvector interconnectedness



Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).
Sources: TRs, ESMA.

Counterparty and geographical exposures

MR-DR-S.149

EU counterparty exposures matrix 4Q21

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins			0.2					
CI		16.9	12.8	0.3	0.5	1.0	3.4	33.3
IF			3.2	0.2	0.4	0.3	0.7	11.5
AIF								
PF								
UCITS								
CCP							0.1	0.9
NFC								14.4

Note: Cross sectoral notional amounts between EU counterparties, as percent of the total. Empty cases are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.
Sources: TRs, GLEIF, ESMA.

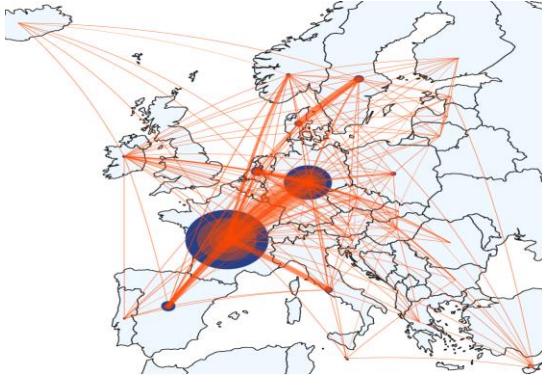
MR-DR-S.150

EU counterparty exposures matrix 4Q22

	Ins	CI	IF	AIF	PF	UCITS	CCP	NFC
Ins								
CI		4.4	14.1	0.6	0.2	0.3	6.5	35.5
IF			1.6	0.3	0.2	0.3	1.2	14.3
AIF								
PF								
UCITS								
CCP							0.1	1.1
NFC								19.2

Note: Cross sectoral notional amounts between EU counterparties, as percent of the total. Empty cases are less than 0.1% of the total. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; Ins=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NFC=Non-Financial.
Sources: TRs, GLEIF, ESMA.

