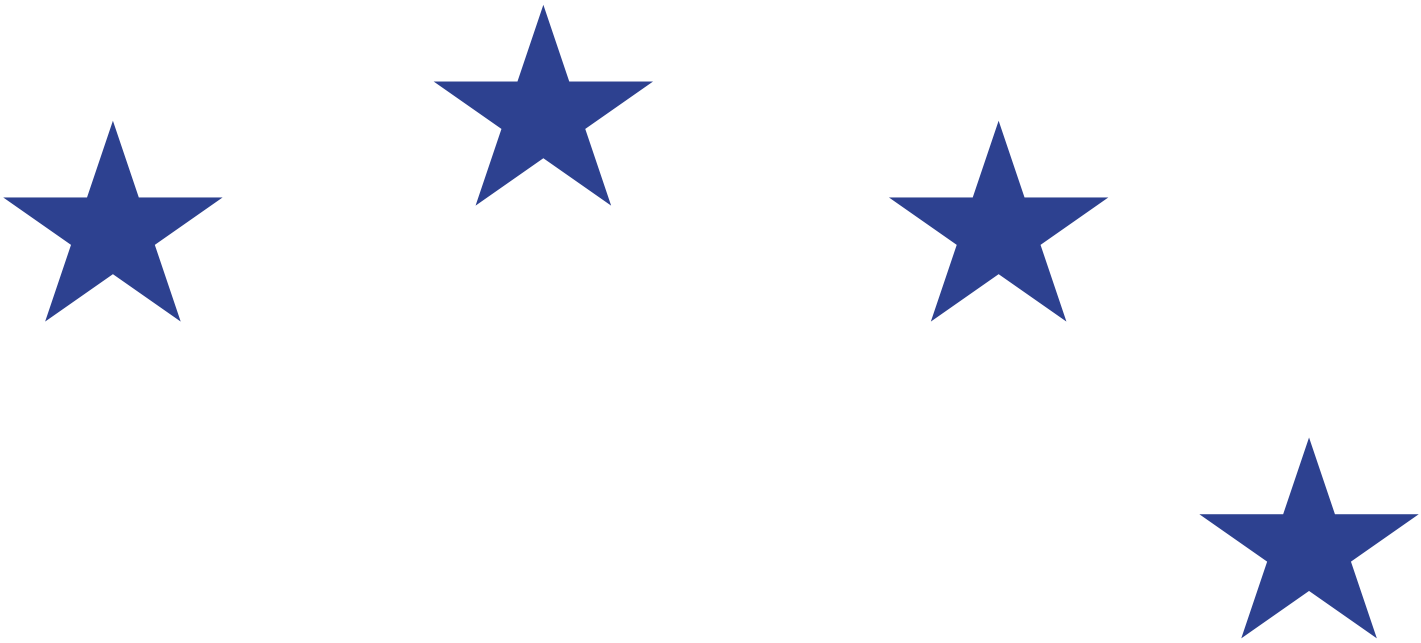
esma European Securities and Markets Authority

EU Derivatives Markets

ESMA Annual Statistical Report 2021



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ESMA Annual Statistical Report on EU Derivatives Markets 2021

 The reporting period of this document is 1 January 2020 to 31 December 2020, unless indicated otherwise. Legal reference of this report: Regulation (EU) No 1095/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Securities and Markets Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/77/EC, Article 32 'Assessment of market developments', 1. 'The Authority shall monitor and assess market developments in the area of its competence and, where necessary, inform the European Supervisory Authority (European Banking Authority), and the European Supervisory Authority (European Insurance and Occupational Pensions Authority), the ESRB and the European Parliament, the Council and the Commission about the relevant micro-prudential trends, potential risks and vulnerabilities. The Authority shall include in its assessments an economic analysis of the markets in which financial market participants operate, and an assessment of the impact of potential market developments on such financial market participants.' This report contributes to ESMA's risk assessment activities. The report and its contents do not prejudice or impair ESMA's regulatory, supervisory or convergence activities, or the obligations of market participants thereunder. Charts and analyses in this report are based on data provided by trade repositories to ESMA under the European Market Infrastructure Regulation (EMIR) and on other data that are publicly available (e.g. Legal Entity Identifier (LEI) data provided by the Global Legal Entity Identifier Foundation (GLEIF) and euro-exchange rates provided by the ECB). ESMA uses these data in good faith and does not take responsibility for their accuracy or completeness. ESMA is committed to constantly improving its data sources and reserves the right to alter data sources at any time.

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Market trends: In 2020 European derivatives markets fell 4% in the total notional outstanding, from EUR 254tn in 4Q19 to EUR 244tn in 4Q20. Underlying this were slight increases in interest rate derivatives (IRDs) (+1%) and in credit (+4%), and falls in currencies (-20%), equities (-18%) and commodities (-22%). Progress on central clearing continued, with strong growth in central clearing rates for both IRDs and credit derivatives, from 68% to 71% for IRDs, and from 38% to 41% for credit. The quarterly rates of clearing of products subject to the clearing obligation remained high throughout 2020, finishing the year at over 90% in interest rate and credit products. The proportion of ETD contracts over all assets fell to 8% in 4Q20 from 9% a year earlier. However, this fall was more than offset by the growth, from 10% to 16%, in the proportion of notional outstanding in OTC contracts executed on trading venues, which grew for IRDs, currencies and credit derivatives. This partly reflects continuing impacts of the MiFID derivative trading obligation to trade certain OTC contracts subject to the clearing obligation on trading venues. Interconnectedness and concentration were stable or slightly increased across asset classes during 2020, and generally remained high.

Statistical methods

EMIR trade-state data explained: EMIR data are vast and contain detailed information about European derivatives markets. The data are based on reports from EEA30 counterparties that are provided to trade repositories (TRs), which in turn report these to ESMA. Here we explain how we prepare the trade-state data so that these can be used to the construct the statistics presented in this report. Particular refinements made this year were the removal of UK reports from EMIR data to reflect the EEA following the exit of the UK from the EU. We also made refinements to our outlier removal methodology and to the calculation of clearing rates. Clearing rate changes were made to improve the accuracy of clearing rates for the products subject to the clearing obligation, and to make some necessary adjustments following the UK's exit from the EU.

Editorial note

Brexit implications for EU EMIR statistics: The UK was a central part of the EU derivatives market and remains an important third-country market after the country has left the EU. As expected, the impact Brexit has had on EU derivatives statistics is profound as the simple example of the aggregate size of the market shows: The total notional outstanding of derivatives in the EU at the end of 2020 amounts to EUR 244tn, just over one-third of the EUR 681tn we had reported for end of 2019. Starting with this edition of this ASR series, we show statistics of the EU derivatives market after Brexit. Comparisons with statistics we had published in earlier editions are, therefore, limited. We summarise the impact on the EU market on page 7.

Essential statistics 2020

	Derivatives asset class					
	All	Commodities	Credit	Currency	Equity	Interest rate
Size						
Total notional amount (EUR tn)	244	2	6	32	11	193
Proportion (% of notional amount)	100	1	2	13	4	79
Change 4Q19 to 4Q20(%)	-4	-22	4	-20	-18	1
Contracts (number in mn)	24	3	0	7	10	4
Proportion (% of total)	100	11	1	30	41	16
Change 4Q19 to 4Q20 (%)	13	5	-3	-4	33	16
Underlying instruments						
Instrument with largest notional amount	Swap	Futures	Swap	Forward	Option	Swap
Proportion (% of notional amount)	57	41	79	69	62	67
Instrument with most positions	CFD	CFD	Swap	Forward	Option	Swap
Proportion (% of positions)	26	36	88	56	47	65
Counterparty exposures						
By type (% of notional amount)						
Investment firms	55	25	36	53	33	58
CCPs	19	30	16	15	40	19
Credit institutions	9	4	16	5	6	9
Non-financial firms	7	39	4	14	11	5
By domicile (% of notional amount)						
Intra-EEA30	24	35	21	27	50	21
EEA30 to third country	68	59	66	68	46	69
EEA30 to UK	49	29	36	25	22	55
EEA30 to other third country	19	31	29	43	24	15
UK to a third country	3	2	6	2	1	3
Intragroup exposures						
Intragroup total notional amount (EURtn)	23	1	0.2	5	3	14
Proportion (% of notional amount)	9	29	4	15	31	7
Intragroup positions (number in mn)	3	1	0.0	1	1	0
Proportion (% of all positions)	13	23	5	17	9	8
Execution venue and clearing						
ETD proportion (% of notional)	8	49	5	1.1	50	7
OTC proportion (% of notional)	92	51	95	99	50	93
On-trading venue	16	0.01	9	16	0.01	17
Off-trading venue	77	51	87	83	50	77
Clearing rate (% of OTC notional)	n/a	1	41	1	2	71
Concentration						
Top five (% of notional amount)						
Excluding CCPs	n/a	44	45	41	48	41
Including CCPs	n/a	44	56	41	48	43

Note: All values as of 4Q20 (11 December 2020). 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

Market structure

Summary

In 4Q20 the EEA30 derivatives stood at EUR 244tn in outstanding total notional amount, down from EUR 254tn a year earlier.[1] Market composition changed slightly, with interest rate derivatives (IRDs) accounting for 79% of notional amount in 4Q20 (up from 76% in 4Q19) while 13% of the notional amount was in currency (down from 16%), with 8% remaining in equity, credit and commodities. Credit institutions and investment firms were the most significant counterparties, these were counterparties in close to 75% of contracts by outstanding notional amount. Exposures in intragroup positions increased slightly, to EUR 23tn from EUR 22tn a year earlier. Over-the-counter contracts (OTC) still accounted for most of the outstanding notional amount, 92%, but 16% of all notional amount was in on-trading venue OTC contracts, while 8% was in exchange traded derivatives (ETDs). Central clearing rates in 4Q20 were 71% of the notional amount in IRDs and 41% in credit derivatives, both up on a year earlier (from 68% and 38% respectively). As a continued part of the single market during the transition period, the UK remained central to EU derivative markets in 2020, about half of contracts by notional amount have a UK counterparty, and a quarter in contracts are held between two EEA30 counterparties

UK removal from the data changes key statistics

In this year's report, our **statistics are very significantly impacted by the removal of the UK** from data reports. Statistics presented in this report fall after the withdrawal of the United Kingdom from the EU on 31 January 2020. Therefore, though we continued to receive UK reports during the transition period in 2020, our statistics are constructed from data reports provided by counterparties located in the 30 member states of the EEA post-Brexit (EEA30).

To make the statistics for 2019 comparable to those for 2020, and particularly to analyse trends as they relate to the EEA30, we also only use data from EEA30 counterparties in constructing our 2019 statistics for this report.

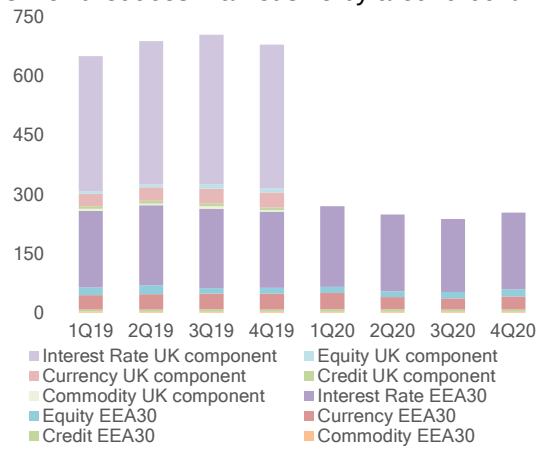
However, the approach also implies that the 2019 statistics in this report are different from those presented in our previous annual report because here we exclude data reported by UK counterparties. The correct derivative EU statistics for 2019 are those in the previous annual report, which include the UK as it was still a member of the EU then.[2]

Before presenting the statistics for 2020, we first compare statistics for 2019 for the EEA30 (excl. UK) with those published in our last report for the EEA31 (incl. UK) to illustrate the key effects. It shows that **market size reduces by nearly two thirds with UK removal**. ASRD.1 shows the market size in 4Q19 was EUR 681tn in notional amount outstanding for the EEA31, compared with EUR 254tn for the EEA30. The number of outstanding positions also drops very significantly with UK removal, from 50mn to 21mn in 4Q19, with the removal of UK data. For both notional amounts and trade numbers, the reduction is similar across asset classes, with the relative proportions of asset classes remaining similar.

[1] As explained below, statistics for 2020 do not include the United Kingdom given its withdrawal from the EU. Statistics for 2019 have also been revised to exclude reports from counterparties in the United Kingdom to enable data comparisons between 2019 and 2020. As a result 2019 statistics in this report do not match those published in the Annual Statistical Report EU Derivatives Markets 2020 where the UK was included. The correct statistics for the EU for 2019 are those published in the previous annual report, as the UK was still a member of the EU at that time.

[2] Our Derivative Statistics section at the end of the report presents essential statistics for 2019 calculated without UK counterparty reports. Comparing this with the essential statistics table published in our previous annual derivatives report provides a useful way to see how the UK removal has affected our statistics. See p.5, Annual Statistical Report EU Derivatives Markets 2020.

ASRD.1
Notional amounts with and without the UK data
UK exit reduces market size by around 60%

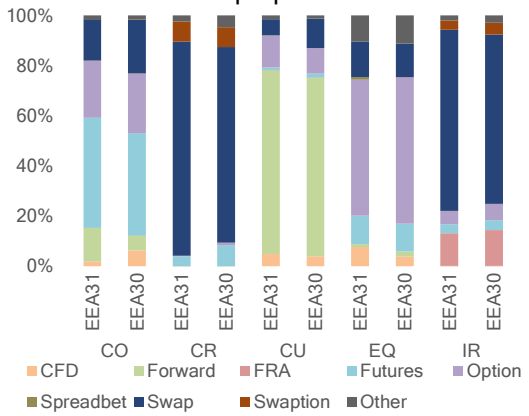


Note: Outstanding notional amounts EU derivative markets, by asset class and split by EEA30 and UK components.
Sources: TRs, ESMA

Share of notional amount in intragroup positions falls with the removal of the UK. In 4Q19, the share of notional amount in intragroup positions in the EEA30 was 9% down from 12% for the EEA31.

The **distribution of instruments remains largely unchanged with UK removal**. Proportions overall and per asset class are similar in the EEA30 as in the EEA31. CFDs are an exception, being less significant in the EEA30 (except for commodities), as shown in ASRD.2.

ASRD.2
Instrument distributions with and without the UK
EEA31 and EEA30 proportions similar



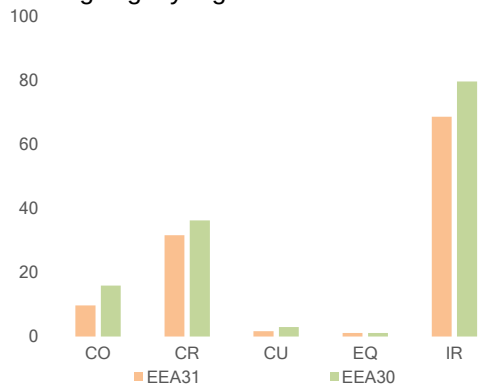
Note: 4Q19 Proportions of total notional amount outstanding by contract type and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources: TRs, ESMA.

Another major change is that **CCPs are no longer in the most significant counterparties for interest rate derivatives,** due to UK CCP reports no longer being included. However, UK CCPs are recognised as Third-Country CCPs, and are eligible to provide their services in the EU until June 2022[3], and thus continue to clear most EU IRD trades subject to the clearing obligation. As a result, the smaller share of CCPs in IRDs is misleading as it obscures the continuing major role of UK CCPs. The removal of the UK CCPs from the data also leads the IRD measured concentration to fall significantly, obscures the high concentration of IRDs held in UK CCPs.

The distribution of notional amount outstanding by **currency of denomination is also strongly affected by the removal of the UK**. The EUR is the largest currency by notional for the EEA30, as opposed to the USD when the UK was included, with the GBP also reduced in share, while the share in SEK increased. Changes reflect the greater focus on EEA30 currencies once UK-reported contracts are no longer reported. However, the distribution in EUR, USD and JPY terms still remains broadly similar across assets, except for an increase in the distribution in EUR and a decrease in the share of USD contracts.

Other key statistics show minimal changes. The proportion of ETD to OTC remains unchanged with the removal of the UK, with about 10% of notional amount outstanding in ETD and 90% in OTC for assets in aggregate. Clearing rates by asset class also remain similar, though are slightly higher in the EEA30 for all assets except equities, as in ASRD.3.

ASRD.3
Clearing rates 4Q19 with and without UK data
Clearing slightly higher in EEA30



Note: Central clearing rate of total notional amount outstanding by asset class in percent as of 4Q19. Sources: TRs, ESMA.CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources: TRs, ESMA.

[3] See https://www.esma.europa.eu/press-news/esma-news/esma-recognise-three-uk-ccps-1-january-2021

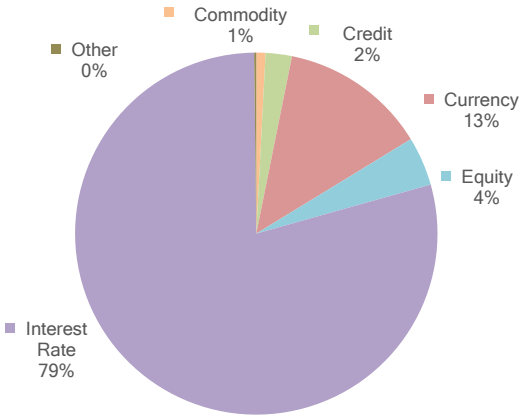
The EU derivatives market in 2020[4]

Turning now to statistics for 2020, data reported under EMIR show that at the end of 2020 the **total notional amount outstanding** in the EEA30 derivatives market, including both over-the-counter (OTC) and exchange-traded derivatives (ETDs), stood at EUR 244tn, held in 24mn open derivative positions. Overall market size was down 4% from a year earlier, when total notional amount stood at EUR 254tn in 21mn positions.[5] The decrease in market size was driven largely by significant falls in notional amounts in currency, commodity and equities that were only partly offset by a small increase in notional amounts for interest rate derivatives.

In 4Q20 exposures between counterparties in the same group, **intragroup positions**, accounted for EUR 23tn of the total notional amount in 3mn positions outstanding. This was an increase of about 5% from the EUR 22tn held in 3mn positions in 4Q19. Excluding intragroup positions, the total notional amount outstanding in 4Q20 was EUR 221tn in 21mn positions. The increase was in spite of the intragroup reporting exemption introduced as part of EMIR Refit. This change came into effect in June 2020 and removed the requirement, where certain conditions are met, for non-financial counterparties to report intragroup positions.[6]

Looking at all positions (including intragroup and non-intragroup) in terms of the **underlying assets**, interest rate derivatives (IRDs) accounted for 79% of the total notional amount outstanding in 4Q20. Currency derivatives remained the second largest by notional amount, at 13% of the total. The remaining asset classes accounted for smaller proportions, with 1% in commodities, 2% in credit derivatives, to 4% in equities in 4Q20 (ASRD.4).

ASRD.4
Total notional amount outstanding by asset class
IRDs account for over three quarters of notional amount



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

Compared to a year earlier, the proportion of notional amount grew in IRDs (+3ppts) and fell in currency (-3ppts) and equities (-1ppt). Proportions of total notional amounts outstanding for commodities and credit derivatives were unchanged year-on-year.

Underlying the changes in relative share was a fall in currencies (fell to EUR 32tn in 4Q20 from EUR 40tn in 4Q19), a fall in equities (to EUR 11tn from EUR 13tn), a fall in commodities (to EUR 2tn from EUR 3tn) and a small increase in the notional amount of IRDs (to EUR 193tn from

[4] 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.

All 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 is the 2020 calendar year. The statistics presented are based on reports from four reference dates 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). For 2020, the four reference dates are 13 March 2020, 19 June 2020, 18 September 2020 and 11 December 2020. Where 2019 data are presented, the four reference dates are the same as those from the previous year's report: 15 March 2019, 7 June 2019, 6 September 2019 and 13 December 2019.

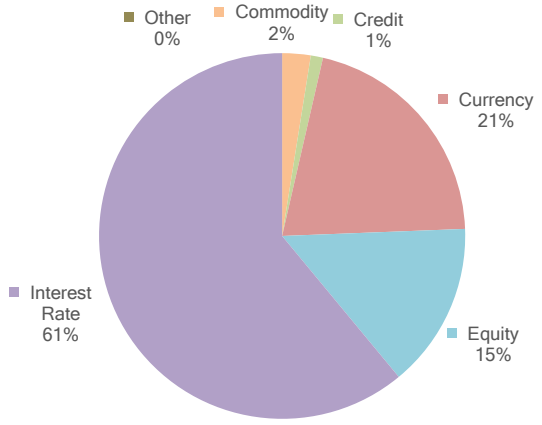
[5] See the Annual Statistical Report EU Derivatives Markets 2020.

[6] In particular, EMIR Refit amended Art.9(1a) of EMIR. For further details see https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019R0834&from=DE .

EUR192tn) and in credit (to EUR 5.7tn from 5.5tn).

The asset composition for intragroup positions was broadly similar to the distribution for the overall market, but with currency and equity more represented, interest rates less represented, and commodity and credit about the same (ASRD.5). The fall in interest rates could be due in part to a reduction in reporting in IRD provided by financial counterparties to non-financial counterparties in the same group, as a result of the introduction of the intragroup exemption under EMIR Refit. However, while interest rates were a lower proportion of intragroup trades, they still accounted for the vast majority of the outstanding notional amount.

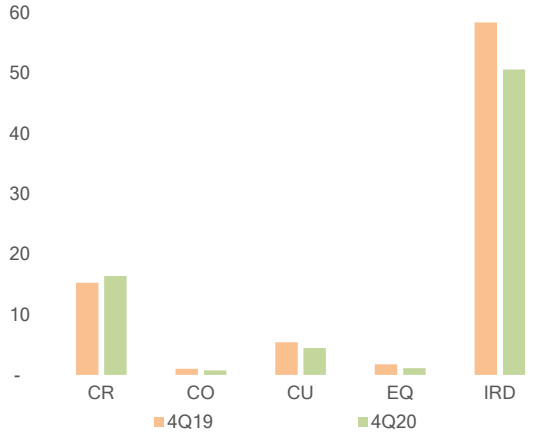
ASRD.5
Intragroup notional amount outstanding by asset class
Currency and equity more prominent in intragroup



Note: Percentages of intragroup notional amounts outstanding by asset class.
Sources: TRs, ESMA.

Looking at the average notional amount per position by asset class for the market overall, IRDs continued to have by far the largest average size (at EUR 51mn per position) followed by credit derivatives (EUR 16mn), currency (EUR 4.5mn), equities (EUR 1.1mn) and commodities (EUR 0.8mn).[7] Values are generally similar to those in 4Q19, except for IRDs which decreased by about EUR 7mn and equities which decreased by EUR 0.7mn (ASRD.6).

ASRD.6
Notional amount per position by asset class
IRDs continue to have largest notional amount per transaction



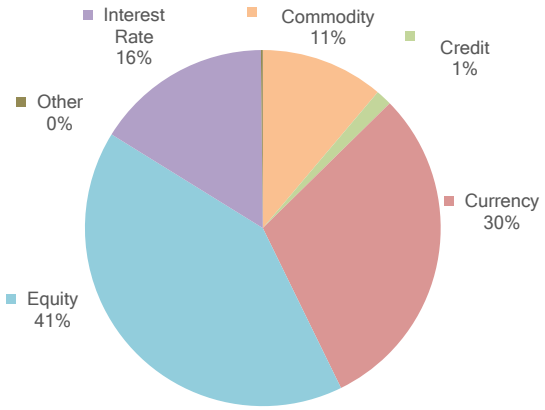
Note: Notional amount per outstanding transaction in EUR millions. CR - credit, CO - commodity, CU - currency, EQ - equities, IRD - Interest rate.
Sources: TRs, ESMA.

The distribution of derivatives by asset class as measured by the **number of positions** continues to be quite different from the distribution of notional amounts. Under this metric, equity derivatives accounted for 41% of the outstanding trades reported in 4Q20, currency derivatives accounted for 30%, commodities accounted for 11%, IRDs accounted for 16%, while credit derivatives accounted for just over 1% (ASRD.7).

Compared to a year earlier, equity accounted for a greater proportion (+6ppts), while currency accounted for a lower proportion (-5ppts), commodities were down 1ppt while IRDs and credit were essentially unchanged. These changes in share were mainly driven by an increase in equity positions from 7mn to 10mn from 4Q19 to 4Q20.

[7] Note that as positions which combine multiple trades and net notional amount, the metric of average size here is more informative as to the relative size of trades between asset classes, rather than on the average amount per transaction.

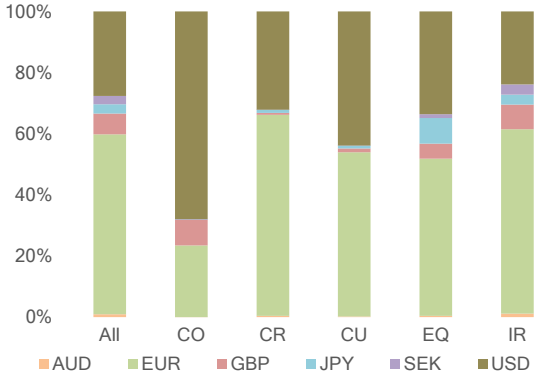
ASRD.7
Number of positions by asset class
Equities account for the largest proportion of positions



Note: Percentages of outstanding derivative contracts by asset class, may not sum to 100% due to rounding error..

The distribution of total notional amount in terms of the **currency of denomination** remained similar to 4Q19, with 55% in EUR (+4ppts from 4Q19), 26% in USD (-3ppts) and 6% in GBP (+1ppt) (ASRD.8). With the exception of equities, the relative share of notional amount denominated in EUR grew while that in USD fell as compared to 4Q19. Increases in EUR ranged from 3ppts in IRDs to a 10ppts increase in currencies, with largely corresponding falls in USD shares. In equities, the share denominated in EUR fell slightly (down 1ppt) with the corresponding increase in USD.