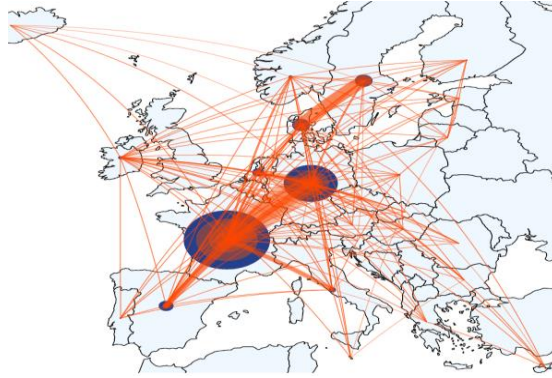
MR-DR-S.151

Intra-EEA network 4Q21

Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

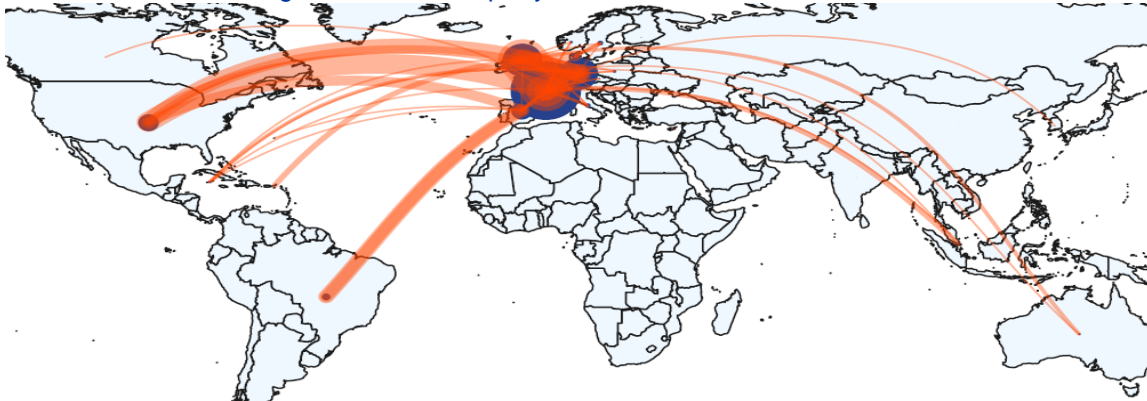
MR-DR-S.152

Intra-EEA network 4Q22

Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

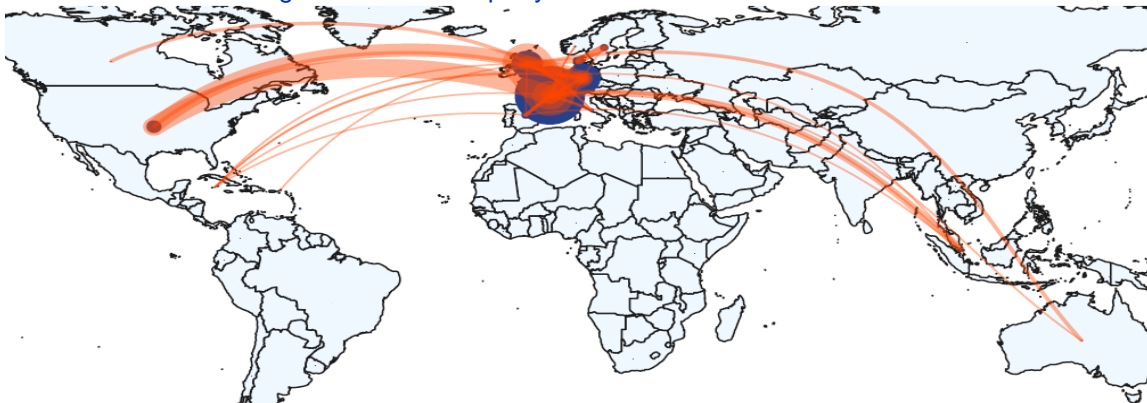
MR-DR-S.153

Global network involving an EEA counterparty 4Q21

Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

MR-DR-S.154

Global network involving an EEA counterparty 4Q22

Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from the two Member States.

Sources: TRs, GLEIF, ESMA.

Annexes

Glossary

Central counterparty: an entity that interposes itself between the two sides of a transaction, becoming the buyer to every seller and the seller to every buyer.

Clearing: the process of establishing positions, including the calculation of net obligations, and ensuring that financial instruments, cash, or both, are available to secure the exposures arising from those positions.

Clearing member: an undertaking that participates in a CCP and that is responsible for discharging the financial obligations arising from that participation.

Client: an undertaking with a contractual relationship with a clearing member of a CCP that enables that undertaking to clear its transactions with that CCP.

Commodity forward: a contract between two parties to purchase or sell a commodity or commodity index at an agreed price on a future date.

Commodity option: a contract that gives the buyer the right (but not the obligation) to purchase or sell a commodity or commodity index at an agreed price at or by a specified date.

Commodity swap: a contract between two parties to exchange sequences of payments during a specified period, whereby at least one sequence of payments is tied to a commodity price or commodity index.

Counterparty: an entity that takes the opposite side of a financial contract, for example, the borrower in a loan contract, or the buyer in a sales transaction.

Credit default swap: a contract whereby the seller commits to repay an obligation (e.g. bond) underlying the contract at par in the event of a default. To produce this guarantee, a regular premium is paid by the buyer during a specified period.

Credit derivative: a derivative whose redemption value is linked to specified credit-related events, such as bankruptcy, credit downgrade, non-payment or default of a borrower. For example, a lender might use a credit derivative to hedge the risk that a borrower might default. Common credit derivatives include credit default swaps (CDS), total return swaps and credit spread options.

Currency option: a contract that gives the buyer the right (but not the obligation) to purchase or sell a currency at an agreed exchange rate at or by a specified date.

Currency swap: a contract between two parties to exchange sequences of payments during a specified period, whereby each sequence is tied to a different currency. At the end of the swap, principal amounts in the different currencies are usually exchanged.

Derivative: a financial instrument whose value depends on some underlying financial asset, commodity or predefined variable. Derivative, or derivative contract, means a financial instrument as set out in points (4) to (10) of Section C of Annex I to Directive 2004/39/EC, as implemented by Article 38 and 39 of Regulation (EC) No 1287/2006.

Equity forward: a contract between two parties to purchase or sell an equity or equity basket at a set price at a future date.

Equity option: a contract that gives the buyer the right (but not the obligation) to purchase or sell an equity security or basket of equities at an agreed price at or by a specified date.

Equity swap: a contract between two parties to exchange sequences of payments during a specified period, where at least one sequence is tied to an equity price or an equity index.

Exchange rate: the price of one country's currency in relation to another.

Exchange Traded Derivative: A derivative that is traded on a regulated market or on a third-country market considered to be equivalent to a regulated market in accordance with Article 28 of MiFIR (Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012), and as such does not fall within the definition of an OTC derivative as defined in Article 2(7) of Regulation (EU) No 648/2012, according to Article 2 of MiFIR.