ASRD.8
Total notional amount by currency of denomination
Euro and US dollar contracts dominate



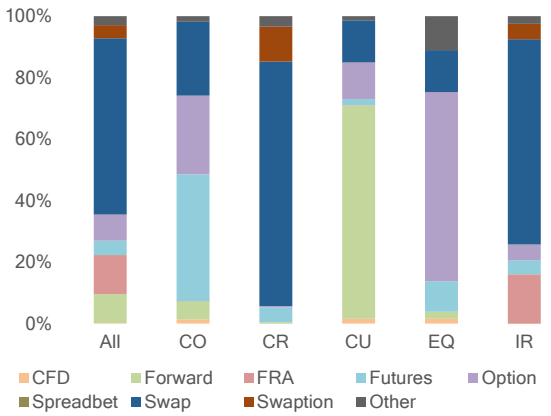
Note: Proportions of total notional amount outstanding by currency and asset class, for six largest currencies by notional amount, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AUD-Australian dollar, EUR - euro, GBP - pound sterling, JPY - Japanese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

As expected, given that IRDs account for most of the notional amount, proportions overall were driven by the distribution of currencies for IRDs (56% in EUR, 22% in USD, 8% in GBP, 3% in each of JPY and SEK, and 1% in AUD). For currency derivatives, the distribution in 4Q20 was 53% in EUR, 43% in USD and 1% in GBP.

As in 4Q19, commodities were largely denominated in USD, with 67% of the total notional amount associated with contracts in USD, 23% in EUR and 8% in GBP. Credit derivatives were largely split between EUR (66%) and USD (32%), with a greater share in EUR than a year earlier. Equity derivatives remained the most diversified, though USD and EUR still dominated. Here the distribution was 47% in EUR, 31% in USD, 8% in JPY, 4% in GBP and 1% in SEK.

During 2020 the distribution of notional amount by **contract type and instrument** stayed broadly the same, with small changes. The share of the overall notional amount in swaps was similar to a year earlier, 57% compared to 56%. This was due to there being little change in the amount of IRD **swaps,** which fell slightly to EUR 129tn from EUR 130tn. Swaps accounted for 67% in IRDs (no change), 79% in credit (up 1ppt from 4Q19), 24% in commodities (+3ppts), 14% in currencies (+2ppts) and 14% in equities (+1ppt) (ASRD.9).

ASRD.9
Total notional amount by contract type
Swaps dominate IRDs and credit, forwards dominate currency, options dominate equity



Note: Proportions of total notional amount outstanding 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.

Forward rate agreements (FRAs) accounted for 16% of IRD notional amount at the end of 2020, up 2pp from a year earlier. **Forwards** were almost entirely in currency (over 97%). They fell in notional amount over the year, with their share of notional in currency derivatives dropping to 69% in 4Q20 from 71% in 4Q19.

In commodities, **futures** again accounted for the largest amount of notional amount at 41%, unchanged from 4Q19. Forwards accounted for

6% of the notional amount in commodities, also unchanged in share from a year earlier. In absolute terms, the notional amounts for futures and forwards both decreased (from EUR 1tn to EUR 0.8tn, and from EUR 150bn to EUR 120bn). In equities futures accounted for 10% of the notional amount, slightly down from the 11% of a year earlier. The corresponding fall in notional amount was from EUR 1.4tn to EUR 1.1tn.

Equity **options** fell over the year, from EUR 8tn to EUR 7tn, leading options to fall in their share of the overall market to 9% (-1ppt). Options remained by far the largest instrument by notional amount in equities, accounting for 62% of the total. Options also remained the second largest instrument in commodities, accounting for about 26% of the total notional amount for these. Swaptions accounted for 11% and 5% of the notional amount in credit derivatives and IRDs respectively, up 3ppts for credit and unchanged for IRDs compared to 4Q19.

Overall, the notional amounts outstanding of **Contracts for Difference (CFDs)** fell significantly in 2020, from EUR 2.2tn in 4Q19 to EUR 0.7tn in 4Q20. This fall was driven by a large drop in CFDs among currency and equity derivatives. Currency CFDs accounted for 2% of the total notional amount in currency derivatives in 4Q20, down from 4% in 4Q19. Their notional amount fell from EUR 1.6tn to EUR 0.5tn. Similarly, CFDs decreased their share in equities to 2% from 4%, associated with a decrease in notional amount from EUR 0.5tn to EUR 0.2tn. Although relatively small in notional amount, CFDs fell even more strongly in commodities, from EUR 160bn in 4Q19 to EUR 29bn in 4Q20, reducing their share from 6% to 1% over the year.

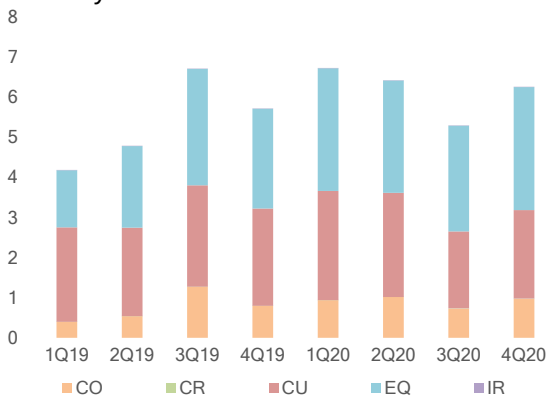
ASRD.10
CFD product intervention measures
From ESMA measures to those of NCAs

In 2018, ESMA introduced temporary measures, under MiFIR product intervention powers, to restrict the marketing, distribution, and offer of CFDs to retail investors. These consisted of leverage limits. a margin close-out rule, negative balance protection, a prohibition on benefits to incentivise trading; and a standardised risk warning.

The measures took effect for three months from 1 August 2018 and were renewed three times, so running until 31 July 2019 before expiring. By this time most national competent authorities (NCAs) had taken permanent national product intervention measures that were at least as stringent as ESMA's.[8]

Looking at the EMIR data over 2019 and 2020, one observes little sign of increase in the size of CFD markets within the EEA30. ASRD.11 below presents CFD outstanding positions and shows flat trends since the middle of 2019.

ASRD.11
CFD number of outstanding positions
Generally flat trends since middle of 2019



Note: Number of CFD trade positions by asset in millions. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. CFD - contracts for difference.
Sources: TRs, ESMA

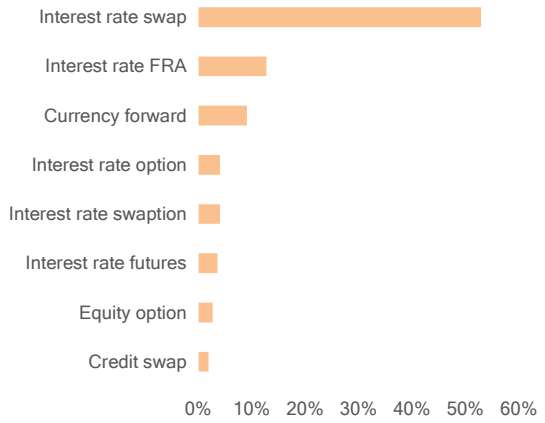
Spreadbets – similar to CFDs – continued to account for a very small amount of the overall notional amount. These fell slightly across asset classes. In total, the notional amount fell from EUR 13bn to EUR 9bn during 2020. Their notional amount remained almost entirely in credit (where CFDs also grew) where they continued to account for less than 0.1% of the notional amount.

The asset and instrument type together provide an indication of the largest derivative markets by notional amount in 4Q20. The four **largest markets by notional amount** were unchanged from a year earlier. These were interest rate swaps, interest rate FRAs, currency forwards and interest rate options, which together accounted for 79% of the total notional amount at the end of 2020, up 1ppt from a year earlier.

Among these, interest rate swaps and FRAs both increased their share (to 53% and 13% respectively, both up 2ppts), while currency forwards and interest rate options respectively fell to 9% and 4% (down 2ppts and 1ppt). This led currency forwards to fall from second largest instrument to third, behind interest rate FRAs in terms of share of overall outstanding derivative notional amount (ASRD.12).

[8] https://www.esma.europa.eu/press-news/esma-news/esma-ceases-renewal-product-intervention-measures-relating-contracts .

ASRD.12
Top 8 notional amount proportion by asset and instrument
Over half of notional amount was in IR swaps



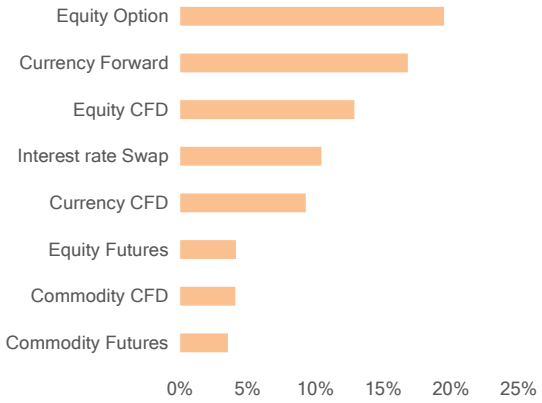
Note: Largest 8 proportions of total notional amount outstanding by asset class and instrument.
Sources: TRs, ESMA.

In terms of the numbers of outstanding **positions by contract type**, CFDs remained the most common (27%, down 1ppt from 4Q19), followed by options (22%, +5ppts), forwards (14%, -1ppt), swaps (18%, -4ppts) and futures (12%, +3ppts). Within asset classes, swaps accounted for most of the positions in IRDs (65%, -6ppts) and credit (88%, +2ppts). CFDs were the most numerous in currency (33%, -2ppts), and in equities (31%, -3ppts), and also accounted for the largest share of commodity positions (36%, +5ppts).

Futures accounted for the second largest number of commodity positions (32%, up 1ppt). Forwards showed a small increase in the share of outstanding currency positions (56% of currency positions, up 1ppt). Equity options accounted for the largest proportion of equity derivatives (47%, +8ppts).

Looking at these numbers by the combination of underlying asset and instrument. The five largest shares of number of trades were equity options with 19% (+5ppts) of outstanding positions, followed by currency forwards at 17% (-2ppts), equity CFDs at 13% (+1ppt), interest rate swaps at 10% (-1ppt), and currency CFDs at 9% (-3ppts). (ASRD.13)

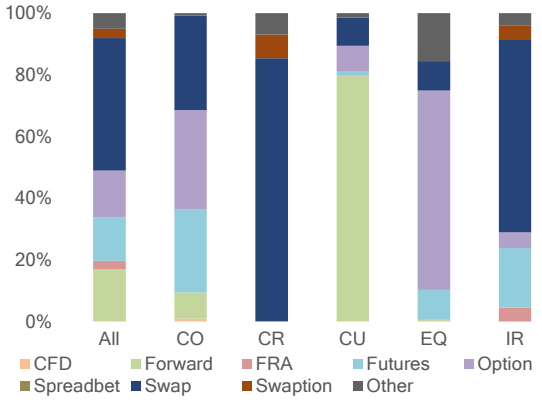
ASRD.13
Top 8 proportion of positions by asset and instrument
Equities account for top three instruments by number



Note: Largest 8 proportions of the number of transactions by asset class and instrument.
Sources: TRs, ESMA.

In terms of **intragroup distribution by contract** type the distribution remained similar to that of derivative contracts more generally. Swaps continued to dominate overall and in credit, IRDs and commodities. Forwards predominated in currency, while options were significant in equities and in commodities (ASRD.14).

ASRD.14
Intragroup notional amount by contract type
Distribution similar in intragroup as generally

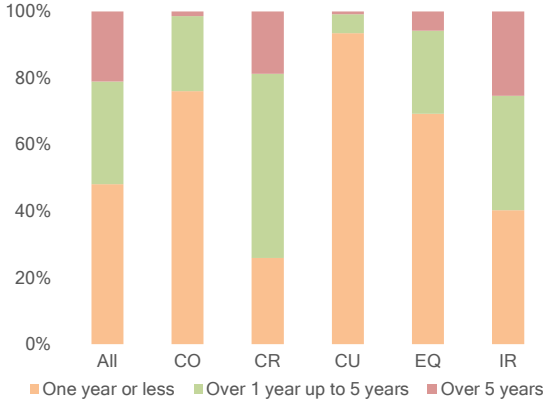


Note: Proportions of intragroup notional amount outstanding by contract type and asset class, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA.

The distribution of notional amount by the remaining **maturity** for derivatives overall remained similar to 4Q19, though with generally longer maturities, due to slightly longer remaining maturities in interest rate derivatives and currency derivatives. In contrast, maturities shortened slightly in equity, commodity and credit derivatives (ASRD.15). Overall, shorter maturities, of a year or less, remained the largest share, with just under half (48%) of the total

notional amount in derivatives having one year or less of maturity remaining, slightly down from 50% a year earlier. The proportion of the notional amount in contracts with maturity remaining of 5 years or more also increased slightly, to 21% in 4Q20 from 20% a year earlier.

ASRD.15
Total notional amount by remaining maturity
Shorter maturities dominate



Note: Proportions of total notional amount outstanding 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.

OTC: Strong increase in contracts on trading venues

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.

EMIR considers ETD contracts those traded on an EU regulated market[9] or a third country venue that is considered equivalent to an EU regulated market.[10] Other derivatives contracts are considered as OTC. As we did in previous reports, here we include derivatives that are reported with a venue of execution that is not a regulated market or a third country equivalent as OTC.[11]

The venue of execution data enables us to see the notional amount executed on trading venues. Trading venues include regulated markets and third-country equivalents. In addition, trading venues also include two other types of venues where OTC derivatives can be executed. These are multilateral trading facilities (MTFs) and organised trading facilities (OTFs). Both venue types offer similar benefits in terms of transparency, liquidity and efficiency as regulated markets. For this reason, OTC derivatives on trading venues are arguably more like ETDs than conventional OTC contracts executed bilaterally.[12] So, higher levels of OTC on trading venues, like higher levels of ETDs, are also an important indicator of higher levels of market transparency, standardisation and liquidity.

In 4Q20 ETDs accounted for 8% of the total notional amount, down from 9% in 4Q19. In contrast to the slight fall in ETD share, the proportion of on-trading-venue OTC derivative notional amount (i.e. where a trading venue was reported that was a MTF or OTF) was significantly increased from a year earlier at 16% (up 6ppts) in 4Q20, while that for off-trading-venue OTC derivatives was 77%,[13] down 4ppts from a year earlier (ASRD.16). As a result, the overall notional amount for contracts executed on trading venues (ETD and OTC) rose to 23% in 4Q20, up from 19% a year earlier.

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

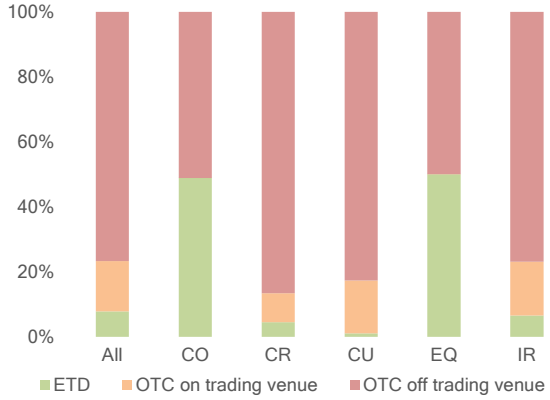
[10] The list of third-country markets that can be considered equivalent to regulated markets for the purposes of the definition of OTC derivatives: https://www.esma.europa.eu/sites/default/files/library/equivalent_tc-markets_under_emir.pdf . As 2020 was during the transition period, contracts executed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

[11] 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.

[12] 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/esma35-43-349_mifid_ii_qas_on_investor_protection_topics.pdf

[13] The sum of the share on ETD (8%), OTC on trading venue (16%) and OTC off trading venue (76%) exceeds 100% due to rounding error.

ASRD.16
ETD vs OTC proportion of total notional amount
OTC dominates except in commodities, equities



Note: Proportions of total notional outstanding by ETD, OTC on trading venue and OTC off trading venue, in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. ETD - exchange traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

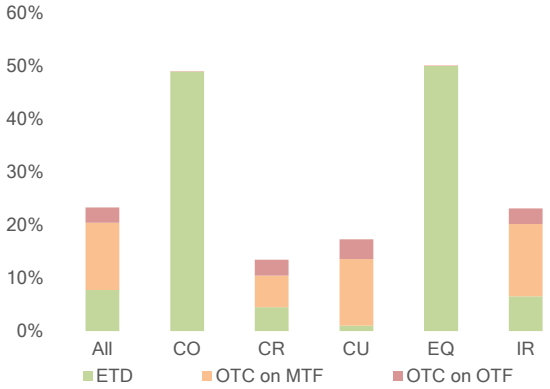
Looking at the underlying asset classes of the derivatives, commodities and equities have relatively large proportions of ETDs, as expected given the greater proportion of instruments in these asset classes, such as futures, traded on regulated markets. For both commodities and equities, the proportion of notional amount in ETDs remained unchanged from 4Q19 to 4Q20, at 49% and 50% respectively. Both of these asset classes have negligible shares traded as on-trading-venue OTC.

For other assets, OTC derivatives still accounted for the bulk of the notional amount outstanding. In 4Q20, the notional amount proportions for OTCs were 93% for IRDs (up 1ppt from 4Q19), 99% for currency (no change), 95% for credit derivatives (up 3ppts) (ASRD.16).

The share of OTC on trading-venue (on MTFs or OTFs) increased for interest rate, currency and credit derivatives. The share of OTC on trade-venue on the total notional amount outstanding increased to 17% for IRDs (up 6ppts from 4Q19) to 16% for currency (up 6ppts) and to 9% for credit (up 3ppts). In each of these the share of OTC on-trading venue exceeded the ETD share.

ETD shares in 4Q20 were 7% for IRDs (-1ppt), 1% for currency (unchanged), and 5% for credit derivatives (-3ppts) (ASRD.17).

ASRD.17
Proportion of total notional amount on trading venues
OTC on TV increasingly significant share



Note: Proportions of total notional on trading venues (ETD, OTC executed on MTFs and OTFs), in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. ETD - exchange traded derivatives, OTC - over-the-counter derivatives. MTF - multilateral trading facilities, OTF - organise trading facilties.
Sources: TRs, ISO, ESMA.

The continuing increases for OTC on trading venue are likely to be related to the Markets in Financial Instruments Regulation (MiFIR) derivative trading obligation which requires certain products subject to the clearing obligation to be executed on trading venues.[14]

In summary, proportions of OTC vs ETD by notional amount remained similar to 4Q19, with ETD sharing falling slightly. However, ETD remained very significant for commodities and equities at about half of the outstanding notional amount and OTC on trading venue shares increased significantly for all three remaining asset classes, IRDs, currency and credit derivatives.

Central clearing: Significant increases

The EMIR clearing obligation[15] requires that certain OTC derivatives contracts be cleared

[14] The MiFIR trading obligation sets out the derivatives subject to the EMIR clearing obligation that are to be executed on trading venues. This includes some interest rate and credit derivatives. See Commission Delegated Regulation (EU) 2017/2417, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2417&from=EN

[15] Under EMIR, as amended by EMIR Refit text, two types of counterparties are subject to the clearing obligation: (i) Financial counterparties (FC) (such as banks, insurers, and asset managers) which decide not to calculate their aggregate month-end average position in OTC derivatives or those who choose to calculate their positions in OTC derivatives and where the result is above any of the clearing thresholds; and (ii) non-financial counterparties (NFCs) whose OTC derivatives positions including those of any NFC belonging to their same group (without considering hedging transactions) exceed the EMIR clearing thresholds. NFCs only become subject to clearing for asset classes in which they exceed the clearing threshold and for which there is a mandate to clear. Intragroup transactions are also exempted from central clearing under certain conditions. The exemption of pension funds from the clearing obligation expired on 17 August 2018, though an additional temporary extension was granted under EMIR Refit (see

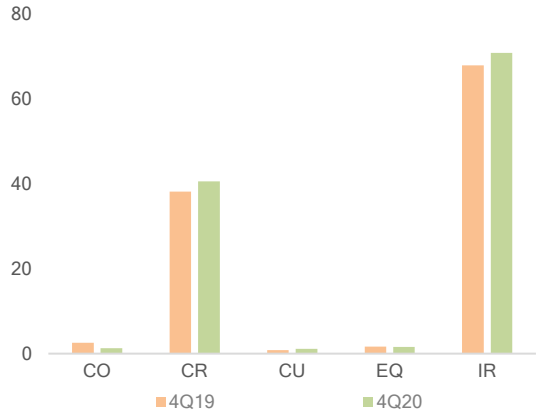
through authorised EU central counterparties (CCPs) or recognised third-country CCPs. Clearing is a key aspect of the EMIR framework, aiming to increase financial stability and to enhance OTC market resilience.

The products subject to the clearing obligation were unchanged from a year earlier, with no new derivative classes becoming subject to the clearing obligation during 2020 for all counterparty types.[16,17] Similarly, existing exemptions to clearing (the intragroup exemption and pension scheme arrangement exemption) did not expire in 2020, being renewed to June 2022.[18]

During 2020, the clearing obligation applied to specific classes of interest rate and credit OTC derivatives. The IRD classes subject to the obligation were basis swaps, fixed-to-float interest rate swaps, forward rate agreements, and overnight index swaps. For credit derivatives certain European untranched index credit default swap (CDS) classes were subject to the obligation.

In 2020 **central clearing** of OTC derivatives continued, largely in IRDs and credit derivatives, the asset classes with products subject to the clearing obligation. For IRDs the clearing rate increased over 2020, to 71% in 4Q20, up 3ppts from a year earlier. For credit the clearing ratio was 41%, also up by 3ppts. (ASRD.18).[19] In contrast, clearing of OTC derivatives remained low in other asset classes: 1% for currency (unchanged), 2% for equity (unchanged) and 1% for commodities (-2ppts).

ASRD.18
Proportion of OTC notional amount cleared
Clearing concentrated in IRD and credit



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.

Counterparties: Credit and investment firms largest

Exposures of counterparties to different derivatives products are informative on the levels of counterparty risk in EU derivative markets. Our data on the sector of the reporting counterparties shows that credit institutions, investment firms, and non-financial firms were the counterparties in derivative markets with the largest exposures in 2020.

Together, credit institutions, investment firms, and alternative investment funds accounted for over 80% of the notional amount in 4Q20 (ASRD.19), with respective proportions of 55% (+2ppts from 4Q19), 19% (-2ppts) and 9% (+1ppt). However, the exposure measures for

https://www.esma.europa.eu/regulation/post-trading/otc-derivatives-and-clearing-obligation)

16 The derogation for counterparties in Category 4 (broadly speaking non-financial counterparties above the clearing threshold, NFCs+) expired on 21 December 2018, for the IRDs denominated in the G4 currencies subject to the clearing obligation. This would have brought more IRDs in G4 currencies transactions under the clearing obligation. However, given that EMIR Refit applies the clearing obligation only to NFCs+ in the asset class(es) where their level of activity is above the clearing threshold, ESMA recommended that national competent authorities (NCAs) not prioritise the supervision of the 21 December 2018 deadline. (see https://www.esma.europa.eu/sites/default/files/library/esma70-151-1773_public_statement_on_co_and_to_for_intragroup_as_well_as_cat_4.pdf)

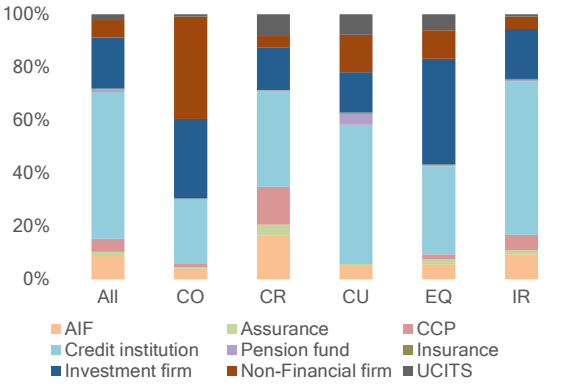
17 For derivatives classes subject to the clearing obligation, the clearing obligation came into effect at different points in time depending on whether the contract-holders were above or below the clearing thresholds. See Commission Delegated Regulation (EU) 2015/2205 for IRDs in G4 currencies (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.314.01.0013.01.ENG), Commission Delegated Regulation (EU) 2016/1178 for IRDs in NOK, PLN and SEK (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1178&from=EN) and Commission Delegated Regulation (EU) 2016/592 for European Index CDSs (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2016.103.01.0005.01.ENG).

18 The end-date for the exemption for pension scheme arrangements was extended to 18 June 2022 (see: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32021R0962&from=EN) and the intragroup exemption was deferred to 30 June 2022 (see https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32021R0237&from=EN).

19 Clearing ratios are calculated here over all interest rate and credit derivatives, some of which are not subject to the clearing obligation, so we would not expect clearing rates here to be 100%.

credit institutions and investment firms will overstate these firms' exposures somewhat because these firms also conduct trading on behalf of end clients that are not explicitly captured in EMIR data.

ASRD.19
Sector of counterparty
Credit institutions and investment funds dominate



Note: Proportions of total notional amount outstanding (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.

Considering each counterparty type in turn we see that **credit institutions** held the largest or second largest shares in all asset classes. Their main exposures were in IRDs (58% of notional amount in that asset class), currency (53%), credit (36%), equities (33%) and commodities (25%). Figures were broadly similar to 4Q19, but with currency, commodities and IRD shares increasing (by 8ppts, 4ppts and 1ppt respectively) and credit and equity shares falling (down 2ppts, and 6ppts respectively.)

Investment firms continued to hold significant exposures across all derivative classes in 4Q20, ranging from 15% in currencies to 40% in equity derivatives. They also accounted for 30% in commodities, 19% in IRDs and 16% of the notional amount in credit derivatives as of 4Q20. The distribution of investment firm exposures was similar to a year earlier for IRDs and credit derivatives, while there were changes in commodities (-7ppts), currencies (-7ppts) and equities (+5ppts).

Non-financial firms accounted for 7% of the overall notional amount in 4Q20, unchanged from 4Q19. As in 4Q19, their exposures still accounted for a large share of the total notional amount in commodity derivatives, at 39% of the total notional amount, increased from 4Q19 (+7ppts). Non-financial firms also continued to account for a small but significant proportion in currency derivatives (14%, unchanged).

CCPs accounted for 5% of the total notional amount outstanding, up 1ppts from 4Q19. In line with their role in central clearing, exposures were mainly in derivative classes with OTC products subject to the clearing obligation. CCP exposures accounted for 6% of the total notional amount in IRDs, and 14% in credit derivatives.[20] Otherwise, CCPs accounted for very small notional amount proportions in other categories. Proportions were also similar to those a year earlier (up 1ppt for IRDs, and up 3ppts for credit).

Figures here are much smaller than in previous reports, when UK counterparty reports were included, because reports from the large UK CCPs, where clearing is still taking place, are not included in this year's report. Therefore, as mentioned above on the impacts of the removal of the UK on our data, our statistics here understate CCP exposures in interest rate and credit markets.

In 4Q20 **Alternative Investment Funds (AIFs)** accounted for 9% (+1ppt from 4Q19) of the notional amount outstanding over all assets. Proportions were similar to a year earlier, exposures in credit were 16% (unchanged), IRDs (9%, +1ppt), equity derivatives (6%, +1ppt), currency (5%, +1ppt) and commodities (4%, -1ppt). In contrast, **undertakings for collective investment in transferable securities (UCITS)** remained minor players in the market in 2020, with their most significant presence still in currency and credit derivatives (8% of the notional amount in both).

Assurance firms,[21] **insurance** firms and **pension funds** also had relatively small presences. The asset classes where these had more sizeable shares were credit (4%, -2ppts), equities and interest rates (both unchanged at 2%). Pension funds' share registered only in currency derivatives, with 4% of the total notional amount. Insurance firms accounted for the smallest notional amount, with their exposures accounting for less than 0.4% of the total notional amount overall. Overall, exposures for these types of firms were similar to a year earlier. However, firms' exposures, as measured in our statistics here, are likely to materially understate

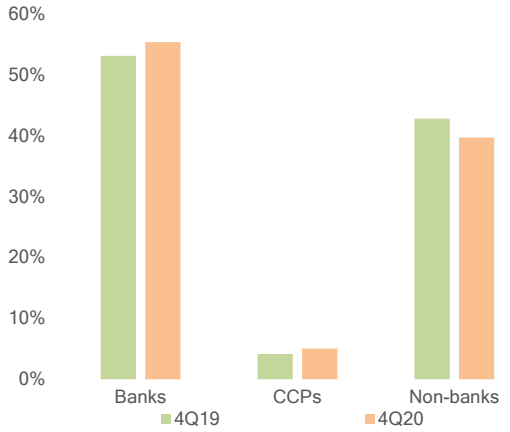
[20] These percentages are not based on reconciled transactions and do not exclude intragroup transactions, so are not comparable to the clearing ratios presented above.

[21] By assurance we mean an assurance undertaking authorised in accordance with Directive 2002/83/EC.

actual exposures, as these firms are likely to be the end clients of some of the exposures captured under credit institutions and investment firms.

Grouping counterparties into banks (credit institutions), CCPs and **non-banks** (counterparties other than credit institutions and CCPs) can reveal to what extent non-banks are counterparties in outstanding transactions, at least to the extent captured by EMIR data (given end clients are not always captured). ASRD.20 presents the bank-CCP-non-bank split, comparing 4Q19 and 4Q20. It shows that by the end of 2020, banks accounted for 55% (+2ppts), CCPs accounted for 5% (+1ppt) while non-banks accounted for 40% of outstanding notional amount. Overall, there was a shift away from non-banks to banks and CCPs.

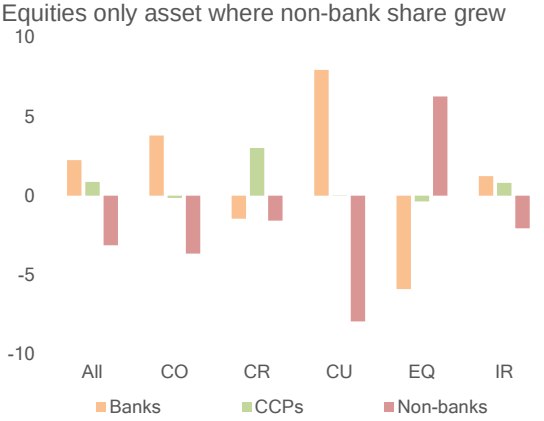
ASRD.20
Notional amounts of banks, non-banks and CCPs
2020 shift from non-banks to banks and CCPs



Note: Proportion of notional amount outstanding by type of counterparty, banks, CCPs and non-banks (all counterparties other than banks and CCPs).
Sources: TRs, ESMA.

Looking at the changes in the proportions held by banks, CCPs and non-banks from 4Q19 to 4Q20 across asset classes reveals significant variation. As shown by ASRD.21 below, the overall shift away from non-banks to banks and CCPs is mainly driven by IRDs, but we also see shifts away from non-banks in all assets except equities. For credit the shift is largely to CCPs, while for currencies, commodities and IRDs, it is predominantly to banks. Equities are very different with a significant increase in non-bank share, at the expense of banks.

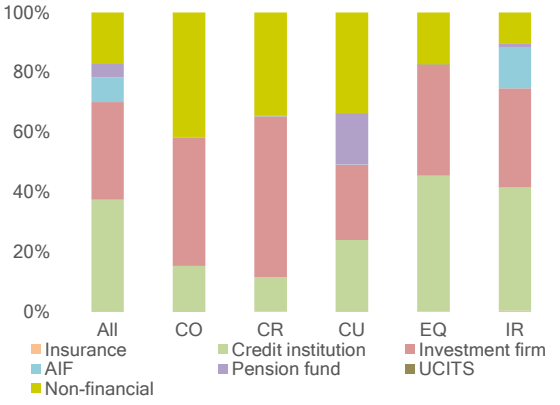
ASRD.21
Changes in share by counterparty type
Equities only asset where non-bank share grew



Note: Percentage point changes from 4Q19 to 4Q20 in proportions of notional amount oustanding held by banks (credit institutions), CCPs and non-banks (counterparties other than banks and CCPs). CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources: TRs, ESMA.

The sectoral split of notional amount for intragroup exposures shows the absence of CCPs, as expected given the intragroup exemption, with investment firms, credit institutions and non-financial firms dominant overall (ASRD.22). Non-financial firms were particularly present in commodities, credit and currencies in 4Q20. This distribution remains largely unchanged from a year earlier.

ASRD.22
Intragroup notional amount by sector of counterparty
Mainly investment firms, credit institutions and non-financial firms across asset classes

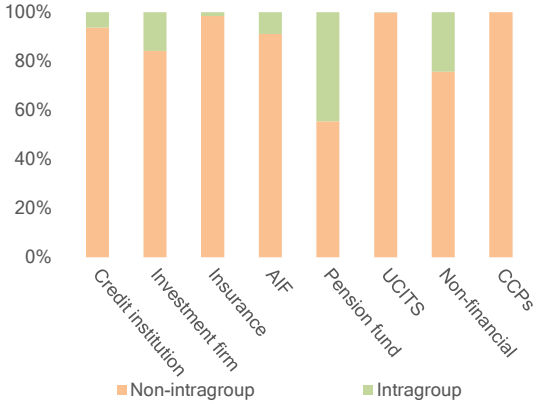


Note: Total notional intragroup amounts by sector of the reporting counterparty and asset class in %. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. AIF - alternative investment funds, UCITS - undertakings for collective investment in transferable securities.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

Looking at the relative proportion of intragroup and non-intragroup exposures by counterparty, we see that in 4Q20 intragroup exposures were particularly significant for pension funds, non-financial firms and investment firms. These respectively held 45%, 24% and 16% of their total notional amount in intragroup positions. In contrast, credit institutions intragroup exposures

were only 6% of the total notional amount of their exposures (ASRD.23).

ASRD.23
Intragroup proportion of exposures by counterparty
Intragroup exposures most significant in pension funds, non-financial and investment firms.



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

Inter-counterparty exposures: Credit institutions central

We now explore which counterparties are in trading relationships with others and to what extent. It is important to note that this section uses somewhat different data from the previous section, which was based on the sector reported by counterparties. Here we also use the legal entity identifiers (LEIs) of non-reporting counterparties, where available, to identify their sectors. This enables us to add sectoral information on the non-reporting counterparties. However, as LEIs are not reported for all counterparties, the full dataset is thus not covered. As a result, figures here are not directly comparable to those presented above. The aim is instead to illustrate which sectors are exposed to which and to what extent.

The table below presents **exposures between counterparties for interest rate derivatives** (ASRD.24). As in 4Q19, the largest exposures were between CCPs and credit institutions (18%, up 4ppts from 4Q19), those between credit institutions themselves (17%, -3ppts), between credit institutions and investment firms (13%, +4ppts) and between credit institutions and non-financial firms (12%, -5ppts). Exposures of non-financial firms fell more broadly, with non-financial firms' exposures to UCITS falling below 1%(-3ppts), that with investment firms falling to 6% (down 1ppt) and with non-financials dropping to 2% (1ppt). Their exposure to CCPs was stable at 4%.

ASRD.24
Cross-sectoral exposures - IRDs
70% of counterparties are banks

	CI	IF	AIF	PF	UCITS	CCP	NF
IC	1.9	0.5					0.5
CI	17.1	13.2	7.7	0.7	1.2	18.1	11.8
IF		4.4	8.0	0.6	0.3	1.3	5.6
AIF							0.5
PF							0.3
UCITS							0.2
CCP							4.5
NF							1.6

Note: Cross sectoral notional amounts between EU counterparties, as a percentage of the total. Empty cases are either zeros or lower than 0.1% of the total. Columns or rows with only empty cells are omitted. Counterparty sectors as self-reported by counterparties. CI=Credit Institution; IF=Investment Firm; IC=Insurance or Assurance Company; AIF=Alternative Investment Fund; PF=Pension Fund; CCP=Central Counterparty; NF=Non-Financial.
Sources: TRs, GLEIF, ESMA.

Other substantive exposures in IRDs were those among investment firms (4%, +1ppt), while those between credit institutions and alternative investment funds accounted for 8% (-1ppt), those between investment firms and AIFs were also 8% (+1ppt). Exposures among other counterparties remained relatively small.

For **credit derivatives**, exposures between credit institutions and CCPs were by far the largest at 39% (+22ppts). The second largest exposures overall were between credit institutions and AIFs (16%, unchanged). In credit investment firm exposures to credit institutions, AIFs, non-financials and UCITS respectively amounted to 8% (+2pp), 5% (-2ppts), 4% (+3ppts) and 3% (-3ppts).

For **commodity derivatives**, non-financials' exposures to credit institutions made up 26% (-4ppts), of the total, to investment firms made up 18% (+8 ppts), and to non-financials made up to 14% (- 1ppt).

Over a quarter (28%) of the **equity derivative** notional amount was held between investment firms and credit institutions, up 17ppts from a year earlier. This was a shift from exposures between credit institutions, which were down 18ppts to 7%. Exposures of credit institutions to non-financials fell (11%, -4ppts) while that between investment firms and CCPs rose (8%, +1ppt). Credit institutions exposures to CCPs also fell (6%, -3ppts).

For **currency derivatives** credit institutions exposures to non-financials was the largest (26%, +1ppt), followed by exposures among

credit institutions (17%, +1ppt), and that between credit institutions and investment firms (13%, +7ppts)

Concentration, connectedness: Remain high

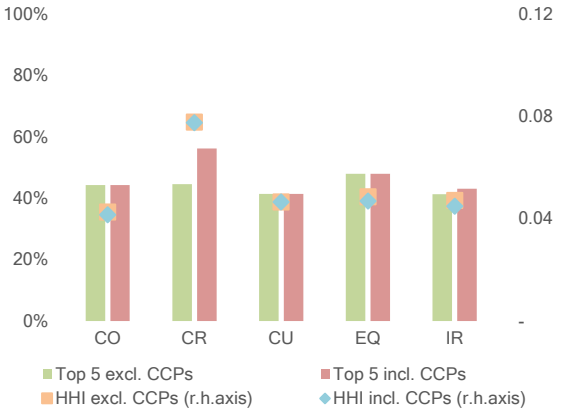
As in our previous report, here we use three measures to assess **concentration**. The first is the proportion of notional amount outstanding held by the top five largest counterparties. The second is the Herfindahl-Hirschman Index (HHI). It is based on the sum of the squares of notional amount proportions for all counterparties.[22] It also captures the concentration for counterparties outside the top five. Lastly, we use the number of counterparties in each asset class, measured by the number of unique reporting counterparties.[23]

The **top five** measure (ASRD.25), excluding CCPs, shows equity and credit markets were again the most concentrated with the top five holding 48% (up 3ppts from 4Q19) and 45% (-1ppt) of the outstanding notional amount respectively in each. For currency, commodities and interest rate derivatives the figures were 41% (+5ppts), 44% (+4ppts) and 41% (-2ppts) respectively.

As one would expect, including CCPs in the top five increased the proportion of exposures held for credit and interest rates. However, with the removal of UK CCPs from our data, effects are not as dramatic as when these were reporting. For interest rates, the top five including CCPs hold 43% of outstanding notional amount, while for credit it stood at 56% in 4Q20.

For the **HHI** the concentration picture is similar to that for the top five (ASRD.25), with the exception of credit where the HHI is higher, suggesting a greater concentration of the top five share in fewer counterparties. Credit again had the most concentrated exposures among asset classes, regardless of whether CCPs are included. The HHI metrics in 4Q20 were similar to those of a year earlier, across all assets.

ASRD.25
Concentration: HHI and top-five counterparties
IRD concentration in line with other assets



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 4Q19.
Sources: TRs, ESMA.

Also relevant is the **number of counterparties** in each market. In 4Q20, there were about 3,600 in credit, 7,000 in commodities, 26,000 in equities, 55,000 in currency and 97,000 in interest rate derivatives (see ASRD-S.30, ASRD-S.42, ASRD-S.54, ASRD-S.66 and ASRD-S.78). There was an increase in equities (+1,000), IRDs (+11,000), and in currencies (+4,000). Numbers for commodities and credit were similar to a year earlier.

We now look at the **interconnectedness** of markets using the ranking of counterparties by the number of counterparty connections they have.[24] As in 4Q19, the top 0.01% most connected reporting counterparties in each asset class still had extremely large numbers of connections in all asset classes in 4Q20 (ASRD.26). For example, in commodities there was only one counterparty in the top 0.01% and it was connected to over 31,000.[25] Credit also had only one reporting counterparty in the top 0.01% and it is connected to about 2,000 counterparties. In interest rate derivatives, there were ten reporting counterparties in the top most connected 0.01%. On average, these were each connected to almost 9,000. Also, connection patterns remain similar throughout 2020, with

[22] HHI is a measure of concentration based on the sum of the squares of market shares (which gives greater weight to larger shares). According to the EC guidelines (in the context of competition law) an HHI value of below 0.1 indicates low concentration and an HHI value of between 0.1 and 0.2 indicates medium concentration. See Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings and "Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings" https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52004XC0205(02)&from=EN.

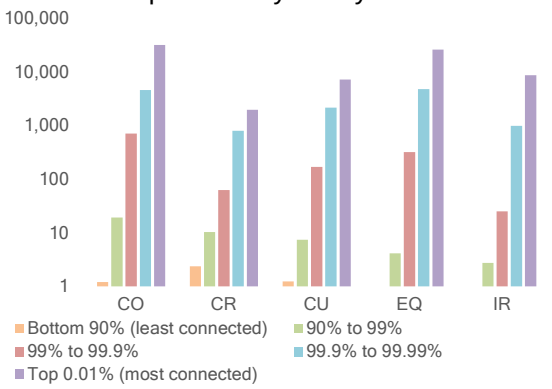
[23] This will under-report counterparties because only firms domiciled in the EU or EEA report trades under EMIR.

[24] A connection is counted when a reporting counterparty reports an outstanding position with another counterparty.

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

high concentration among the most connected counterparties in all assets.

ASRD.26
Connections by quantile of how connected
Some counterparties very widely connected

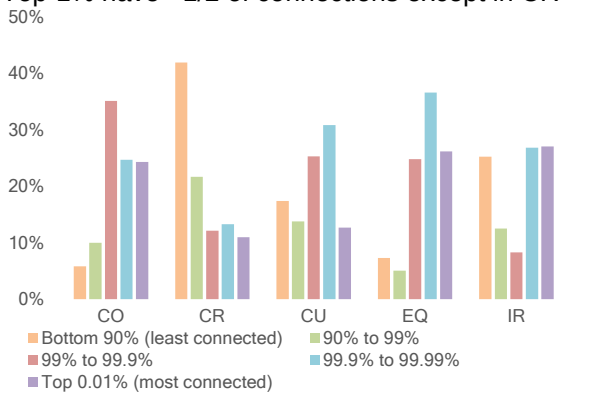


Note: Average connections per reporting counterparty (y axis, log scale) by quantile of how connected as of 4Q20. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources:TRs, ESMA

At the other extreme, in 4Q20 each asset class continued to have a large proportion of counterparties with very few connections. In in every asset class except credit, between 70% and 85% of the reporting counterparties had only one counterparty, in credit it was just under 40%. This shows how connections continued to be concentrated in a very small proportion of counterparties who were connected to a large number of counterparties, who in turn were only connected to them.

The chart below presents the distribution of counterparty connections (ASRD.27). It shows that in 4Q20 the top 0.01% most connected counterparties' connections accounted for at least 10% or more of all the connections into reporting counterparties, ranging from 11% in credit to 27% in interest rate derivatives. Moreover, the top 1% of the most connected reported counterparties in each of the asset classes also accounted for over a third of the connections in every asset class. Proportions for the top 1% ranged from 36% in credit to 88% (-3ppts) in equities. These proportions remained similar throughout 2020.

ASRD.27
Connections by quantile of how connected
Top-1% have >1/2 of connections except in CR



Note: Proportion of all counterparty connections (y axis) in quantiles of reporting counterparties ranked by connectedness as of 4Q20. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources: TRs, ESMA

As in previous reports, the charts show the extent to which in each asset class a few counterparties were connected to many others, while a large majority of counterparties are connected to very few, often to just one other counterparty. They also show variation in the extent of concentration across asset classes, with connections in credit and interest rate derivatives less extremely concentrated than those in commodities, equities and currencies.

Network: FR, DE at core of intra-EEA30 exposures

Here we look at the cross-border dimension of derivatives exposures.[26] We map derivatives exposures using the reporting counterparty's domicile information.[27] This year, with the removal of the United Kingdom (UK) from the data, **intra-EEA exposures** look very different from previous reports, bringing out the exposures among remaining member states more explicitly, as these include only the 30 remaining members of the EEA.

Looking at exposure patterns across asset classes (see ASRD-S.11 to ASRD-S.15), France (FR) and Germany (DE) emerge as the member

[26] Note that as the reporting period for this report (2019) predates the United Kingdom's exit from the EU in January 2020, the EEA and EU here include the United Kingdom.

[27] In the geographical charts the size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the country (i.e., the sum of all the individual exposures). The thickness of the lines is proportional to the total notional amount outstanding between counterparties from the two countries.

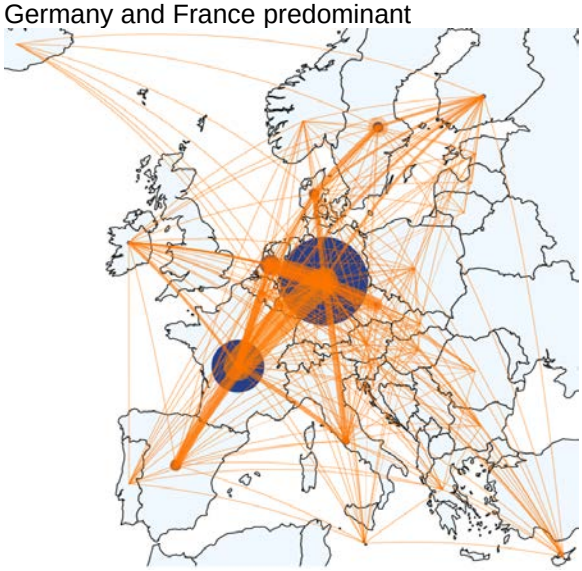
These charts and those in the Annex are based on the domicile of the reporting counterparty, which may not be the ultimate risk holder (e.g. an investment firm trading on behalf of a client). EMIR data do not allow the identification of end clients. As a result, the charts may overstate the role of large dealers in the market, which tend to be domiciled in a few EU countries.

To identify the domicile of reporting counterparties, we use the counterparty's reported Legal Entity Identifier (LEI) from database of the Global Legal Entity Identifier Foundation (GLEIF). See https://www.gleif.org/en/about/this-is-gleif

states with the largest share of counterparty exposures, with the Netherlands (NL) also significant in equities and currencies.

For interest rate derivatives, the main exposures were again DE-DE, FR-FR, DE-FR, SE-SE and NL-DE. Also visible are the numerous links from almost other member states to the core states of DE, FR and NL (ASRD.28). In terms of the relative share by domicile of counterparties, represented by the size of the dark blue circles in the chart below, Germany is by far the largest, followed by France and then the Netherlands.

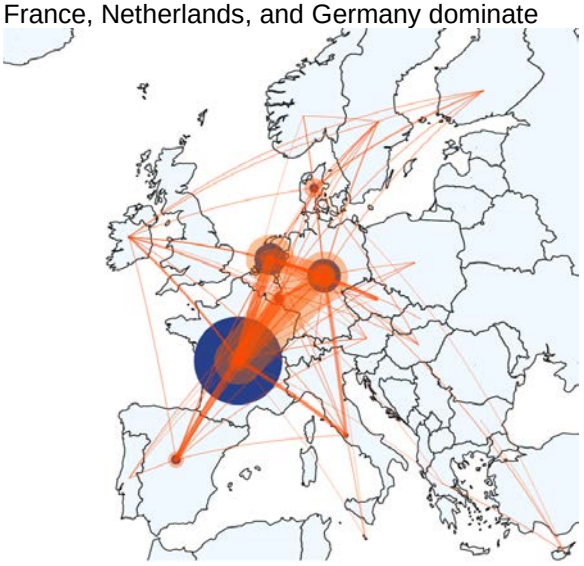
ASRD.28
Interest rate derivatives: intra-EEA30 network
Germany and France predominant



Note: Undirected network of total notional amount outstanding as of 4Q19.. The size of the bubbles is proportional to the aggregate notional amount outstanding for counterparties domiciled in the Member State. The thickness of the lines is proportional to the total notional amount outstanding between counterparties from the two Member States.
Source: TRs, ESMA, GLEIF.

Equity exposures are even more concentrated among between France, Germany and the Netherlands and to a lesser extent Luxembourg. In this case, France was the largest domicile for positions, followed by Germany and the Netherlands, roughly similar in share (ASRD.29). Visible links to other members states are fewer than with IRDs, with larger links from Denmark, Spain and Italy.

ASRD.29
Equity derivatives: intra-EEA30 network
France, Netherlands, and Germany dominate



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

The other asset classes, credit, currencies, and commodities, present a similar picture (ASRD-S.12, ASRD-S.13 and ASRD-S.15) in that in all three France is the member state with the largest share, followed by Germany. In currencies, Netherlands and Denmark also have sizeable shares, and connections between members states are more numerous and varied. In contrast, in credit exposures are dominated by those in and between France and Germany, though exposures between Finland and France also noticeable. Finally, for commodities, the picture also has more numerous and varied exposures between member states. The exposures between France and Germany are again the most significant, and France again accounts for the largest share.

With the United Kingdom's exit from the EU, exposures to counterparties domiciled there are now represented in our global charts, which present exposures between counterparties in EU and EEA member states and those domiciled in **third countries**.[28] These show that the United Kingdom continues to play a central role in EU derivative markets, across all asset classes (ASRD-S.16 to ASRD-S.20).

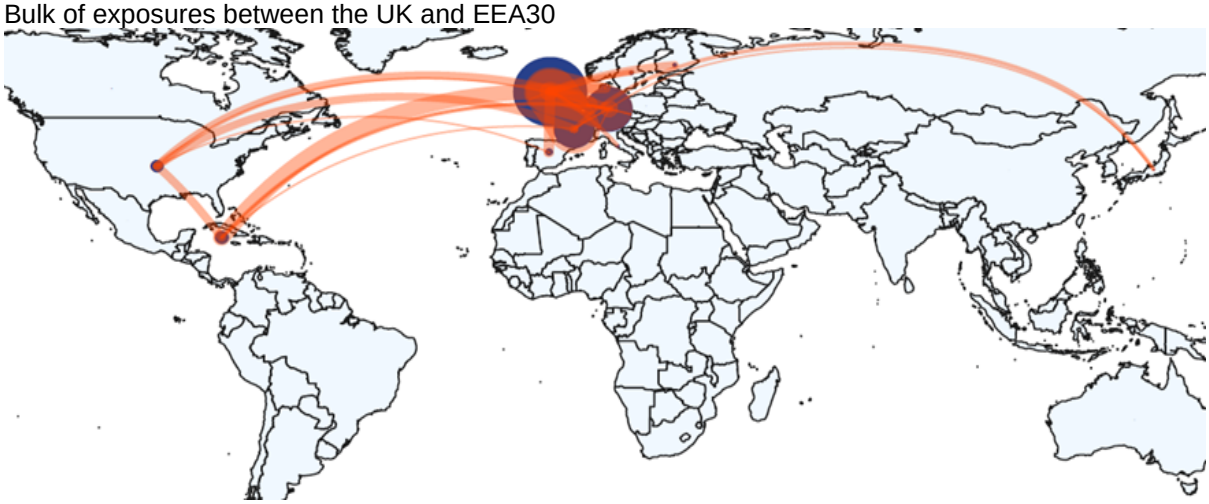
The chart below (ASRD.30), for example, shows the global exposures reported under EMIR for interest rate derivatives. Here there are very large

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

exposures to the UK from France, Germany, and the Netherlands. There are also smaller but sizeable exposures to the UK from Denmark, Spain, Finland, Italy and Ireland. There are also some exposures to the United States that are sizeable in Germany and France, and to a lesser extent, the Cayman Islands.