Financial counterparty: an investment firm authorised in accordance with Directive 2004/39/EC; a credit institution authorised in accordance with Directive 2006/48/EC; an insurance undertaking authorised in accordance with Directive 73/239/EEC; an assurance undertaking authorised in accordance with Directive 2002/83/EC; a reinsurance undertaking authorised in accordance with Directive 2005/68/EC; a UCITS and, where relevant, its management company, authorised in accordance with Directive 2009/65/EC; an institution for occupational retirement provision within the

meaning of Article 6(a) of Directive 2003/41/EC; and an alternative investment fund managed by AIFMs authorised or registered in accordance with Directive 2011/61/EU.

First counterparty basis: a methodology whereby positions are allocated to the primary party to a contract.

Insurance: for this report, unless explicitly separated, insurance is the aggregation of an insurance undertaking authorised in accordance with Directive 73/239/EEC; an assurance undertaking authorised in accordance with Directive 2002/83/EC; and a reinsurance undertaking authorised in accordance with Directive 2005/68/EC.

Interconnectedness: interconnectedness is a market-level centralisation measure based on the network-centrality scores of each counterparty in the market, while the market is defined as all derivatives outstanding within an asset class. This is done using the R package igraph.⁴⁰ The underlying formula is:

$$\text{Interconnectedness}(\text{market}) = \frac{\sum (\max(c(w), w) - c(v), v)}{\sum (\max(c(w), w) - c(v), v)}$$

where $c(v)$ is the centrality of counterparty v . The market-level centrality score is then normalized by dividing it by the maximum theoretical score for a theoretical market with the same number of counterparties. It ranges between 0 and 1, 0 being the minimum level of interconnectedness and 1 the maximum. For eigenvector interconnectedness the most centralized structure is the graph with a single edge (and potentially many isolates).

Interest rate option: a contract that gives the buyer the right (but not the obligation) to pay or receive an agreed interest rate on a predetermined principal at or by a specified date.

Interest rate swap: a contract to exchange periodic payments related to interest rates on a single currency. It can be fixed for floating, or floating for floating based on different indices. This group includes those swaps whose notional amount principal is amortised according to a fixed schedule independent of interest rates.

Notional amount outstanding: total nominal or notional amount value of all derivatives contracts concluded and not yet settled on the reporting date.

Over the counter: an 'OTC derivative' or 'OTC derivative contract' means a derivative contract the execution of which does not take place on a regulated market as within the meaning of Article 4(1)(14) of Directive 2004/39/EC or on a third-country market considered as equivalent to a regulated market in accordance with Article 19(6) of Directive 2004/39/EC.

Pension funds: for this report, an institution for occupational retirement provision within the meaning of Article 6(a) of Directive 2003/41/EC.

Portfolio compression: portfolio compression is defined in MIFIR as a risk reduction service in which two or more counterparties wholly or partially terminate some or all of the derivatives submitted by those counterparties for inclusion in the portfolio compression and replace the terminated derivatives with another derivative whose combined notional amount value is less than the combined notional amount value of the terminated derivatives.

Remaining maturity: the period from the reference date until the final contractually scheduled payment.

Swap: financial derivative in which two parties agree to exchange payment streams based on a specified notional amount for a specified period.

Trade repository: a legal person that centrally collects and maintains the records of derivatives.

⁴⁰ Csardi G, Nepusz T: The igraph software package for complex network research, InterJournal, Complex Systems 1695. 2006. <http://igraph.org>

List of abbreviations

AIF	Alternative Investment Fund
BIS	Bank for International Settlements
CCP	Central Counterparty
CDs	Credit Derivatives
CDS	Credit Default Swap
CR	Credit
CFD	Contract for Difference
CM	Clearing Member
CO	Commodity Derivatives
CTPY	Counterparty
CU	Currency Derivatives
EEA	European Economic Area
EMIR	European Markets Infrastructure Regulation
EQ	Equity Derivatives
ETDs	Exchange Traded Derivatives
FC	Financial Counterparty
FRA	Forward Rate Agreement
FSB	Financial Stability Board
HHI	Herfindahl-Hirschman Index
IR	Interest Rate
IRD	Interest Rate Derivatives
IRS	Interest Rate Swaps
ISDA	International Swaps and Derivatives Association
LEI	Legal Entity Identifier
MIC	Market Identifier Code
MiFIR	Markets in financial instruments Regulation
MTF	Multilateral Trading Facility
NCA	National Competent Authority
NFC	Non-Financial Counterparty
OTF	Organised Trading Facility
OTC	Over the Counter
RTS	Regulatory Technical Standard
TR	Trade Repository
UCITS	Undertakings for Collective Investment in Transferable Securities

Countries abbreviated according to ISO standards

Currencies abbreviated according to ISO standards