In all of the other asset classes, there is also a sizeable exposure to the UK, particularly in credit and currencies (ASRD-S.17, ASRD-S..18). In the case of IRDs and credit a sizeable amount of the exposures is associated with clearing that is continuing in UK CCPs. In equities and commodities, exposures are somewhat more spread across third countries, though the UK remains the largest third country to which EEA30 counterparties are exposed (ASRD-S.19, ASRD-S.20).

ASRD.30
Interest rate derivatives: global network of positions involving an EEA30 counterparty
Bulk of exposures between the UK and EEA30



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

The table below shows the extent of such links in 4Q20 (ASRD.31), while the second shows by how many percentage points exposures changed since 4Q19 (ASRD.32).

The first table shows that over the whole market, exposures involving third countries accounted for at least two thirds of notional outstanding in 4Q20. Of this, exposures to the UK were the largest account for almost half, 49%, of notional amount over all assets, up 1ppt from a year earlier. Exposures within the EEA30 accounted for just under a quarter, 24% (up 2ppts), while those to other (non-UK) third countries accounted for just under a fifth (19%, -4ppts).

The share and the shifts for the assets overall are due to those of interest rate derivatives, as by far the largest asset class by notional amount outstanding. For IRDs the share of exposures to the UK accounted for 55% (unchanged), share of exposure between the EEA30 counterparties was 21% (+2ppts) while those to other third countries stood at 15% (-3ppts).

There was also an increase in the share of exposures that was between EEA30 counterparties in other assets (commodities up 4ppts, credit up 6ppts, currency up 4ppts, equity up 3ppts). For commodities and equities this appears to be due to shift from exposures with UK entities, in credit it is due to a shift away from third country exposures (both UK and non-UK), and for currencies it is due to a shift away from non-UK third countries.

Overall, the statistics indicates that the EEA30 derivatives market is very highly linked to non-EEA30 counterparties, but with a general shift to more intra-EEA30 exposures over the year, across all asset classes.

ASRD.31
4Q20 cross-border exposures notional amount as a percentage of total outstanding notional amount
Exposures with third-countries account for over two thirds of exposures in all asset classes

	All	Commodities	Credit	Currency	Equity	Interest rate
Proportion of total notional amount (%)	100	1	2	13	4	79
Proportion by counterparty domicile (%)						
Intra-EEA	24	35	21	27	50	21
EEA with a third country	68	59	66	68	46	69
To the UK	49	29	36	25	22	55
To another third-country	19	31	29	43	24	15
UK to third-country	3	2	6	2	1	3
Unclear if intra-EEA or with third-country	6	4	7	3	4	6

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

ASRD.32
Changes in geographical exposures from 4Q19 to 4Q20 in percentage points
Slight shift to intra-EEA30 exposures away from third-country

	All	Commodities	Credit	Currency	Equity	Interest rate
Proportion of total notional amount (%)	-	0	0	-3	-1	3
Proportion by counterparty domicile (%)						
Intra-EEA	2	4	6	4	3	2
EEA with a third country	-2	1	-2	-5	1	-2
To the UK	1	-2	-1	1	-1	0
To another third-country	-4	4	-2	-6	2	-3
UK to third-country	0	-2	0	0	0	-1
Unclear if intra-EEA or with third-country	1	-3	-4	0	-3	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

Market trends

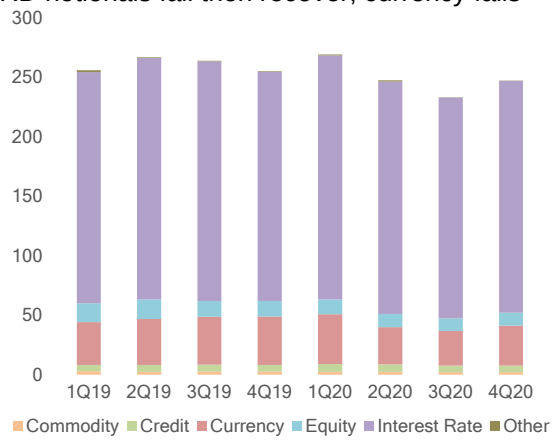
Summary

In 2020 European derivatives markets fell 4% in the total notional outstanding, from EUR 254tn in 4Q19 to EUR 244tn in 4Q20. Underlying this were slight increases in interest rate derivatives (IRDs) (+1%) and in credit (+4%), and falls in currencies (-20%), equities (-18%) and commodities (-22%). Progress on central clearing continued, with strong growth in central clearing rates for both IRDs and credit derivatives, from 68% to 71% for IRDs, and from 38% to 41% for credit. The quarterly rates of clearing of products subject to the clearing obligation remained high throughout 2020, finishing the year at over 90% in interest rate and credit products. The proportion of ETD contracts over all assets fell to 8% in 4Q20 from 9% a year earlier. However, this fall was more than offset by the growth, from 10% to 16%, in the proportion of notional outstanding in OTC contracts executed on trading venues, which grew for IRDs, currencies and credit derivatives. This partly reflects continuing impacts of MiFID requirements to trade certain OTC contracts subject to the clearing obligation on trading venues. Interconnectedness and concentration were stable or slightly increased across asset classes during 2020, and generally remained high.

Market shrinks, then recovers

Total notional amounts outstanding show an increase in EU derivative market size in 1Q20 followed by a fall over the next two quarters, before recovering a little in 4Q20 (ASRD.33). Year-on-year the total notional amount shrank to EUR 244tn by 4Q20, down from EUR 254tn in 4Q19 (a 4% fall). The peak size in 2020 was EUR 268tn in 1Q20, driven by the IRD market also peaking in that quarter.

ASRD.33
Total notional amounts outstanding by asset class
IRD notionals fall then recover, currency falls



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

From 4Q19 to 4Q20, **interest rate** derivative notional amount finished 2020 largely unchanged over the year, from EUR 192tn in 4Q19 to EUR 193tn in 4Q20. During 2020, the market was at its highest in 1Q, EUR 204tn, lowest in 3Q, EUR 184tn, before recovering to EUR 193tn by 4Q, with increasing notional amounts in swaps, FRAs and to a lesser extent in futures and options in that quarter (ASRD-S.21).

Currency derivative notional amounts fell over 2020, from EUR 40tn in 4Q19 to EUR 32tn in 4Q20 (a 20% decrease year-on-year). The fall occurred over the first three quarters of 2020, with the currency derivative market falling to lowest level of EUR 29tn in 3Q20. This was associated largely with a fall in currency forwards which occurred between 1Q20 and 3Q20 (ASRD-S.58). In 4Q20 the currency market grew, as forwards notional amounts recovered. Part of the fall of the currency forwards early in the year appears to be from the withdrawal of trades reported to CME, a trade repository that ceased its EMIR TR activities in 2020. If this is the case, then currency forwards early in 2020 and in late 2019 are overstated somewhat and the fall during in 2020 is likely to be less extreme than that which is indicated in our data here.

Equity derivatives fell from EUR 13tn in 4Q19 to EUR 11tn in 4Q20 (a 18% decrease). The drop in equities occurred from the end of 2019 to 3Q, with the notional amount already dropping to EUR 11tn in 3Q20, mainly as a result of a gradual fall in the notional amounts in options. Options accounted for about half of the overall fall in equities, with the remainder of due largely to falls in futures, CFDs, and swaps (ASRD-S.45).

Credit notional amounts finished 2019 at a slightly higher level than 4Q19, at EUR 5.7tn, an increase of about EUR 0.2tn year-on-year (4% increase). Levels were highest in the first half of the year, EUR 6.6tn in 1Q20 and EUR 6.2tn, before falling to EUR 5.5tn in 3Q and recovering in 4Q. The early peak in credit notionals is likely

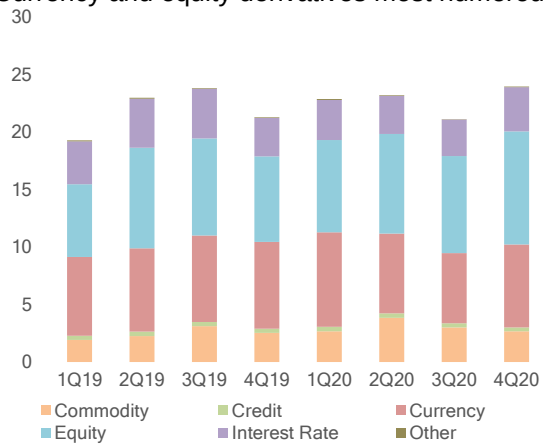
to be capturing record levels of CDS trading volumes that occurred in March 2020 with the onset of the COVID pandemic.[29] CDSs continued to account for most of the credit derivative notional amounts and to drive the trends in credit derivatives though credit swaptions also contributed, with both CDS and credit swaptions finishing the year slightly up on a year earlier, while options and futures fell (ASRD-S.33).

Commodity derivative notional amounts fell significantly, from EUR 2.6tn in 4Q19 to about EUR 2tn in 4Q20. There was an initial fall in 1Q20 followed by slight recovery and then fall again over the second half of the year. The 22% year-on-year fall was driven mainly by falls in outstanding notional amounts of commodity futures, which accounted for almost half of the fall, with the rest of the fall accounted for mainly by falls in CFDs and options. (ASRD-S.69).

Looking at the number of outstanding **positions by asset class**, these increased in early 2020, before dipping in 3Q and then increase in 4Q20 (ASRD.34). Overall, numbers of contracts increased by 13% from 4Q19 to 4Q20. The increase was largely due to an increase in the number of outstanding equity positions, which rose 2.4 million over the year, up by nearly a third. Notable in this rise in equities was a step increase in the number of outstanding equity options in 2Q, which in turn is likely to be related to growth in equity option trading early in 2020, related to the market turbulence associated with the onset of the COVID-19 pandemic. This is discussed in more depth below (ASRD.43).

Among other asset classes, interest rate derivatives also showed a sizeable increase, up half a million (15%) on a year earlier. In contrast, other assets showed much smaller changes year-on-year.

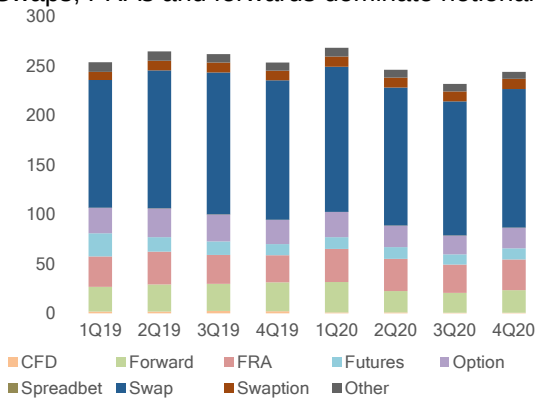
ASRD.34
Total number of trades outstanding
Currency and equity derivatives most numerous



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

Looking at notional amounts outstanding for **contract types**, there were sizeable increases in FRAs and swaptions (up EUR 4tn and EUR 1tn respectively from 4Q19) both largely due to increases in these contract types for interest rate derivatives. In contrast, options, forwards and swaps all shrank in notional amount outstanding (down EUR 7bn, EUR 4bn and EUR 1bn respectively). The fall in forwards was almost entirely driven by the fall in currency forwards mentioned above, while the falls in options and swaps falls were largely driven by these contracts in interest rates (ASRD.35).

ASRD.35
Total notional amounts outstanding by contract type
Swaps, FRAs and forwards dominate notional



Note: Total notional outstanding in trillions by product type.CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. CFD - contracts for difference, FRA - forward rate agreements.
Sources: TRs, ESMA

As in previous years, swaps continued to account for by far the most notional amount throughout 2020, due to their dominance within IRDs. The second asset class by notional amount was

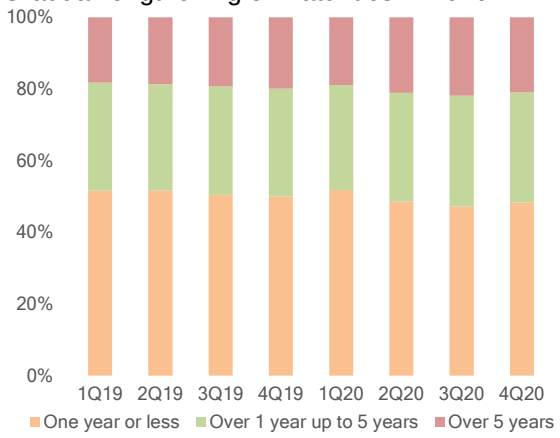
[29] See, Risk.net (2020), 'Swaps data: record trading volumes in March', available at: https://www.risk.net/comment/7544341/swaps-data-record-trading-volumes-in-march .

forwards (including FRAs), given the significance of FRAs in IRDs, which are the second after in notional amounts after swaps, and of forwards in currency derivatives, the largest instrument by notional there.

Maturities gradually lengthening

The **remaining maturity** of contracts lengthened gradually through 2020 (ASRD.36). Notional amounts in contracts with a remaining maturity of one year or less fell slightly from 50% in 4Q19 to 48% in 4Q20. The proportion of outstanding notional amount in the one-to-five year category grew slightly to 31% from 30% over the year, while the over 5-year maturity grew from 20% in 4Q19 to 21% in 4Q20. Overall, the distribution indicates a gradual lengthening of the maturity of contracts through 2020.

ASRD.36
Total notional amount by maturity
Gradual lengthening of maturities in 2020



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

This slight lengthening of maturities overall was largely due to small increases in maturities in the two largest asset classes over 2020, in IRDs and currencies (ASRD-S.24, ASRD-S.60). In contrast for equities and for commodities, there was a shortening of maturities over 2020 (ASRD-S.48, ASRD-S.72). While for credit, there was no clear trend towards shorter or longer maturities (ASRD-S.36).

OTC central clearing: Continued growth

We now analyse **central clearing trends** during 2020. As in previous reports, the focus is primarily on IRDs and credit derivatives, the two asset classes with products subject to the clearing obligation.

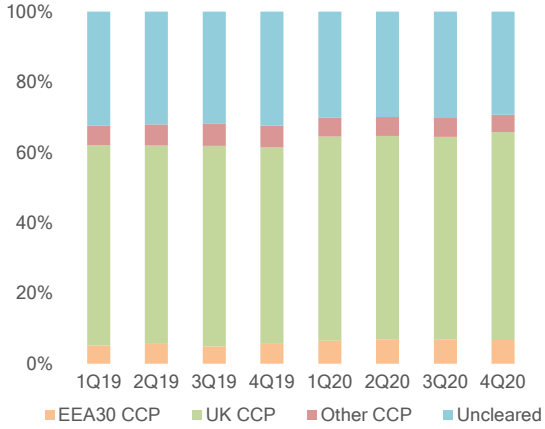
The proportion of the notional amount of outstanding OTC positions that was cleared grew markedly for both IRDs and credit, from 68% in 4Q19 to 71% in 4Q20 for IRDs, and from 38% in 4Q19 to 41% in 4Q20 for credit. (ASRD.37)

ASRD.37
Central clearing – credit and interest rate derivatives
Growth in rates for IRDs and CRs over 2020

Note: Percentage of over-the-counter notional centrally cleared by asset class. CR - credit, IR - interest rate derivatives.
Sources: TRs, ESMA.

The increase in the central clearing ratio for **interest rate derivatives** was due both to an increase in the amount of cleared notional and a decrease in the amount of uncleared notional. In terms of clearing location, central clearing in 2020 continued to be carried out mostly by UK CCPs, where 59% of the total notional amount outstanding was cleared in 4Q20, up 3ppts from 4Q19. The share of total notional amount cleared in the EEA30 also increased slightly, from 6% in 4Q19 to 7% in 4Q20. While 5% of the total notional amount outstanding was cleared by CCPs located outside the EEA30 and UK in 4Q20, down a 1ppt from the year before (ASRD.38).

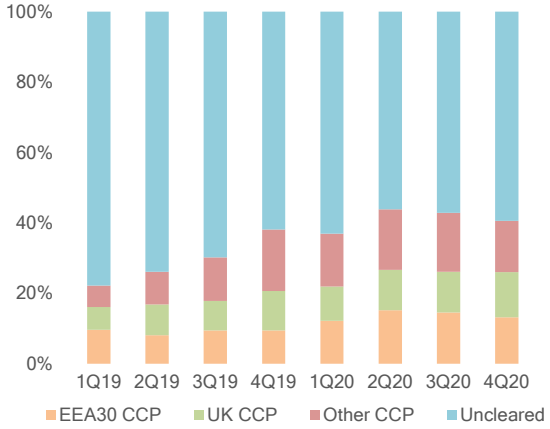
ASRD.38
Interest rate derivatives clearing by CCP location
Clearing growth mainly in UK CCPs



Note: Percentages of cleared and uncleared notional outstanding by location of CCP for interest rate derivatives.
Sources: TRs, ESMA.

Like IRDs, for **credit derivatives** the clearing ratio also increased because of an (albeit small) year-on-year increase in the cleared notional amount outstanding combined with a fall in uncleared notional amounts outstanding. The proportion of total notional amount that was cleared by EEA30 CCPs increased from 9% to 12% during 2020. The proportion of notional amount cleared in UK CCPs also grew, reaching 13% in 4Q20, up 2ppts (ASRD.39). In contrast the proportion of total notional cleared in CCPs located outside the EEA30 or the UK fell 2ppts to 15%.

ASRD.39
Credit derivatives clearing by CCP location
Share of clearing in 2020 grew across locations



Note: Percentages of cleared and uncleared notional outstanding by location of CCP for credit derivatives.
Sources: TRs, ESMA.

Commodities clearing rates also grew in 2020 to 4% in 1Q20 before falling back down in the last quarter to 1% (ASRD-S.68). In other asset classes central clearing in OTC markets remained very low. Regarding equities, clearing rates ranged from between 1.6% to 2%, while for currencies they remained at around 1% throughout the year (see ASRD-S.44 and ASRD-S.56).

In the next section, we dig deeper and present notional amounts cleared and clearing rates by quarter for specific products subject to the clearing obligation.[30] It should be remembered that estimates here are constructed differently because of a data constraint and are based on the execution timestamp for trades reported on our four quarterly reference dates.[31] In addition, in this year's report, we have improved the identification of instruments subject to the clearing obligation. In particular, the clearing obligation applies only to financial and non-financial counterparties whose positions in OTC derivatives exceed the clearing thresholds. Counterparties that exceed the clearing obligation have to notify ESMA and the relevant national competent authority when they exceed the clearing thresholds. For this year's report, we look at the instruments subject to clearing obligation and only at the counterparties exceeding the clearing thresholds has notified to ESMA. This refinement improves the accuracy of the metric, and is explained more in detail in the statistical methods section below.

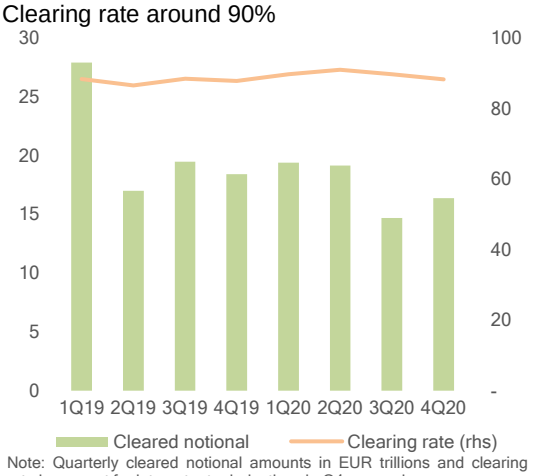
This methodological improvement also means that the clearing rate should, if compliance was complete and in the absence of poor data reporting, be close to 100%. Thus, the metric presented here becomes more of a measure of the rate of compliance to the clearing obligation for products subject to it, rather than simply a measure of levels of clearing.

For **OTC interest rate derivatives** classes denominated in the G4 currencies (USD, EUR, GBP and JPY) the quarterly clearing rate for new contracts was high and stable in 2020, finishing and starting the year at 88% and peaking at 91% in 2Q20 (ASRD.40).

[30] Note that because of data limitations, we identify the instrument but not the counterparties here. This means in some cases the transaction would not be subject to the clearing obligation (e.g. for an NFC or a FC below the clearing thresholds). For an overview of the clearing obligation and risk-mitigation techniques under EMIR see: https://www.esma.europa.eu/regulation/post-trading/otcderivatives-and-clearing-obligation.

[31] See in particular, 'Measuring central clearing in OTC markets' in the Annual Statistical Report 2018.

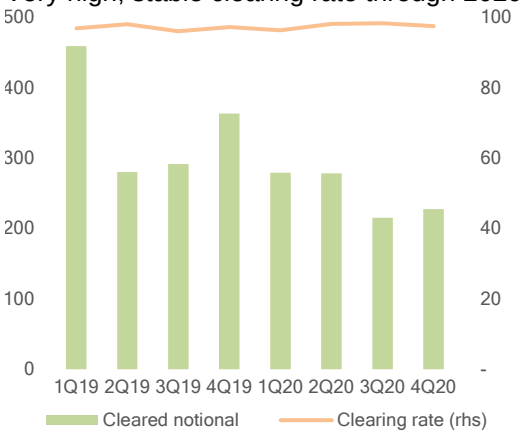
ASRD.40
IRDs in G4 currencies
Clearing rate around 90%



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

Clearing rates for OTC interest rate derivatives classes denominated in NOK, PLN and SEK were higher still. As with the interest rate derivatives in the G4 currencies, the rate was stable year-on-year, at a higher rate, starting and finishing 2020 with clearing rates of 97%. The rate fluctuated little, falling to 96% in 1Q20 and rising to 98% in 3Q20 (ASRD.41).

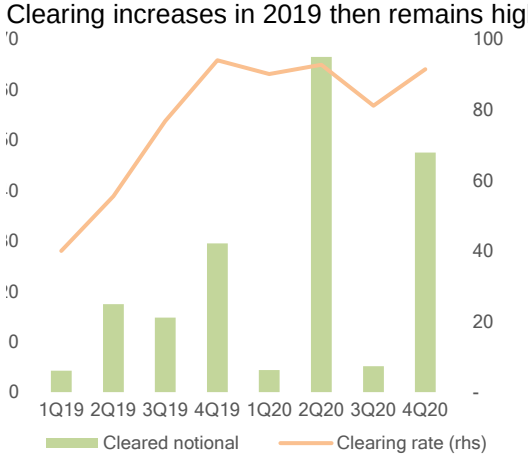
ASRD.41
IRDs in NOK, PLN and SEK
Very high, stable clearing rate through 2020



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

In 2020 credit derivative clearing rates and for **CDS on European indices** increased in 2019 and then remained high in 2020 (ASRD.42).[32]

ASRD.42
Clearing trends for CDS on Indices
Clearing increases in 2019 then remains high



lote: Quarterly cleared notional amounts in EUR billions and clearing ate in percent of CDS on European indices in percent.
ources: TRs, ESMA.

Quarterly clearing rates were 94% in 4Q19 and finished down slightly year-on-year at 92% in 4Q20, dipping to 81% in 3Q20. Cleared quarterly notional amounts are volatile, with a strong jump in 2Q20, likely reflecting the jump in and record levels in credit swap trading activity, particular for CDS on indices, in March 2020 with the onset of the Covid pandemic, which in our data, is likely feed predominantly into our 2Q20 figure given our mid-March reference date for 1Q20 and lags in reporting.[33]

ASRD.43
COVID-19 and derivative markets in 2020
Impacts of the COVID-19 in EMIR data

The COVID-19 pandemic had dramatic impacts on financial markets in early 2020, reflecting rapid changes in economic activity and expectations globally. During the initial stage of the crisis in 1Q20, markets experienced rapid surges in volatility and liquidity contractions across financial markets. ASRD.44 below shows rapid jumps in market and credit risk with the onset of the pandemic in late February and March 2020, with sharp spikes in implied volatility for equity indices and in CDS spreads, reflecting the massive challenges and uncertainty that were then facing corporates in Europe and elsewhere.

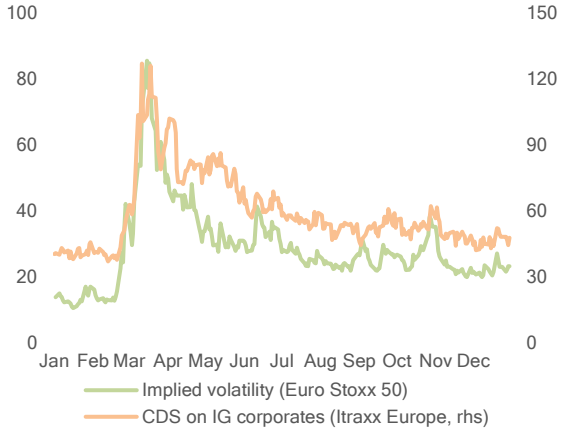
The quarterly trade-state EMIR data used in this report can provide only a very limited view of the development of the pandemic, because of the broad time-granularity of the quarterly observations and the focus on stock of outstanding amounts, both of which are not well suited to observe rapid changes in trading activity. It is generally when we look at trade flows, such as those inferred above in the quarterly clearing charts for CDS on European indices, and the large peak visible there in 2Q20, or when we look at more frequent

[32] These are index CDS that have as reference index the iTraxx Europe Main or the iTraxx Europe Crossover. (See https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0592&from=EN)

[33] See, for example, Risk.net (2020), 'Swaps data: record trading volumes in March', available at: https://www.risk.net/comment/7544341/swaps-data-record-trading-volumes-in-march .

observations,[34] that we begin to discern the impacts of the pandemic more clearly.

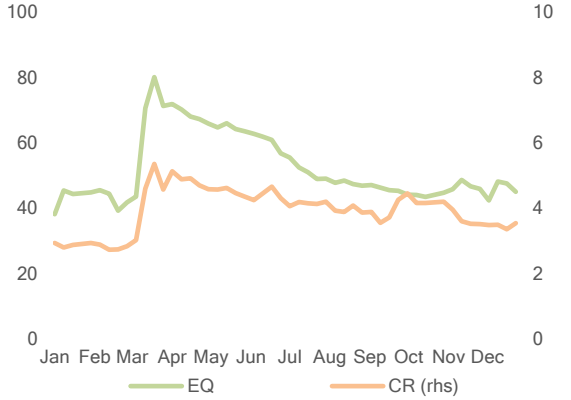
ASRD.44
Market and credit risk for corporates
COVID-19 spike in market, credit risk



Note: Implied volatility of EURO STOXX 50 (VSTOXX) in % and CDS spread on ITraxx Europe in bps, in 2020.
Sources: Refinitiv Datastream, ESMA.

Key effects of the pandemic can also be seen in other data reported under EMIR. In particular, as discussed in last year's report, initial margins posted to CCPs show clearly how the CCP framework responded rapidly and effectively to the very rapid increase in risk in March 2020. ASRD.45 shows margins responded to the jumps in volatility. It presents initial margins posted for equities and credit by all EU and non-EU counterparties to EEA30 CCPs.[35] It also shows how initial margins posted gradually returned to levels closer to those of early 2020, reflecting the fall in risks as government measures to support the economy and contain the pandemic increasingly took effect.

ASRD.45
Initial margins posted for equities and credit
Initial margin trends reflect risk appetite shift

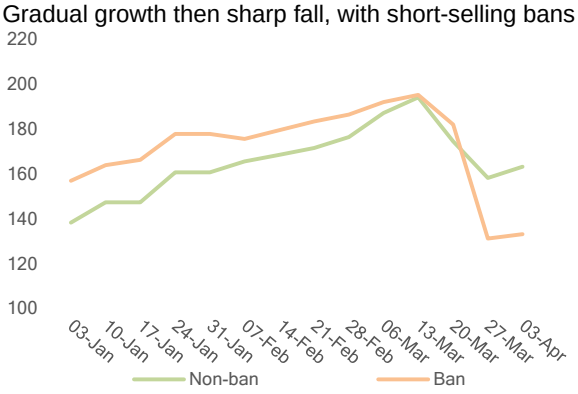


Note: Outstanding amounts of intital margin required and excess collateral received by EEA30 CCPs in 2020 (CCP.A, CC&G,European Central Counterparty N.V and KDPW data missing) for equity (EQ) and credit derivatives (CR) in EUR bn.
Sources: TRs, ESMA.

Another issue early in the pandemic was the increase in short-selling from end-February in equity markets. Given this, and to support transparency, ESMA on 16 March lowered the reporting threshold of net short positions on shares to 0.1%, which was then extended in June for three months. Around the same time several Member States also imposed short-term or long-term short-selling bans (AT, BE, FR, GR, IT, ES) which were subsequently lifted in mid-May as market conditions improved.

Purchasing a put option on a stock provide one way to short sell. The chart below (ASRD.46) shows the gross notional outstanding of equity put options bought by EEA30 and UK counterparties around the time of the short selling measures. It shows that single stock put options bought by participants first grew as the pandemic took hold, before falling with the introduction of the short-selling ban. It also shows there was a greater impact reducing of purchases of put options in countries with a ban, though a reduction was also clearly visible countries that did not introduce a ban.

ASRD.46
Outstanding notional amount equity put options
Gradual growth then sharp fall, with short-selling bans



Note: Equity put options bought by EEA31 (EEA30 + UK) counerparties, gross notional outstanding in EUR bn. Country of instrument is the country of its Relevant Competant Authority (RCA). Ban countries include countries that imposed a short selling ban (AT, BE, ES, FR, GR, IT).
Sources: TR, ESMA.

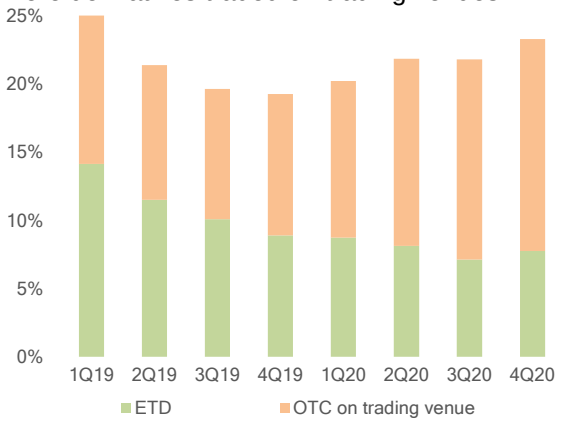
Execution: ETD share falls slightly

In 2020 the overall proportion of notional amount outstanding in ETDs fell from 9% in 4Q19 to 8% in 4Q20, falling as low as 7% in 3Q20 (ASRD.47).

[34] In the Annual Derivatives Report 2020 (p.8), weekly observations of notional amounts (covering the EU27 and UK) show rapid changes in all asset classes in the early stages of the pandemic. In particular, we observed rapid increases in notional amounts outstanding between February and March for IRDs (up 6%), currencies (up 13%) and credit (up 22%) and falls of about 15% for both commodities and equities from March to April.

[35] As initial margins are posted a portfolio level, we decompose margins according the relative weights of the asset classes in the portfolio. See 'CCP initial margins in 2019' in the Annual Statistical Report EU Derivatives Markets 2020.

ASRD.47
Trading venue proportions split by ETDs and OTC
More derivatives traded on trading venues



Note: ETD, OTC trading venue and other OTC share of outstanding notional amount. ETD - exchanged traded derivatives, OTC - over-the-counter derivatives.
Sources: TRs, ISO, ESMA.

At asset level, the proportion of notional amounts in ETDs was stable in equities, commodities and currencies (unchanged year-on-year at 50%, 49% and 1% respectively), and fell in interest rate derivatives (from 8% in 4Q19 to 7% in 4Q20) and credit (8% in 4Q19, 5% in 4Q20). Given the sizeable share of IRDs overall, the asset class level changes show that the overall change in ETD proportions was driven the fall in ETD for IRDs.

In terms of instrument types, almost EUR 2tn of the EUR 3tn fall in ETD notional amount outstanding from 4Q19 to 4Q20 resulted from reductions in ETD contracts in interest rate options. Notional amounts in interest rate futures reported as ETD were largely unchanged, while ETD equity options fell (EUR -0.5tn) as did equity futures (EUR -0.4tn) There were much smaller changes in other asset classes, which accounted for the remainder of the change.

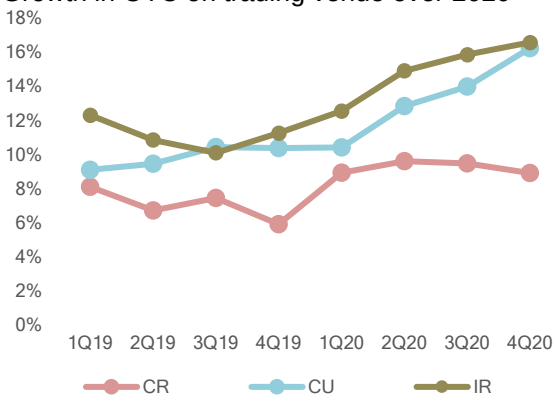
Looking at the broader category of contracts executed on trading venues, which includes OTC contracts executed on MTFs and OTFs in addition to ETDs, then the proportion of the notional amount **executed on trading venues** grew strongly over 2020, after falling in 2019 due to falls in ETD.

The proportion of notional amount executed on trading venues grew from 19% in 4Q19 to 23% in 4Q20 (ASRD.48). The increase was driven mainly by strong growth in on-trading venue OTC IRDs, which grew strongly for both FRAs (up EUR 5tn) and swaps (up EUR 4tn).

There was also sizeable growth in the share of OTC contracts executed on trading venues for currencies as a proportion of total notional amount outstanding, which grew from 10% to 16%. This growth was driven by on-trading venue OTC notional amounts increasing for currencies by almost EUR 1tn year-on-year, driven in turn by an increase in on-trading venue currency forwards (up EUR 0.6tn) and to a lesser extent growth currency swaps (up EUR 0.2tn).

For credit the share of on-trading-venue OTC also grew strongly year-on-year, from 6% in 4Q19 to 9% in 4Q20, as a share of total notional amount. This was driven by a EUR 0.2tn year-on-year increase in the notional outstanding for OTC CDS exchanged on trading venues. The chart below shows the strong growth in OTC on-trading venue share notional amounts for IRDs, currencies and credit (ASRD.48).

ASRD.48
Proportion OTC on trading venue
Growth in OTC on trading venue over 2020



Note: Proportions of total notional amount that is OTC on trading venue by asset class, equities and commodites omitted as shares are negligible. CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives. ETD - exchanged-traded derivatives, OTC - over-the counter derivatives.
Sources: TRs, ISO, ESMA.

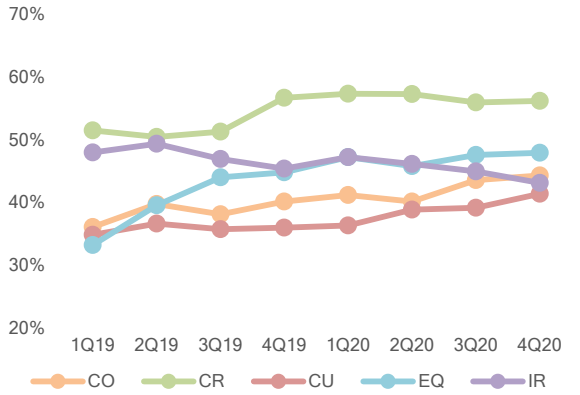
Concentration: Mixed trends

Looking at **concentration** related metrics, we see growth in counterparty numbers from 4Q19 to 4Q20 in all asset classes: interest rate derivatives (+13%), currencies (+8%), equities (+6%), commodities (+5%) and credit (+3%). See ASRD-S.22, ASRD-S.34, ASRD-S.46, ASRD-S.58, ASRD-S.70. By 4Q20 counterparty numbers ranged from about 3,500 for credit derivatives to just over 95,000 for IRDs. Given the rate of growth in counterparties exceeds relative change in notional or number of trades, this suggests – in simplistic average terms, slightly decreasing concentration, as measured by market size (notional amount or number of trades) per counterparty.

Looking at the more sophisticated metrics, HHI and the top five metrics, we see an **increase in**

concentration for currencies over 2020 (ASRD-S.65), both in terms of the notional shares of the top five largest counterparties, and the HHI. The proportion of exposures held by the top five counterparties increased from 36% in 4Q19 to 41% in 4Q20 (ASRD.49), while over the same period the HHI grew from 0.03 to 0.05. This continued a trend for growing concentration seen in 2019. Although, compared to other asset classes on these metrics, currencies remain the least concentrated. Concentration also grew in equities, though less strongly. Its top 5 share grew from 45% to 48% from 4Q19 to 4Q20, while its HHI grew from 0.04 to 0.05.

ASRD.49
Top-5 counterparty share by asset class
Growth in most asset classes



Note: The share of notional of the Top 5 largest counterparties by asset class. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources: TRs, ESMA.

There were mixed trends in the concentration for commodities. From 4Q19 to 4Q20, the top 5 metric grew from 40% to 44% while the HHI fell from 0.05 to 0.04. This indicates that, while the overall share held by the top 5 grew, the distribution among the top 5 (and others) became slightly more even.

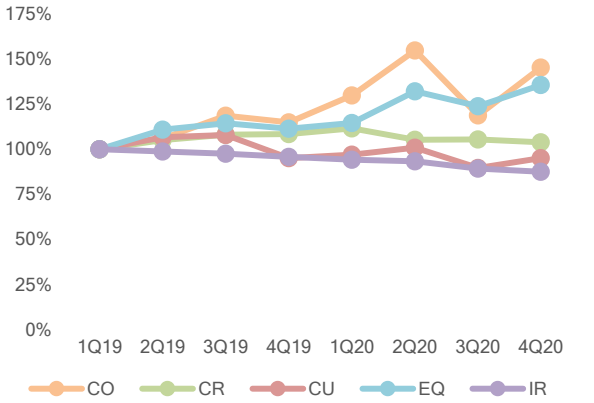
Credit, with the inclusion of CCPs, remained the most concentrated asset class in terms of both top 5 and HHI. Its concentration remained largely unchanged over the year, with the top 5 share falling slightly from 57% to 56% and the HHI remaining at 0.04 throughout the year.

Concentration in interest rate derivatives fell slightly, with the top 5 share falling 2ppts from 4Q19 to 4Q20, down to 41%, while HHI fell from 0.05 to 0.04. Although, given that UK CCPs still pay a central role in IRD clearing for EU counterparties, the concentration metrics for IRDs here understate the actual concentration of he IRD market (with UK CCPs included).

Interconnectedness: Stable to increasing

Regarding **interconnectedness**, we look first at a very simple metric, the trends in the average connections per counterparty for reporting counterparties. The chart below (ASRD.50) indexed at 100% at 1Q19, shows relatively little change for credit, currencies, and interest rate derivatives. In contrast, for commodities and equities there is an increasing trend and greater volatility, with average connections per counterparty for commodities and equities increasing by 26% and 22% respectively from 4Q19 to 4Q20. These increases in average numbers of connections could be reflecting increased trading activity in early 2020 with the onset of the pandemic. The other asset classes trends were flatter, with the average number of connections for currencies unchanged over the year, while that for credit and interest rates fell by 4% and 9% respectively.

ASRD.50
Average connections per counterparty
Trends mixed across asset classes



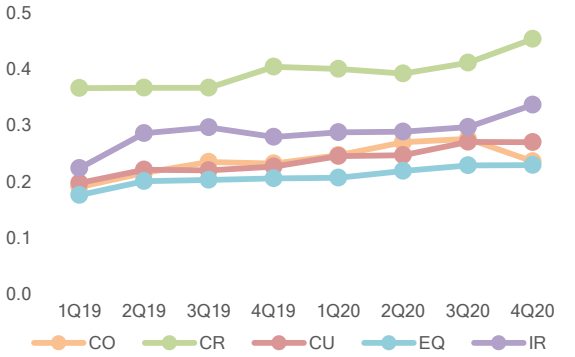
Note: Average connections per counterparty by asset as percentage of 1Q19 value. CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest rate derivatives.
Sources: TRs, ESMA.

The picture is also reflected in the degree connectedness metric, which measures connectedness of each participant based on how many other counterparties it has an outstanding position. Unlike the average connections per counterparty, it only counts multiple connections between the same two counterparties once.

With this metric, we see slightly different trends, with gradually increasing degree connectedness across all asset classes, with the exception of commodities which shows little change year-on-year (ASRD.51). When considered with the increasing number of average connections above, this suggests that in early 2020 that

counterparties in equities and commodities increased their positions with counterparties they were already positions with, rather than with new counterparties.

ASRD.51
Degree interconnectedness by asset
Increases in all assets except commodities

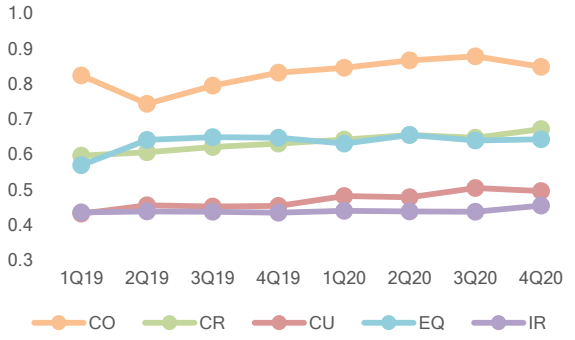


Note: Degree inteconnectedness indicator by asset. This measures a participant's influence based on the number of links it has to other participants within the network. It ranges from 0 (lowest) to 1 (highest interconnectedness). CO - commodities, CR - credit, CU - currencies, EQ - equities, IR - interest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

To conclude, we look at trends using another metric, Eigenvector interconnectedness. This measures the extent to which the connections in a market tend to be centralised in a few very highly connected counterparties. This metric also takes connections of these counterparties to other highly connected counterparties in the network into account. It ranges from 0 (lowest interconnectedness) to 1 (highest).

With this measure, connectedness shows similar trends as degree connectedness from 4Q19 to 4Q20 (ASRD.52).

ASRD.52
Eigenvector interconnectedness by asset
Largely stable, large 1Q spike for commodities



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.

The Eigenvector connectedness trends are gently increasing for all asset classes with eigenvector connectedness increases by 2% for commodities and equities, by 3% for interest rates and currencies and by 5% for credit. Some of these increases, especially for credit and interest rates, are also reflected in similar trends for degree connectedness.

Overall, the general growth in Eigenvector connectedness suggests that across all assets, connectedness is gradually increasing among a few highly connected counterparties.

Summary

Some of the key trends from 4Q19 to 4Q20 by asset class were as follows.

— Interest-rate derivatives: the outstanding notional amount of IRDs grew very slightly over the year, from EUR 192tn in 4Q19 to EUR 193tn in 4Q19, while the number of positions grew by 16%. Growth was driven by growth in FRAs and futures. Clearing rates grew strongly from 68% in 4Q19 to 71% in 4Q20. Over the same period, the notional amount of IRD contracts executed on trading venues (ETD and OTC) grew significantly from 19% to 24% with growth in on-trading venue FRAs and swaps, offset a drop in ETD due to a fall in options.

— Credit derivatives: notional amounts grew in size by 4%, driven by CDSs and swaptions. Clearing rates also grew strongly for credit in 2020, from 38% at the end of 2019, to 41% at the end of 2020. ETD notional amounts outstanding fell to 5%, 3ppts down from a year earlier. However, this fall was offset by OTC contracts executed on trading venues which increased 3ppts to 6% of the notional amount.

— Equity derivatives: Notional amounts for equity derivatives fell significantly, by 18% between 4Q19 and 4Q20. Most of this drop occurred between 1Q20 and 2Q20 and was driven by a fall in notional amounts for equity options, and to a less extent CFDs, futures and swaps. Trading venue notional amounts, almost entirely ETDs, was unchanged over the year at 50%.

— Currency derivatives: Currency derivatives fell by 20% in notional amount over the year, largely due to falls in reported in currency

forwards between 4Q19 and 1Q20. The trading venue notional amount, almost entirely OTC, grew strongly in 2020, albeit more slowly, increasing from 11% to 17% of the total notional amount outstanding over the year.

— Commodity derivatives: Commodities notional amounts fell sharply between 4Q19 and 4Q20. This was associated with falls in outstanding futures, CFDs and options notional amounts. Overall, the notional amount outstanding fell by 22% year-on-year. The share of ETD finished the year unchanged at 49%, with the share of OTC on trading venue remaining negligible.

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 EEA30 counterparties that are provided to trade repositories (TRs), which in turn report these to ESMA. Here we explain how we prepare the trade-state data so that these can be used to construct the statistics presented in this report. Particular refinements made this year were the removal of UK reports from EMIR data to reflect the EEA following the exit of the UK from the EU. We also made refinements to our outlier removal methodology and to the calculation of clearing rates. Clearing rate changes were made to improve the accuracy of clearing rates for the products subject to the clearing obligation, and to make some necessary adjustments following the UK's exit from the EU.

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).[36] Given the withdrawal of the UK from the EU, it also explains the extra steps were necessary to allow to construct a two-year time-series for 2019 and 2020 without UK data. Given the continued prevalence of outliers, it explains how our outlier approach was adjusted, by calculating dynamic thresholds for scarcely traded derivatives. It also sets out changes to the clearing rate methodology to improve accuracy and to account for the departure of the UK from the EU.

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 EEA30[37] 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 then disseminate these reports, filtered according to access rights,[38] to the relevant authorities. These authorities include the European supervisory authorities, NCAs and central banks. As was the case last year, this year's report we used data from all TRs that were registered in 2019 and 2020.[39] Noteworthy here is that Bloomberg TR was deregistered on 31 March 2019. In the anticipation of the withdrawal of the UK from the EU of two TRs, DTCC and Unavista, registered entities within the EU in March 2019, as these were originally based in the UK. The changes had no implications for our report. Similar to last year we have relied on the TRACE system for obtaining the EMIR data reports.[40]

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 TR apply trade-activity messages to create or update records that represent the derivative positions. However, once the derivative is closed or matured (as indicated in the Maturity Date field) the TRs removes the respective record. This means that these data show a snapshot of the

[36] 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/market-analysis/financial-stability

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

[38] Please compare articles 18 and 20 of https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R0150.

[39] For an updated list of registered TRs see https://www.esma.europa.eu/document/list-registered-trade-repositories .

[40] TRACE is the Access to Trade Repositories System. ESMA's TRACE provides a single point of access to trade repository data for authorities.

latest information available on each outstanding derivative contract.

The third type of report, position data, provides information on outstanding derivatives between two counterparties at an instrument level. This dataset is mainly used for analysing cross-counterparty exposures.[41]

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, 2019 and 2020. The data captures all open positions within the EEA30, and positions between an EEA30 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 happen on the last Friday of the month.

As we use quarterly data, our four datapoints for 2020 are based on the following four months: March, June, September and December. The number of records for 2020, after the rigorous cleaning exercise explained below, ranges from 27mn to 31mn per quarter and totals 118mn records, aggregated over the four quarterly dates of this report. Due to the withdrawal of the UK further adjustments to the data were also necessary. These are explained in box ASRD.53 below.

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 2020, 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, positions reported by other counterparties against the overreporting entity where 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.

ASRD.53
Data preparation after the withdrawal of the UK
Removal of UK records

This years' edition of the report is published after the withdrawal of the United Kingdom from the EU on 31 January 2020. The withdrawal was followed by a transitional period that lasted until 31 December 2020 during which the UK remained part of the EU Single Market, and financial market and reporting regulations essentially stayed the same for UK counterparties. In terms of financial market reporting data, this implied that UK entities still fell under the EMIR reporting regime and therefore were obliged to report their derivative positions to the TRs established in the EU.

In our reporting, we show EEA30 markets in 2020, i.e. after the formal withdrawal of the UK, and therefore positions transmitted by UK counterparties after 31 January 2020 are not displayed. EMIR data reports where the LEI of the reporting counterparty was UK-based were removed from the dataset. This led to a significant reduction in size of the EMIR trade state dataset. Before the removal of the UK reports the data set ranged in size from 54mn to 70mn, which fell to between 27mn to 31mn records per day with the UK's removal. To keep consistency throughout the report and to enable the interpretation of market trends UK data was also removed from 2019 data used in this report. As a result, the 2019 data in this report show only those reports from EEA30 counterparties. Thus, the full picture of the EU derivatives market in 2019 is presented in our previous annual report, which used data from the whole EEA (EEA31) at that time.

Given the removal of the UK data, our procedures to adjust for the double reporting (double reporting in this context means that one transaction is reported twice if conducted between EEA30 entities, as they are both required to report) needed to be adapted. Here the UK was re-categorized as a third country which means, in the context of pairing and reconciliation, that these positions counted as they are reported without any further refinement steps. By changing the dataset significantly, the removal of the UK also had some effects on wider data quality issues, in particular, issues related to outliers decreased following the UK's removal from the data.

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** exercise was slightly modified this year. As discussed in the previous edition of this report, our outlier removal procedure relies on two thresholds: a dynamic and a fixed one. The fixed threshold excludes

[41] 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

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 terms of asset class, contract type, intragroup, compression and notional currency.

This segmentation into derivative types leads to 2,270 different calculations with associated thresholds. However, about 39% of these thresholds are calculated on fewer than 30 observations (with on average only eight observations in these). The small number of observations limits the statistical power of the thresholds and undermines the goal of identifying outliers reliably. However, though only a small number of records is associated with these invalid thresholds (about 7 thousand of 25 million) they can affect the aggregation negatively if outliers go undetected. For example, in the past ESMA has observed derivative segments with small observations where all values were outliers. Calculating outlier thresholds on such a sample would result in erroneous thresholds and all of the outliers would stay in the aggregation.

To address this issue a different approach was used for segments with few observations. Instead of calculating the median and the standard deviations from the samples, these were estimated using the following linear regression:

$$Parameter_i = \alpha_i + \beta_1 * Intragroup_i + \beta_2 * Compression_i + \beta_3 * AssetClass_i + \beta_4 * ContractType_i + \varepsilon_i$$

Where ‘Parameter’ is either the median or the standard deviation and the other variables are dummies for each of the respective values reported in these fields. The regression model is estimated using the data of valid thresholds (i.e. those that have at least more than 30 observations), with the coefficients then used to predict the median and the standard deviation of the segments with fewer observations. As a result, the relevant median and standard deviations for the thresholds are estimated instead of being calculated on few and possibly implausible values.

After the thresholds were calculated the outliers were identified and removed. This operation reduced the notional amount significantly, down to EUR 1,217tn while keeping 99.927% of the records (ASRD.54). Compared to last year, there is a decrease in the relative share of outliers which shows a slight improvement of the data quality.

ASRD.54
Cleaning and reconciliation results
EMIR data require complex cleaning steps

	Raw	Outliers removed	Double reporting removed
Commodity	1,758	12	9
Credit	37	29	24
Currency	565	170	134
Equity	161	67	45
Interest rate	4,822	937	776
Other	6	3	3
Total	7,349	1,217	991

Note: Total notional amounts in EUR trillion, aggregated over the four quarters in 2020. ‘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 transaction between two counterparties results in two reports. Considering both reports would overstate the market size if calculated for the whole EEA30 area. As a large proportion of derivative transactions are conducted between EEA30 counterparties and are hence subject to the double reporting, we see a significant decline in the notional amount from this step also, down to EUR 991tn, in aggregate for the four quarters in 2020.

Interestingly, the relatively large notional amount removed at this step also indicates how much is traded among EEA30 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 countries (e.g. US or UK). In contrast for currency, commodity and equity more of the notional amount is removed which makes sense given these are traded more within the EEA30 and less with third countries.

In contrast to the last year, we did not see issues with matured trades this year. Thus, the removal of matured trades was not necessary and we do not present statistics here associated with operations to remove these.

Clearing methodology changes

This year's report also includes two changes in the clearing rate calculations: first, we improved the selection of instruments subject to the clearing obligation and restricted the sample only to counterparties to which clearing obligation applies. Second, we adjusted the methodology developed to compute clearing rates given the UK's removal from the data.

In relation to the first change, improving the identification of the instruments subject to clearing obligation, we improved the selection the relevant indices, improving the string-matching technique on the reporting fields floating rate of leg 1 and 2; we also added stricter criteria on maturity and type of instruments, following the specifications included in the ESMA register on clearing obligation. At the same time, we also restricted the sample to the counterparties to which the clearing obligation applies using the notification received from the counterparties.[42] ESMA and the NCA will also be notified in case the counterparty will fall below the clearing threshold and the obligation to clear is no longer applicable.[43]

Second, the methodology to compute clearing rates for each asset class was modified to account for Brexit and the treatment of UK CCPs as third country's CCPs. As we are currently not able to pair the transaction with a third country CCP reporting, the clearing methodology may be biased in the case of two EEA30 counterparties clearing with a third country CCP, where the cleared transaction appears twice in the data, with both clearing members reporting the transaction vis-à-vis the CCP.[44] Based on the information reported in the CCP field, the majority of the transaction cleared by a CCP in the UK are between a counterparty in the EEA30 and a UK one with the CCP appearing only in one report. Only 7% of the trades cleared by an UK CCP (corresponding to 3% of the notional) are between two EEA30 counterparties and represent a bias in the estimation (where the CCP appears twice as other leg of the report). In order to account for this bias we correct the notional cleared in the UK with a weight of 0.95, chosen to remove the overcounting of UK cleared notional in the 7% of cases where the cleared notional is reported twice from the two EEA30 counterparties clearing at a UK CCP.

Conclusion and outlook

ESMA continues to improve the data quality with several initiatives in cooperation with the NCAs. In 2019 ESMA and several NCAs performed the peer review into supervisory actions aiming at enhancing the quality of data reported under EMIR. The review found room for improvement at NCAs and set out good practices to enhance data quality supervision (ASRD.55).

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[42] According to article 4a and article 10 of EMIR, financial and non-financial counterparties may compute their aggregate month-end average position for the previous 12 months and, if they exceed the clearing thresholds – or if they decide not to calculate their positions – they become subject to the clearing obligation and have to notify ESMA and the relevant competent authority.

Article 4a and article 10 of EMIR also distinguish between financial counterparties (FCs) and non-financial counterparties (NFCs) to which different calculation methods and different rules apply. FCs will take into account all those OTC derivatives entered into by any entity within their group and, on the other hand, NFCs will only take into account OTC derivatives entered by any NFC within the same group. In addition, NFCs benefit from the so-called hedging exemption whereby OTC derivatives that are entered into to reduce risks related to the commercial activity of the NFC are excluded from the calculation for the purpose of the clearing obligation.

[43] ESMA has provided market participants with a template to notify at group level their position against the threshold or the decision to not calculate the thresholds. The template contains information of the counterparties in each group, their LEI, country, nature and sector and information on the parent entity. A database is automatically generated from the notifications considered compliant with the established parameters in the template.

[44] For a detailed explanation of the methodology developed by ESMA to compute clearing rates, see ESMA 2018 Derivatives ASR here: https://www.esma.europa.eu/sites/default/files/library/esma50-165-639_esma-rae_asr-derivatives_2018.pdf

ASRD.55
EMIR and SFTR data quality report 2020
Need for increased efforts on data supervision

In April 2021 ESMA has published its first report which focuses solely the data quality within the EMIR and SFTR reported data.[45] The report covers the progress made in improving EMIR data quality for regulatory and supervisory uses.

With respect to EMIR, the report shows several data quality shortcomings. Here the report mentioned late reporting as an issue that affected 7% of the daily submissions and that non-daily valuation updates affect around 11 million records of the trade state data. The important issue of outliers was also acknowledged and NCAs were contacted where suspected outliers were identified.

Additionally, the report highlights that the number of identifiable doubly-reported transactions is still below expectations, with 47% of the derivatives remain unpaired. Some of these transactions might be the 3.2 to 3.7 million transactions that are not reported to EMIR data.

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.

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 improvement of data quality, thanks to its supervision and the continuing work of the NCAs.

[45] For more information please see the press statement and link to the report here: https://www.esma.europa.eu/press-news/esma-news/esma-highlights-need-increased-efforts-emir-and-sftr-data-quality

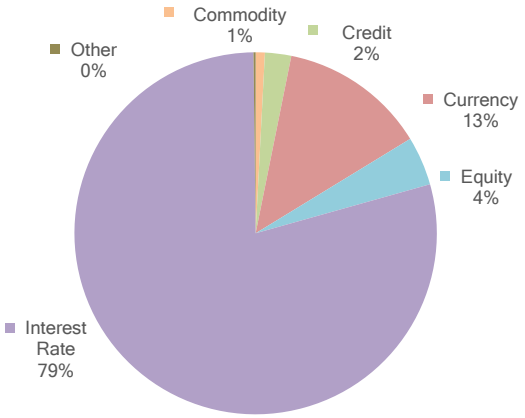
Derivatives statistics

Market structure

EEA30 derivatives market

ASRD-S.1

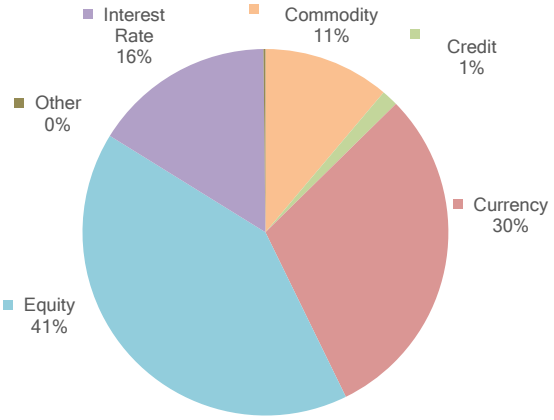
Total notional amount by asset class



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

ASRD-S.2

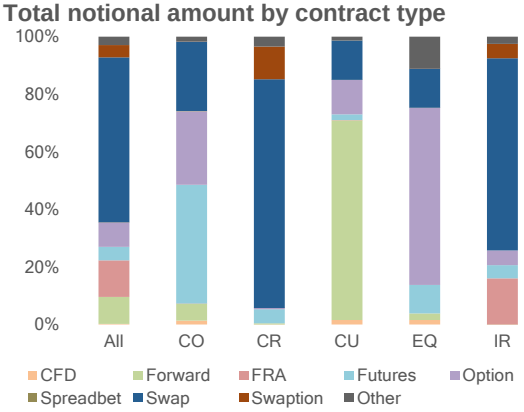
Number of derivative contracts by asset class



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

ASRD-S.3

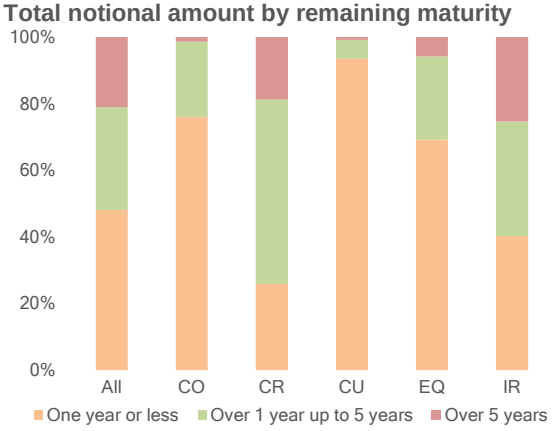
Total notional amount by contract type



Note: Proportions of total notional amount outstanding 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.

ASRD-S.4

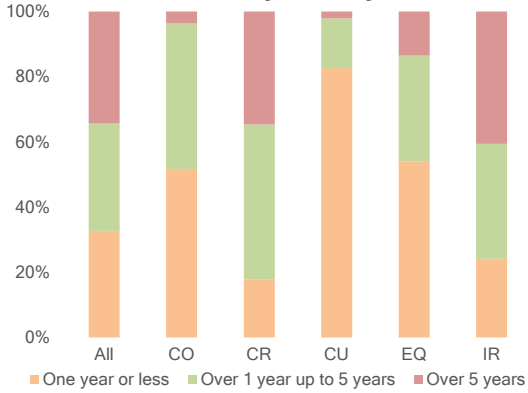
Total notional amount by remaining maturity



Note: Proportions of total notional amount outstanding 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.

ASRD-S.5

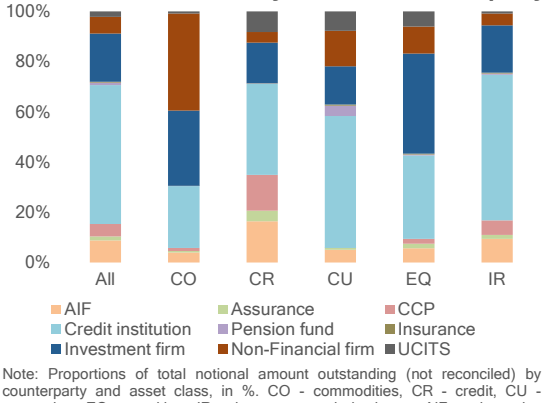
Total notional amount by maturity at execution



Note: Proportions of total notional amount outstanding 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.

ASRD-S.6

Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (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.

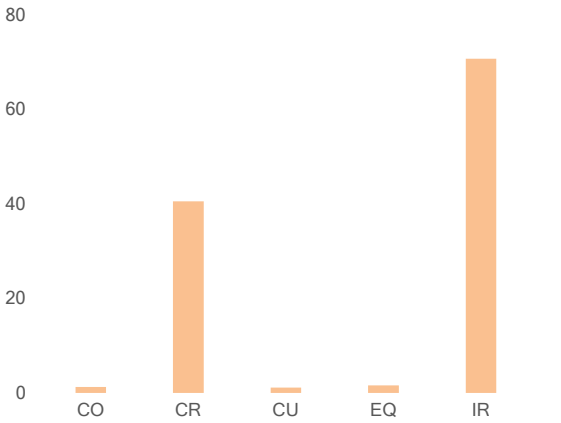
ASRD-S.7

Total notional amount by type of execution

Note: Percentages of total notional amount outstanding 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.

ASRD-S.8

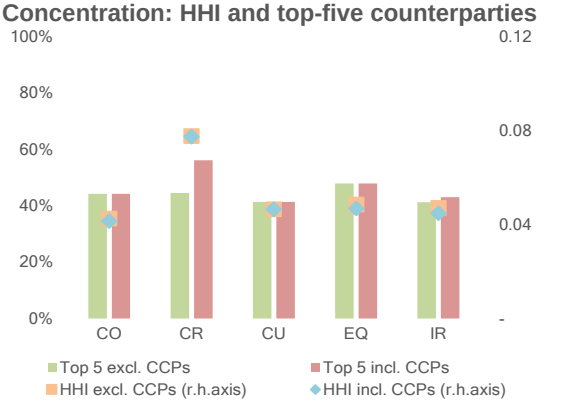
Clearing rates



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

ASRD-S.9

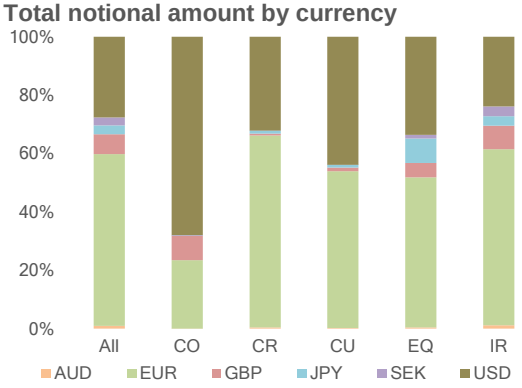
Concentration: HHI and top-five counterparties



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 4Q19.
Sources: TRs, ESMA.

ASRD-S.10

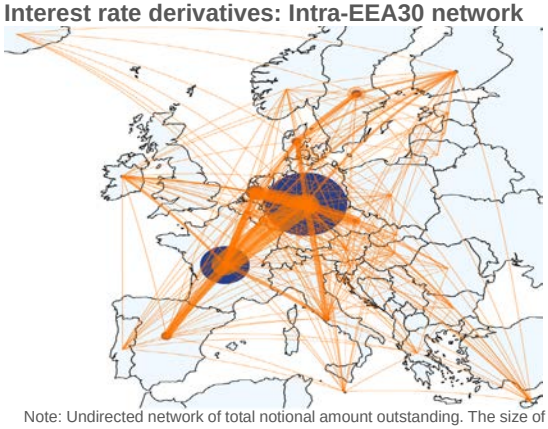
Total notional amount by currency



Note: Proportions of total notional amount outstanding 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.

ASRD-S.11

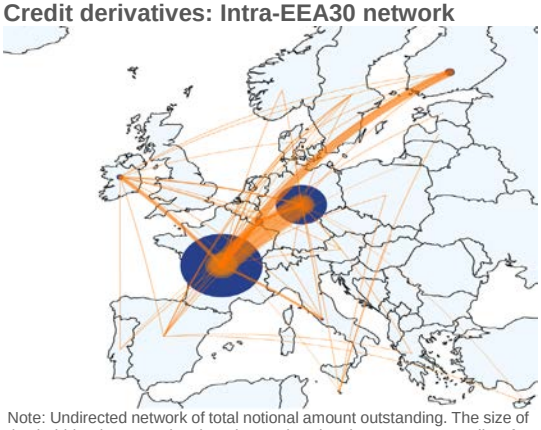
Interest rate derivatives: Intra-EEA30 network



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.

ASRD-S.12

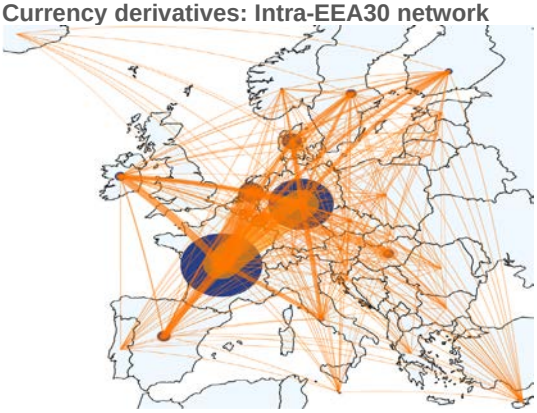
Credit derivatives: Intra-EEA30 network



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.

ASRD-S.13

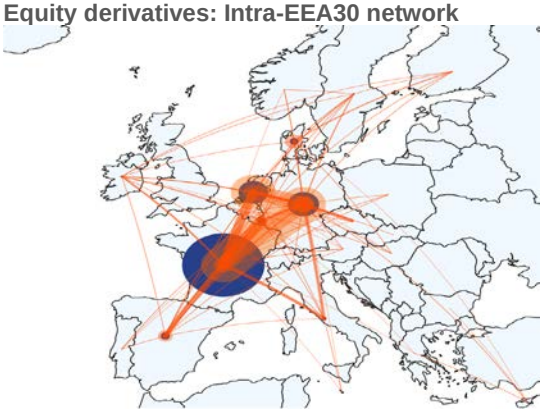
Currency derivatives: Intra-EEA30 network



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.

ASRD-S.14

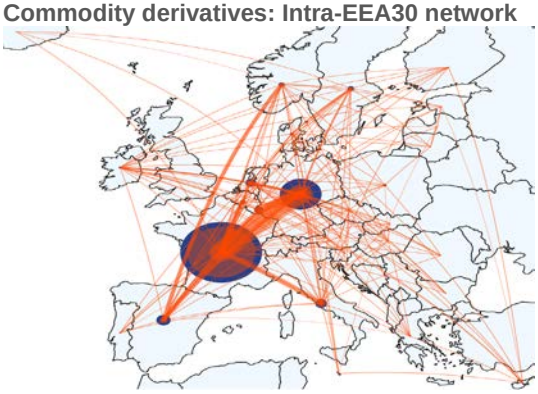
Equity derivatives: Intra-EEA30 network



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.

ASRD-S.15

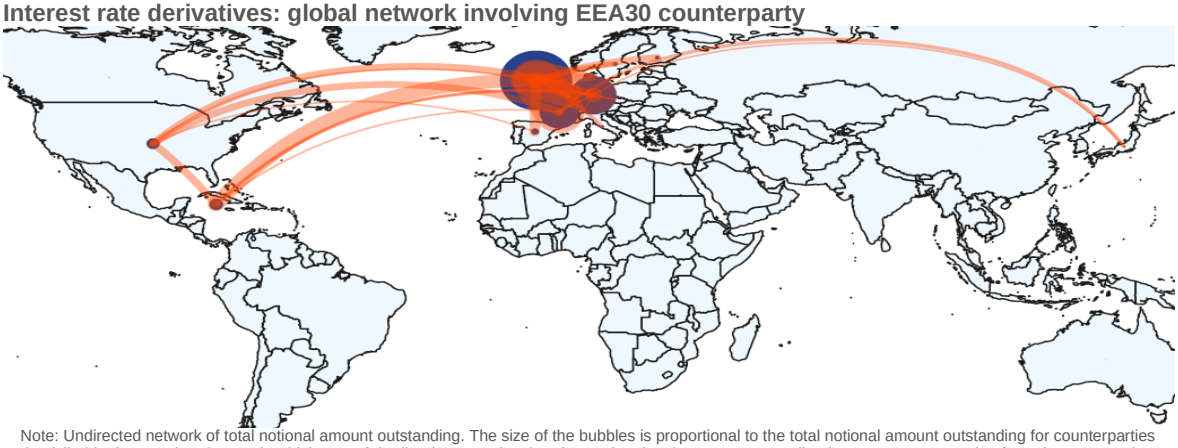
Commodity derivatives: Intra-EEA30 network



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.

ASRD-S.16

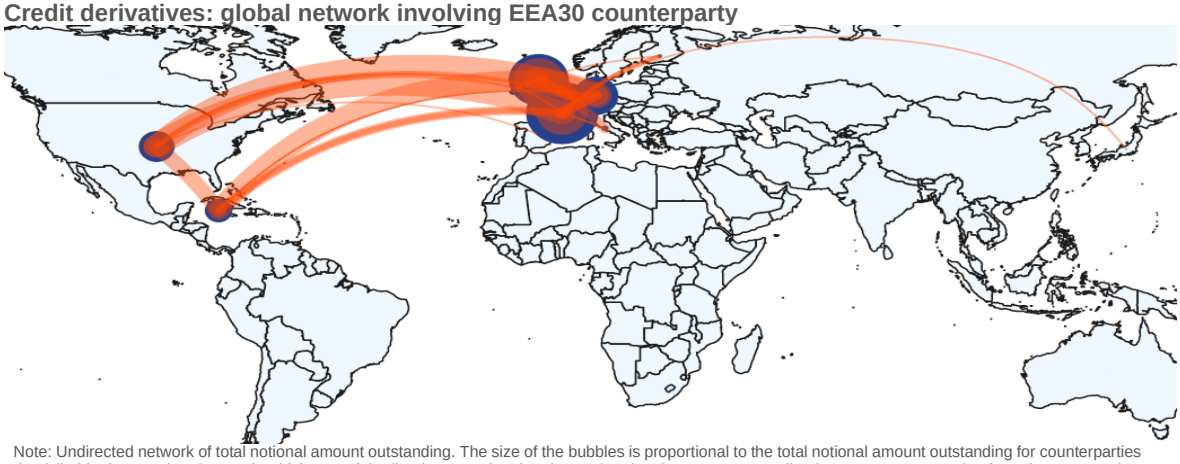
Interest rate derivatives: global network involving EEA30 counterparty



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.

ASRD-S.17

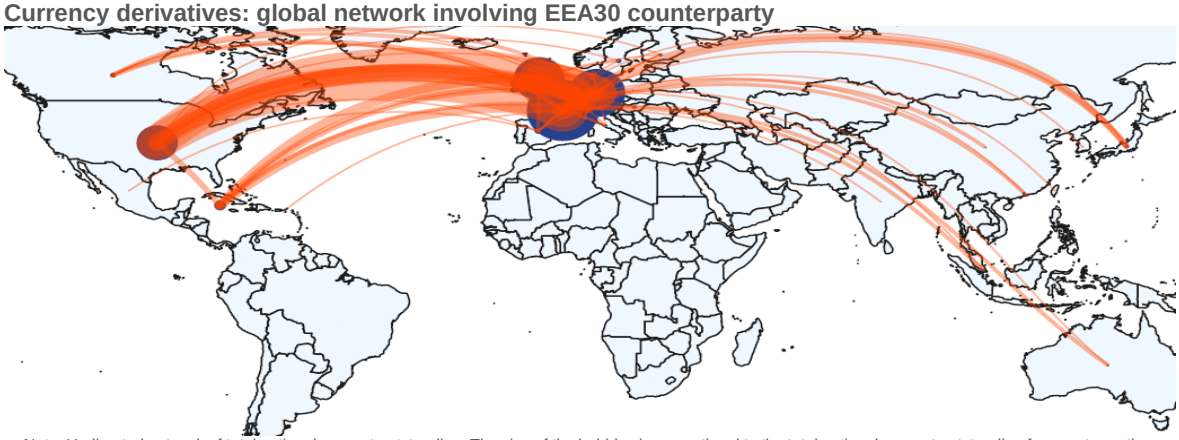
Credit derivatives: global network involving EEA30 counterparty



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.

ASRD-S.18

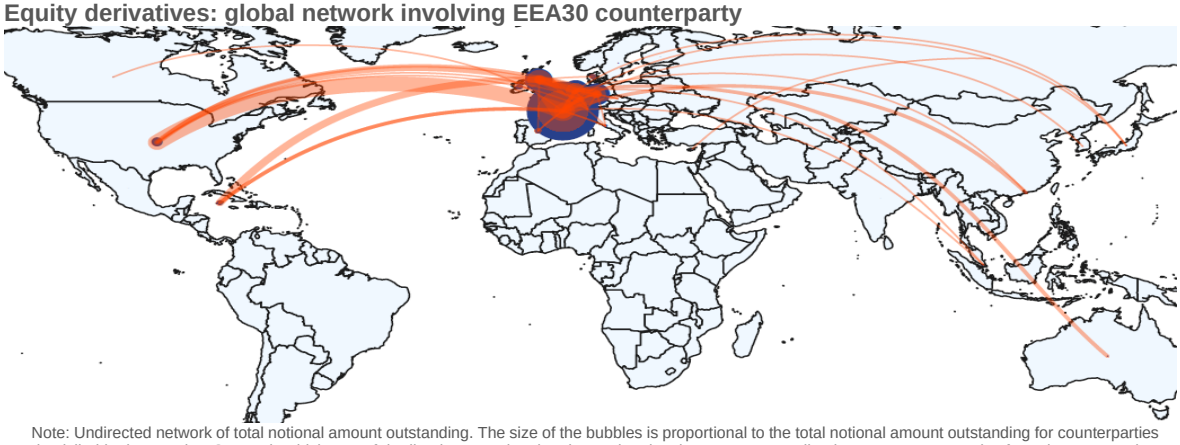
Currency derivatives: global network involving EEA30 counterparty



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.

ASRD-S.19

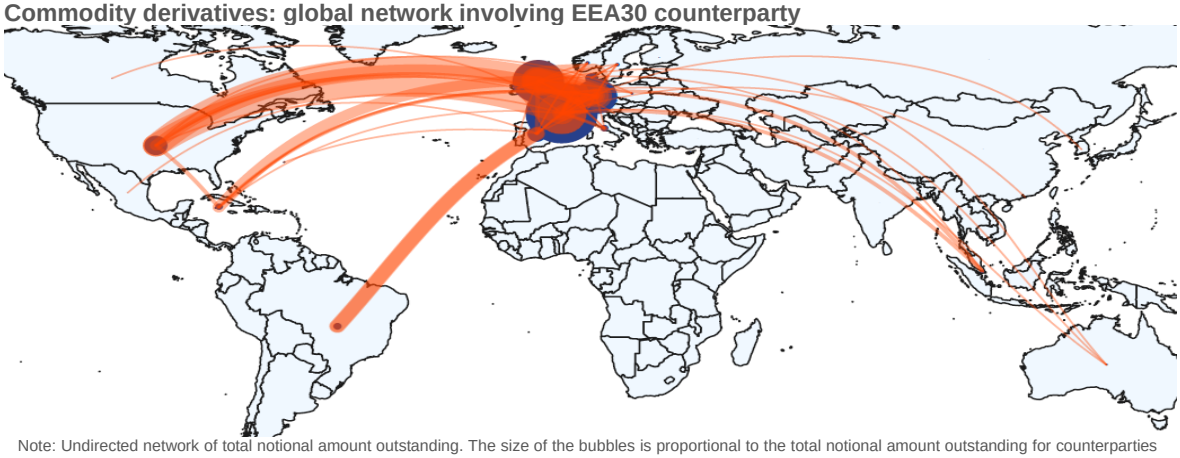
Equity derivatives: global network involving EEA30 counterparty



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.

ASRD-S.20

Commodity derivatives: global network involving EEA30 counterparty



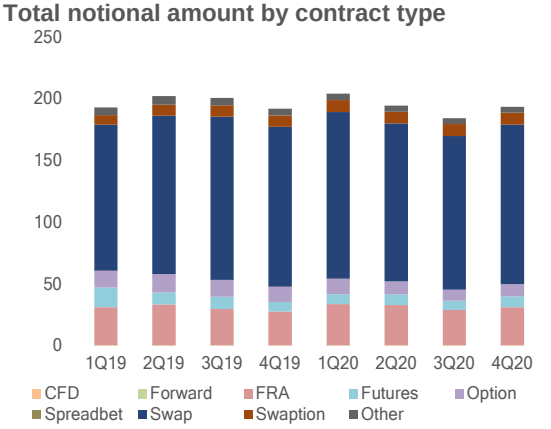
Note: Undirected network of total notional amount outstanding. The size of the bubbles is proportional to the total notional amount outstanding for counterparties domiciled in the Member State. The thickness of the line is proportional to the total notional amount outstanding between counterparties from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

Market trends

Interest rate derivatives market

ASRD-S.21

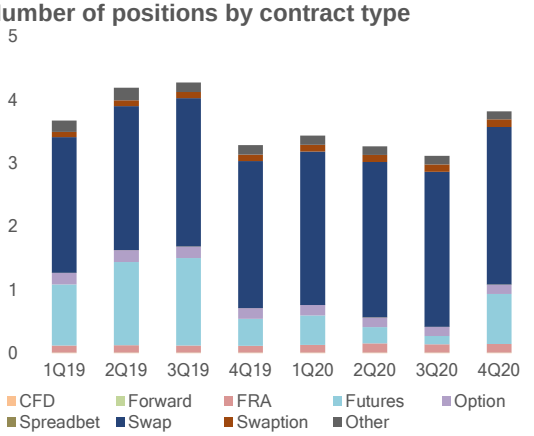
Total notional amount by contract type



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

ASRD-S.22

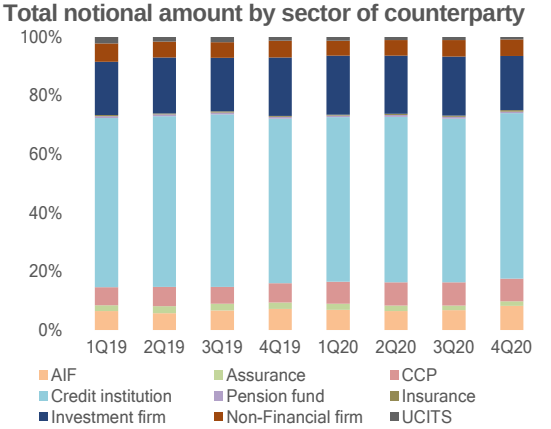
Number of positions by contract type



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

ASRD-S.23

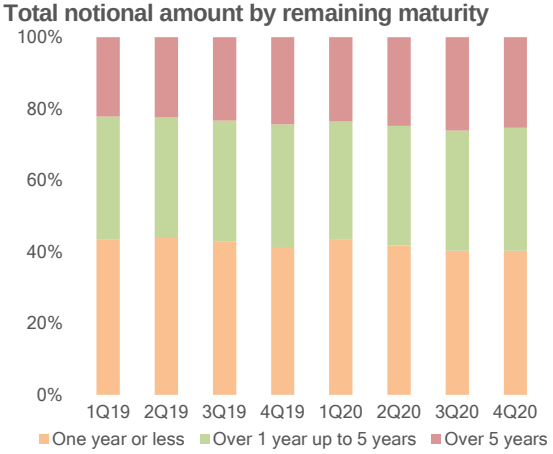
Total notional amount by sector of counterparty



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.

ASRD-S.24

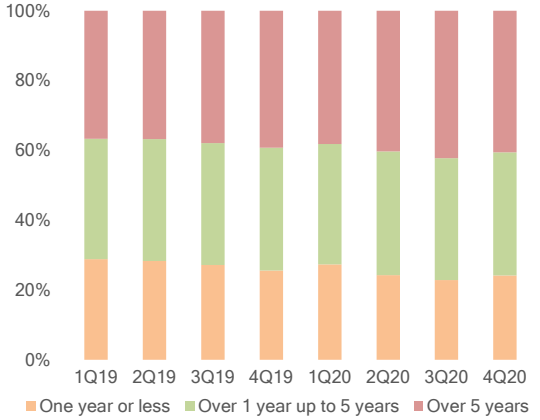
Total notional amount by remaining maturity



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

ASRD-S.25

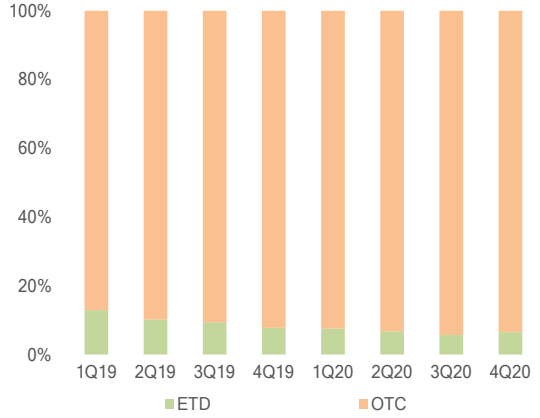
Total notional amount by maturity at execution



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

ASRD-S.26

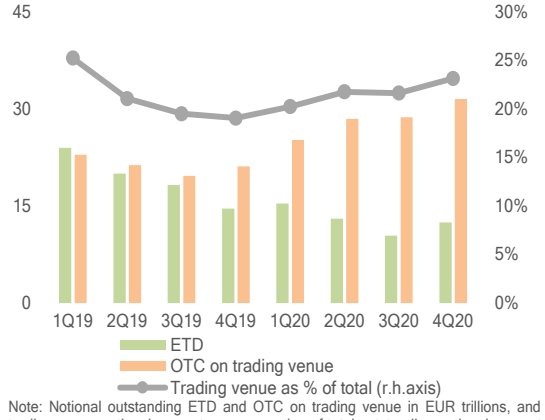
ETD versus OTC



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

ASRD-S.27

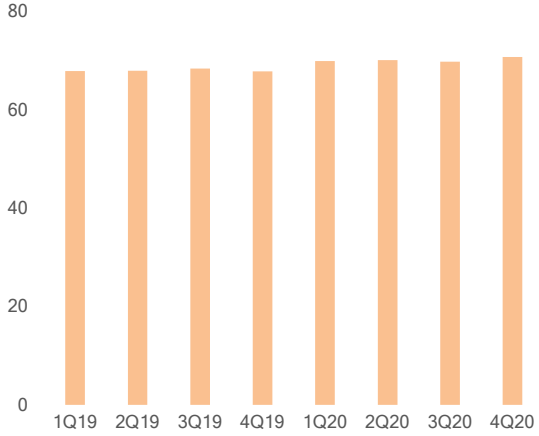
Trading venue notional amounts OTC and ETDs



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.

ASRD-S.28

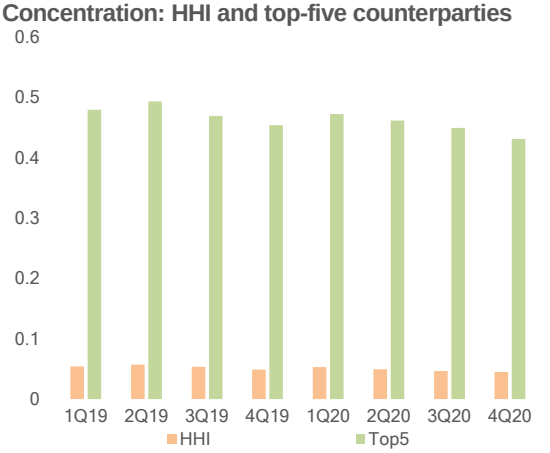
Clearing rates



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

ASRD-S.29

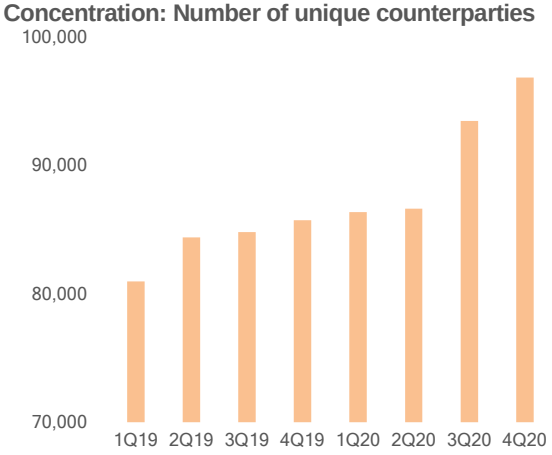
Concentration: HHI and top-five counterparties



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.

ASRD-S.30

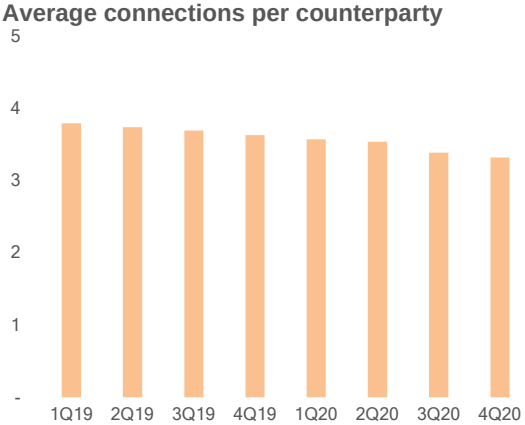
Concentration: Number of unique counterparties



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

ASRD-S.31

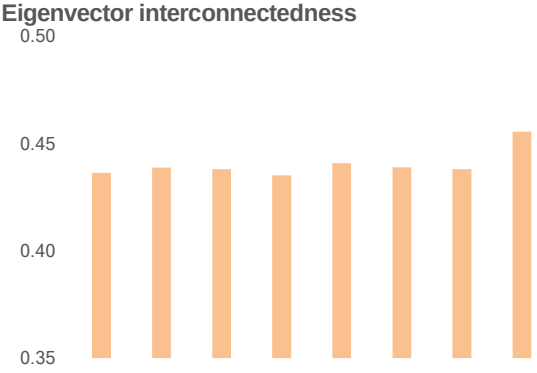
Average connections per counterparty



Note: Average number of connections (i.e. other counterparties connected to it) each reporting counterparty has.
Sources: TRs, ESMA.

ASRD-S.32

Eigenvector interconnectedness

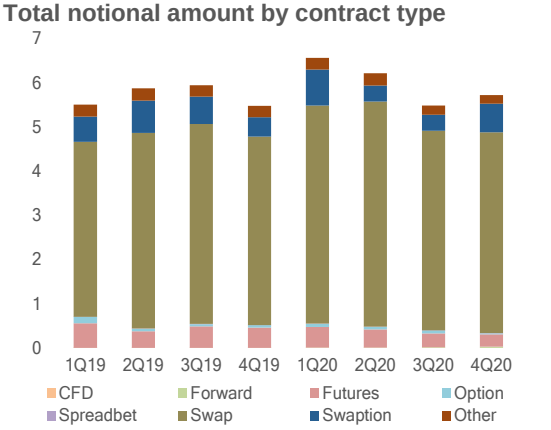


Note: The eigenvector-interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).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

Credit derivatives market

ASRD-S.33

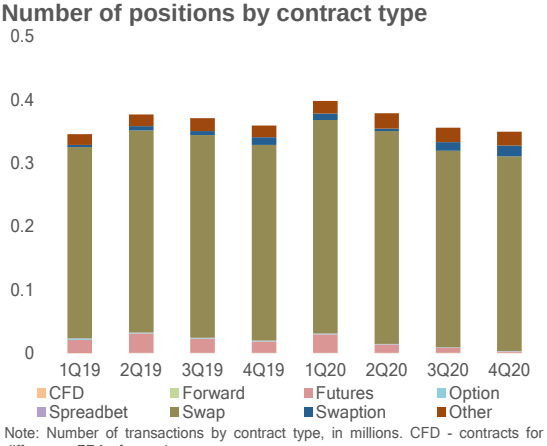
Total notional amount by contract type



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

ASRD-S.34

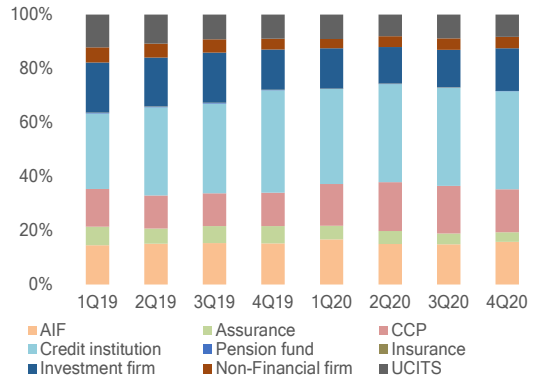
Number of positions by contract type



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

ASRD-S.35

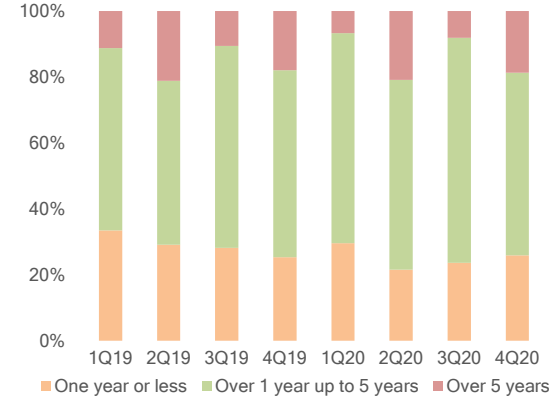
Total notional amount by sector of counterparty



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.

ASRD-S.36

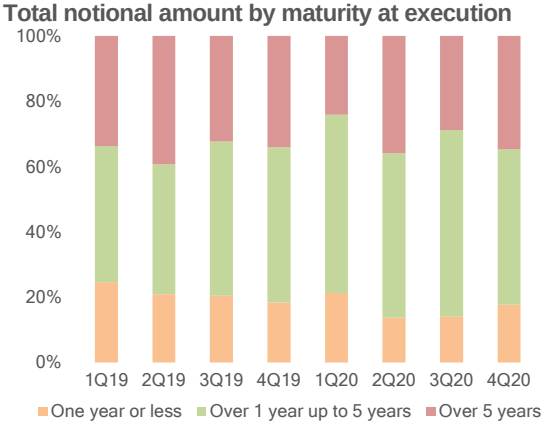
Total notional amount by remaining maturity



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

ASRD-S.37

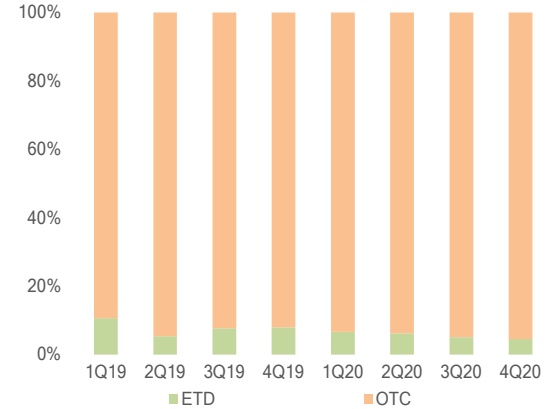
Total notional amount by maturity at execution



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

ASRD-S.38

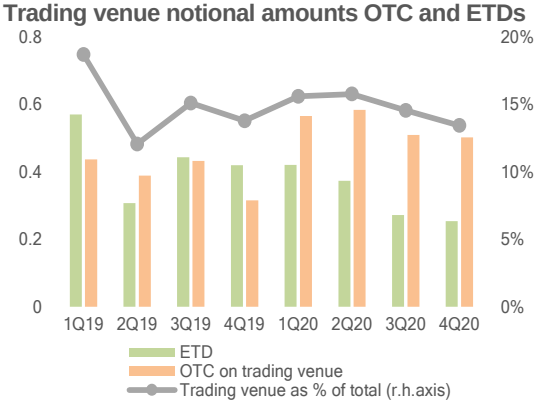
ETD versus OTC



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

ASRD-S.39

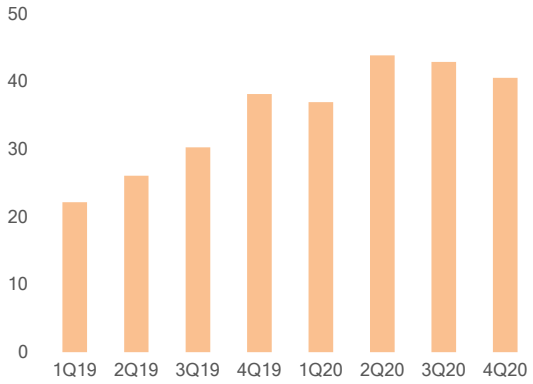
Trading venue notional amounts OTC and ETDs



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.

ASRD-S.40

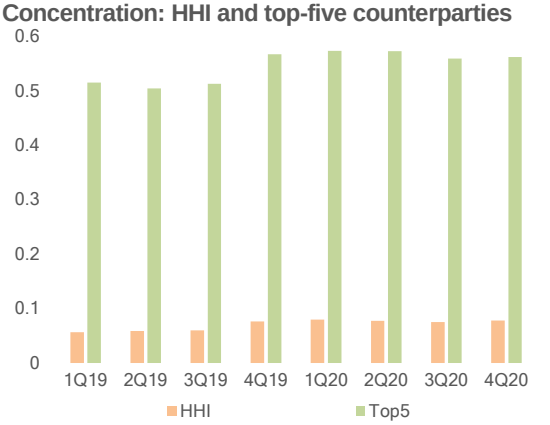
Clearing rates



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

ASRD-S.41

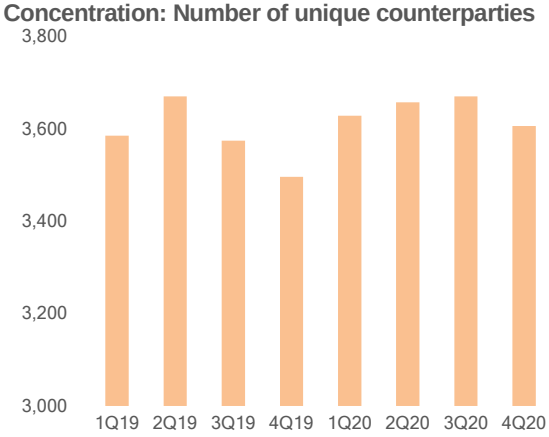
Concentration: HHI and top-five counterparties



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.

ASRD-S.42

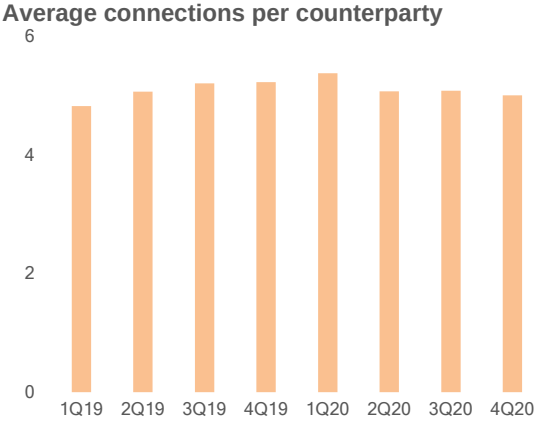
Concentration: Number of unique counterparties



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

ASRD-S.43

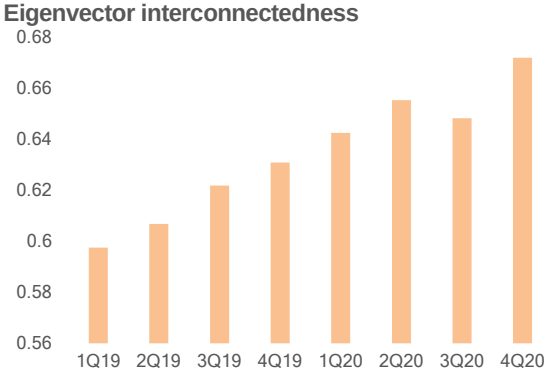
Average connections per counterparty



Note: Average number of connections (i.e. other counterparties connected to it) each reporting counterparty has.
Sources: TRs, ESMA.

ASRD-S.44

Eigenvector interconnectedness

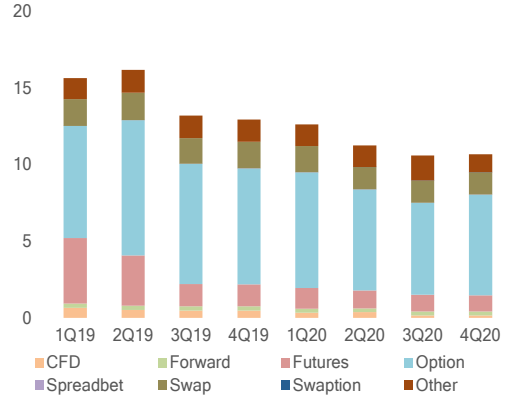


Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).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

Equity derivatives market

ASRD-S.45

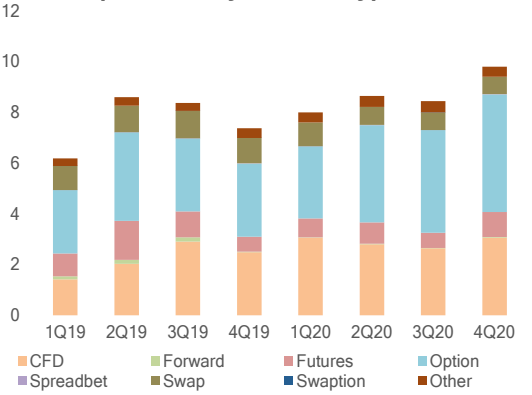
Total notional amount by contract type



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

ASRD-S.46

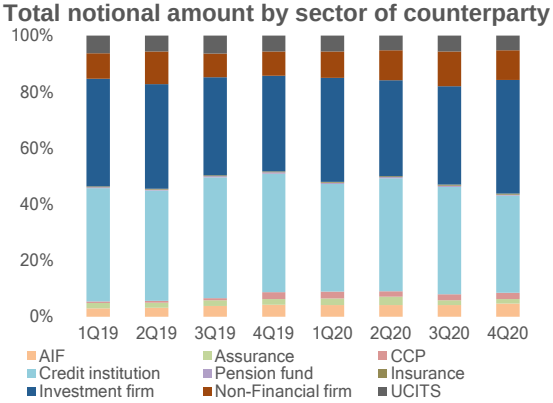
Number of positions by contract type



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

ASRD-S.47

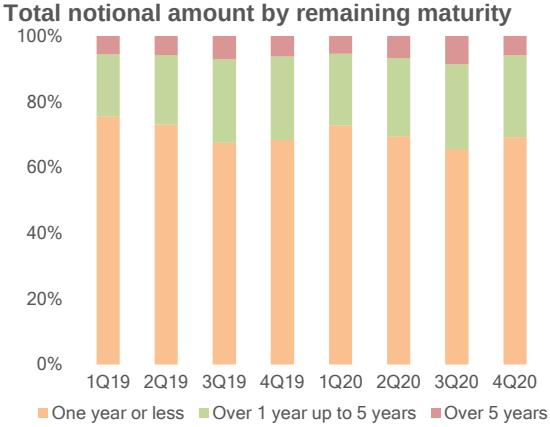
Total notional amount by sector of counterparty



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.

ASRD-S.48

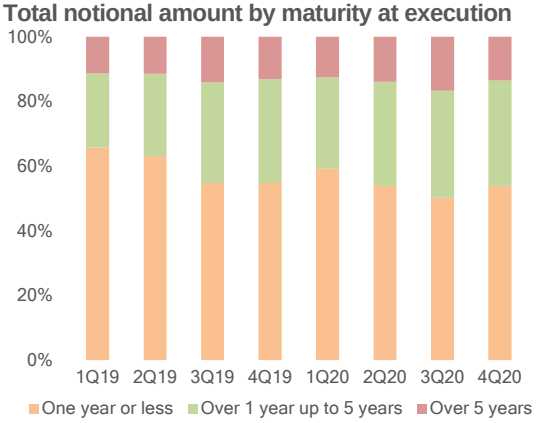
Total notional amount by remaining maturity



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

ASRD-S.49

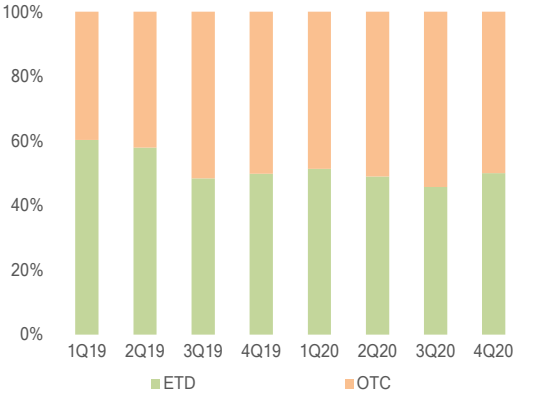
Total notional amount by maturity at execution



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

ASRD-S.50

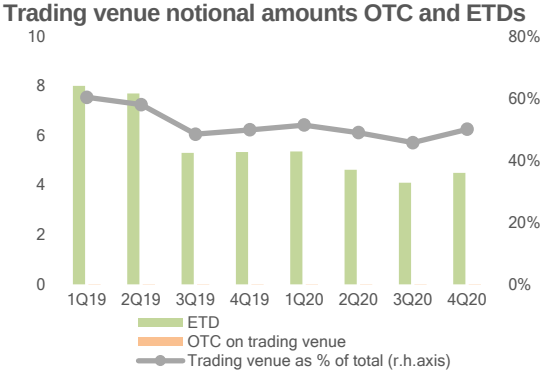
ETD versus OTC



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

ASRD-S.51

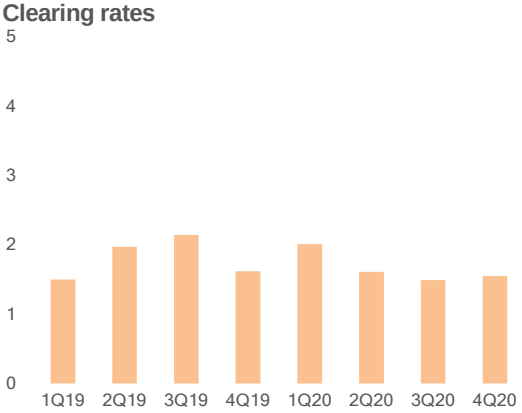
Trading venue notional amounts OTC and ETDs



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.

ASRD-S.52

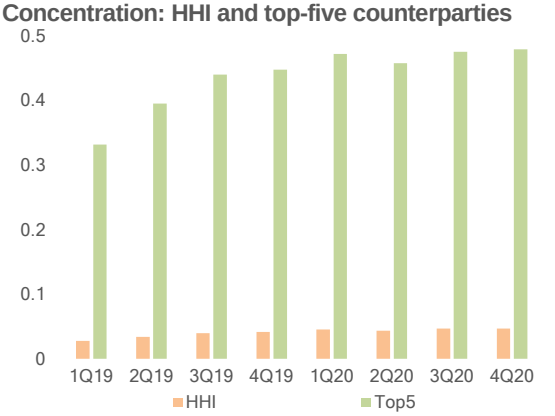
Clearing rates



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

ASRD-S.53

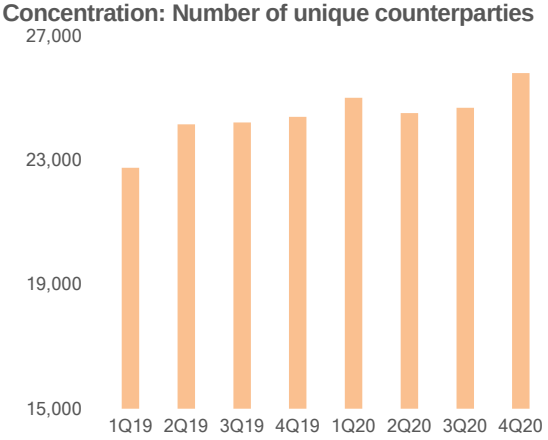
Concentration: HHI and top-five counterparties



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.

ASRD-S.54

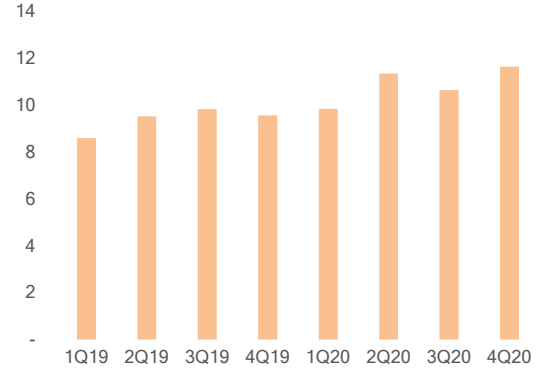
Concentration: Number of unique counterparties



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

ASRD-S.55

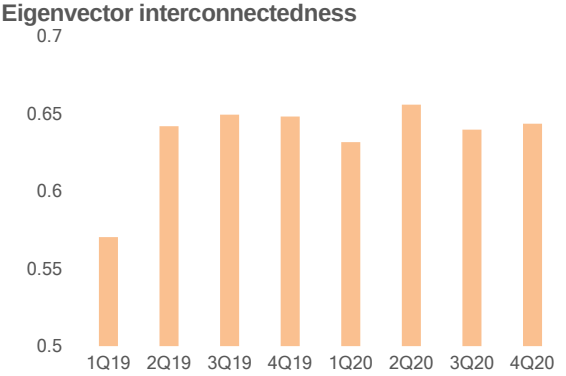
Average connections per counterparty



Note: Average number of connections (i.e. other counterparties connected to it) each reporting counterparty has.
Sources: TRs, ESMA.

ASRD-S.56

Eigenvector interconnectedness

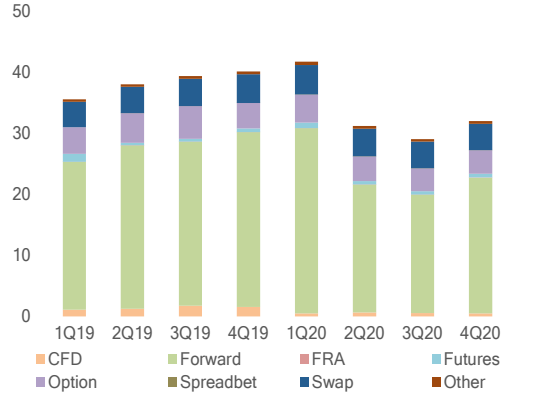


Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).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

Currency derivatives market

ASRD-S.57

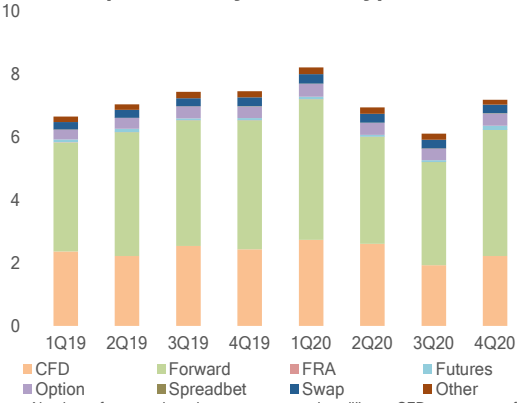
Total notional amount by instrument



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

ASRD-S.58

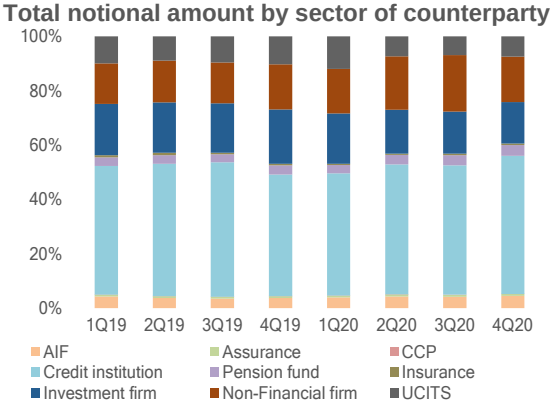
Number of positions by contract type



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

ASRD-S.59

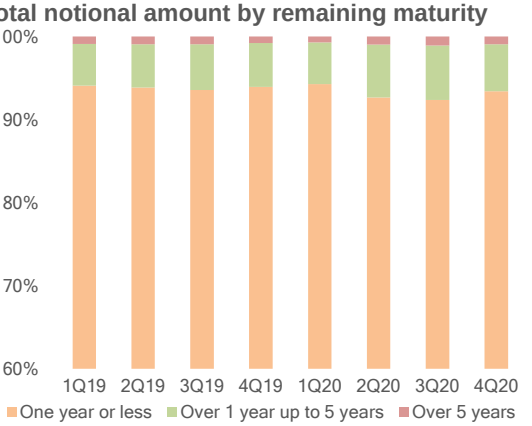
Total notional amount by sector of counterparty



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.

ASRD-S.60

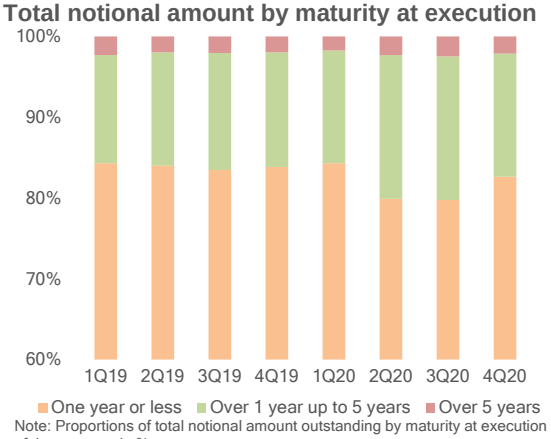
Total notional amount by remaining maturity



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

ASRD-S.61

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.

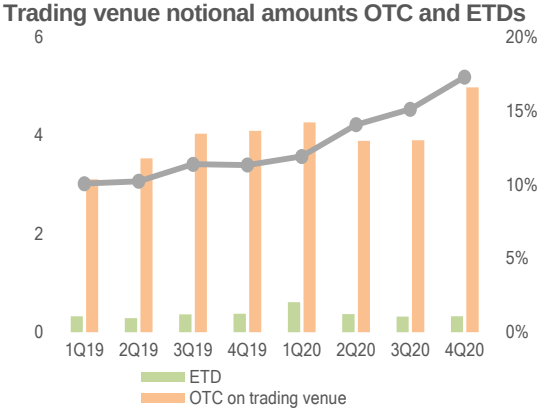
ASRD-S.62

ETD versus OTC

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

ASRD-S.63

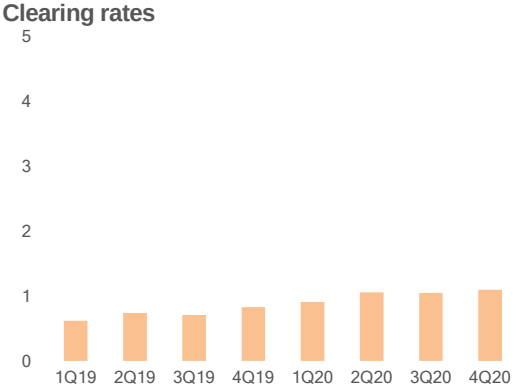
Trading venue notional amounts OTC and ETDs



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.

ASRD-S.64

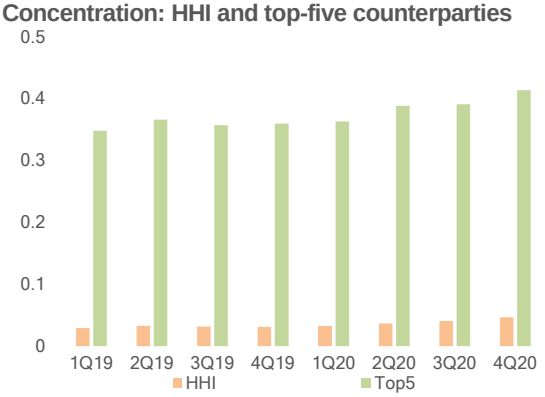
Clearing rates



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

ASRD-S.65

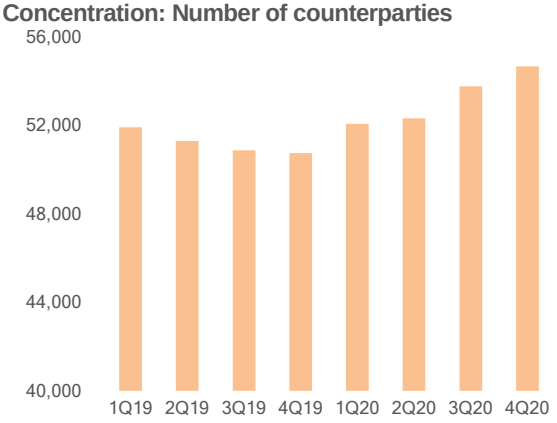
Concentration: HHI and top-five counterparties



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.

ASRD-S.66

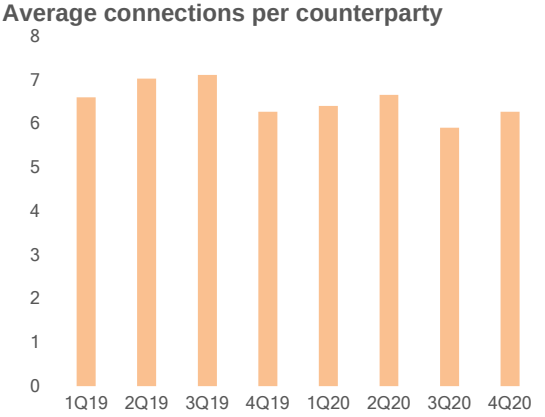
Concentration: Number of counterparties



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

ASRD-S.67

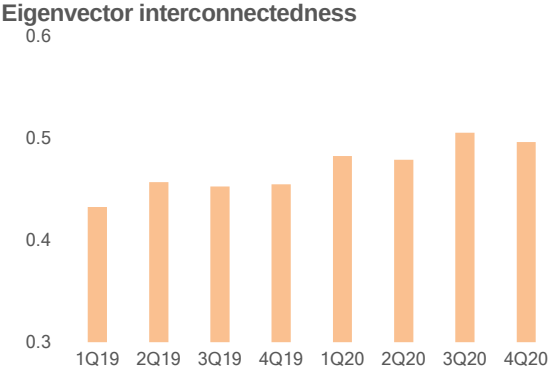
Average connections per counterparty



Note: Average number of connections (i.e. other counterparties connected to it) each reporting counterparty has.

ASRD-S.68

Eigenvector interconnectedness

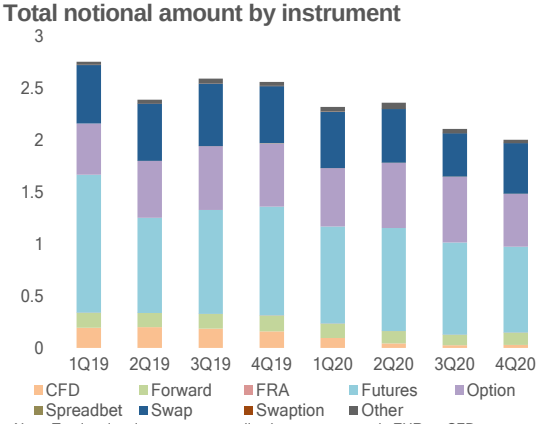


Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).

Commodity derivatives market

ASRD-S.69

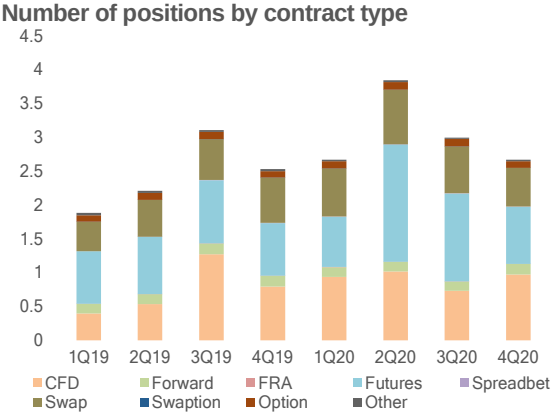
Total notional amount by instrument



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

ASRD-S.70

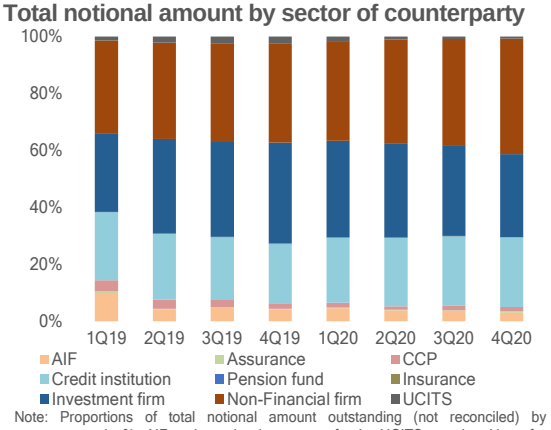
Number of positions by contract type



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

ASRD-S.71

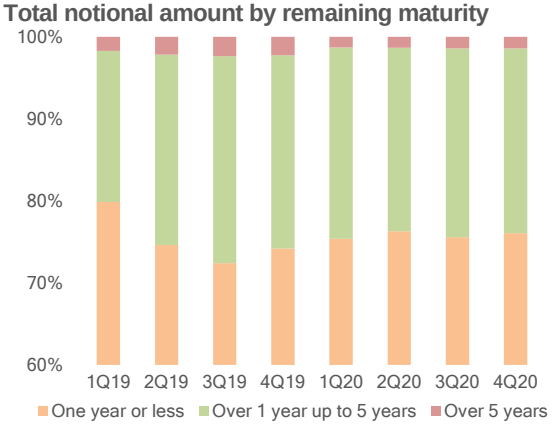
Total notional amount by sector of counterparty



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.

ASRD-S.72

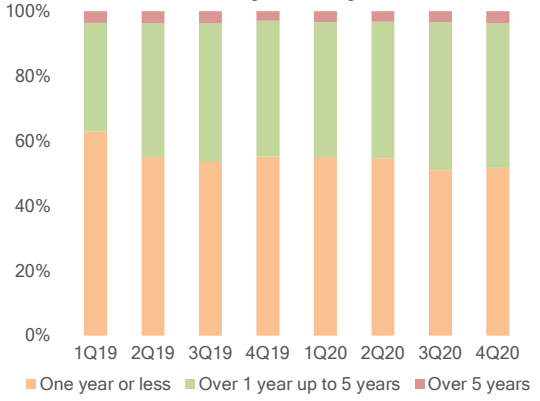
Total notional amount by remaining maturity



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

ASRD-S.73

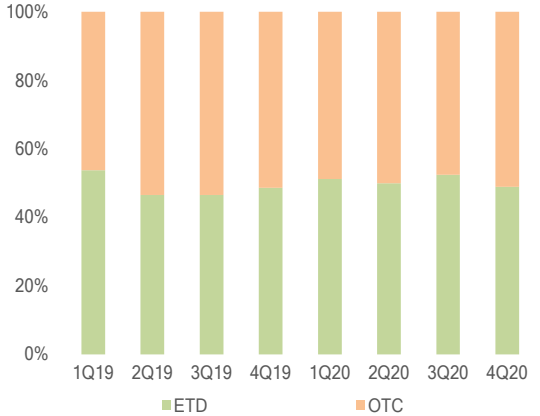
Total notional amount by maturity at execution



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

ASRD-S.74

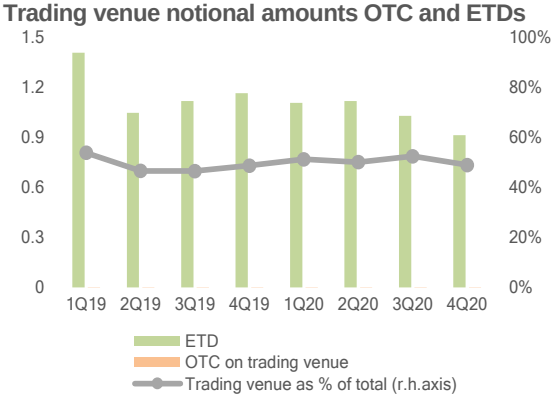
ETD versus OTC



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

ASRD-S.75

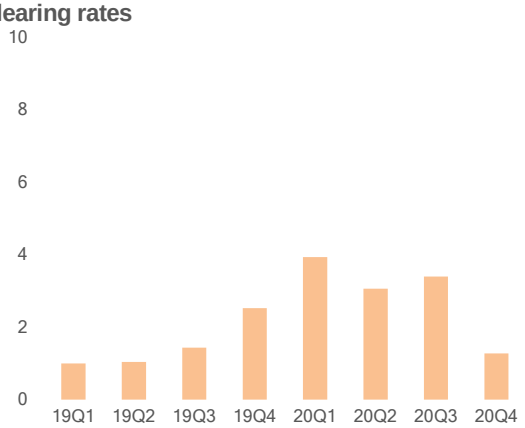
Trading venue notional amounts OTC and ETDs



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.

ASRD-S.76

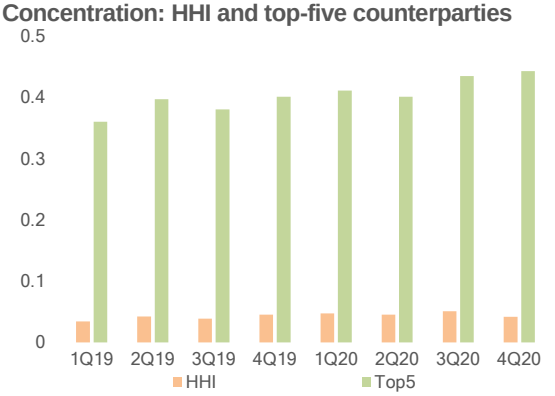
Clearing rates



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

ASRD-S.77

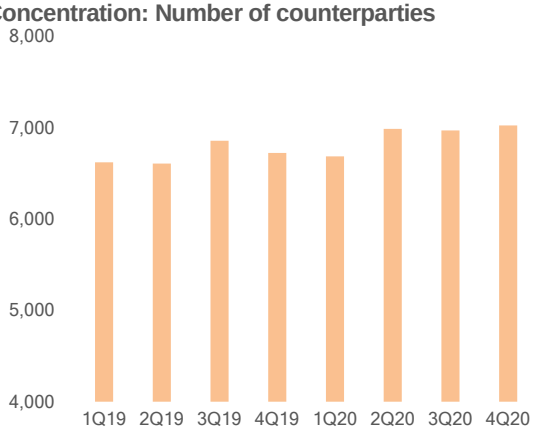
Concentration: HHI and top-five counterparties



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.

ASRD-S.78

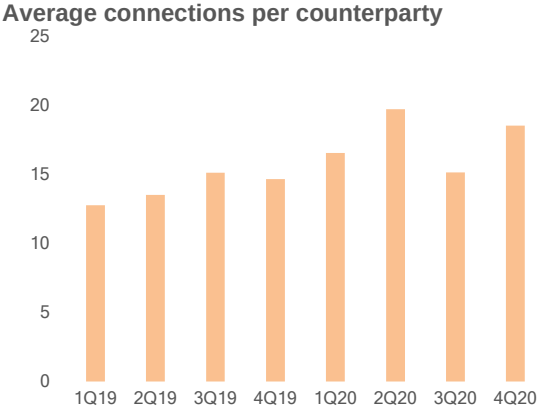
Concentration: Number of counterparties



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

ASRD-S.79

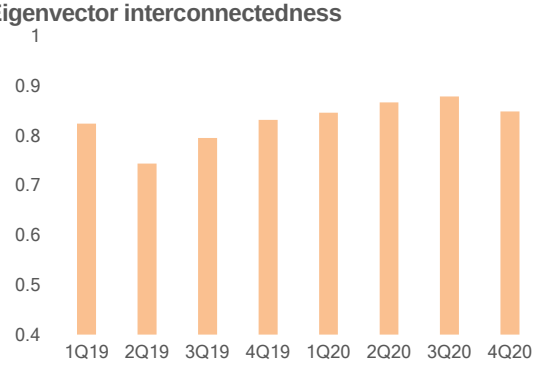
Average connections per counterparty



Note: Average number of connections (i.e. other counterparties connected to it) each reporting counterparty has.
Sources: TRs, ESMA.

ASRD-S.80

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.

Essential statistics 2019 for EEA30

To facilitate comparisons with 2020, we here reproduce the essential statistics from 2019 without UK data reports.

	Derivatives asset class					
	All	Commodities	Credit	Currency	Equity	Interest rate
Size						
Total notional amount (EUR tn)	254	3	5	40	13	192
Proportion (% of notional amount)	100	1	2	16	5	76
Change 1Q19 to 4Q19(%)	-0.3	-1	-7	13	-17	-1
Contracts (number in mn)	21	3	0.3	7	10	4
Proportion (% of total)	100	13	2	34	47	18
Change 1Q19 to 4Q19 (%)	10	31	4	10	17	-11
Underlying instruments						
Instrument with largest notional amount	Swap	Futures	Swap	Forward	Option	Swap
Proportion (% of notional amount)	56	41	78	71	58	67
Instrument with most positions	CFD	CFD	Swap	Forward	Option	Swap
Proportion (% of positions)	27	31	86	55	39	71
Counterparty exposures						
By type (% of notional amount)						
Credit institutions	53	21	38	45	39	57
Investment firms	21	37	14	22	35	21
AIFs	8	5	16	4	5	8
Non-Financial firms	7	32	4	14	8	5
By domicile (% of notional amount)						
Intra-EEA	21	31	15	23	47	19
EEA to third country	70	58	68	73	45	72
EEA to UK	47	31	37	24	23	54
EEA to other third country	23	27	31	49	22	17
UK to a third country	3	4	6	1	1	4
Intragroup exposures						
Intragroup total notional amount (EUR tn)	22	0.8	0.2	5	4	12
Proportion (% of notional amount)	9	32	3	13	30	6
Intragroup positions (number in mn)	2.9	0.7	0.01	1.1	0.7	0.3
Proportion (% of all positions)	14	26	4	16	7	8
Execution venue and clearing						
ETD proportion (% of notional)	9	49	8	0.9	50	8
OTC proportion (% of notional)	91	51	92	99	50	92
On-trading venue	10	0.02	6	10	0.01	11
Off-trading venue	81	51	86	89	50	81
Clearing rate (% of OTC notional)	n/a	3	38	1	2	68
Concentration						
Top five (% of notional amount)						
Excluding CCPs	n/a	40	48	36	45	44
Including CCPs	n/a	40	57	36	45	45

Note: All values as of 4Q19 (13 December 2019). Excludes UK counterparty reports to ensure comparability with 2020. 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. 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.

Annex

Statistical annotations

ASRD-S.11 – ASRD-S.20 Geographical network of derivatives: These maps of the geography of risks show the undirected network of total notional amounts outstanding between country domiciles of counterparties. The size of the blue bubble is proportional to the total notional amount outstanding for counterparties domiciled in the country. The thickness of the orange line is proportional to the total notional amount outstanding between counterparties from the two countries, the total notional amount between counterparties in the same country is represented as an orange bubble.

ASRD-S.29, ASRD-S.41, ASRD-S.53, ASRD-S.65, ASRD-S.77, Concentration - top five exposure: This graph shows the relative notional amount exposure of the top five counterparties (excluding the central counterparties) compared with the overall market.

ASRD-S.29, ASRD-S.41, ASRD-S.53, ASRD-S.65, ASRD-S.77, Concentration - HHI: These graphs show the development of concentration of open contracts by all counterparties (including central counterparties) using the Herfindahl-Hirschman index (HHI) which is a widely used measure to determine the concentration of a market. A higher HHI is associated with higher concentration, i.e., less competition in a market, and a smaller HHI is associated with a more competitive, i.e., less concentrated, market. The calculation is as follows:

$$HHI = \sum_{i=1}^{N} (\text{MarketProportion}^2)$$

ASRD-S.28, ASRD-S.40, ASRD-S.52, ASRD-S.64, ASRD-S.76 Clearing rates: We define the clearing rate as the cleared outstanding notional amount divided by the total outstanding notional amount, for contracts with at least one counterparty located in the EEA. The formula to compute clearing rates is:

$$Cleared\ notional\ (\%) = \frac{\frac{CN_{EEA}}{2} + 0.95 * CN_{UK} + CN_{NonEEA,UK}}{UN + \left(\frac{CN_{EEA}}{2} + 0.95 * CN_{UK} + CN_{NonEEA,UK}\right)}$$

where:

- CN_{EEA} is the notional amount of contracts with one EEA CCP as a counterparty
- CN_{UK} is the notional amount of contracts with one UK CCP as a counterparty;
- $CN_{nonEEA,UK}$ is the notional amount of contracts with a CCP established outside of the EEA and the UK as a counterparty;
- *UN* is the notional amount uncleared.

For a detailed explanation of the formula and its application, see the section “Methodology for clearing rate calculation”, pp.25-31 in the EU Derivatives Annual Statistical Report 2018 and the “Clearing rate methodology changes” section on pp.39 of this report.

ASRD-S.32, ASRD-S.44, ASRD-S.56, ASRD-S.68, ASRD-S-80 Eigenvector interconnectedness: This is a recursive measure which gives the tendency of participants to be exposed to other central participants.

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.[46] The underlying formula is:

$$Interconnectedness(market)=sum(max(c(w), w) - c(v),v)$$

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.

[46] 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

esma European Securities and Markets Authority