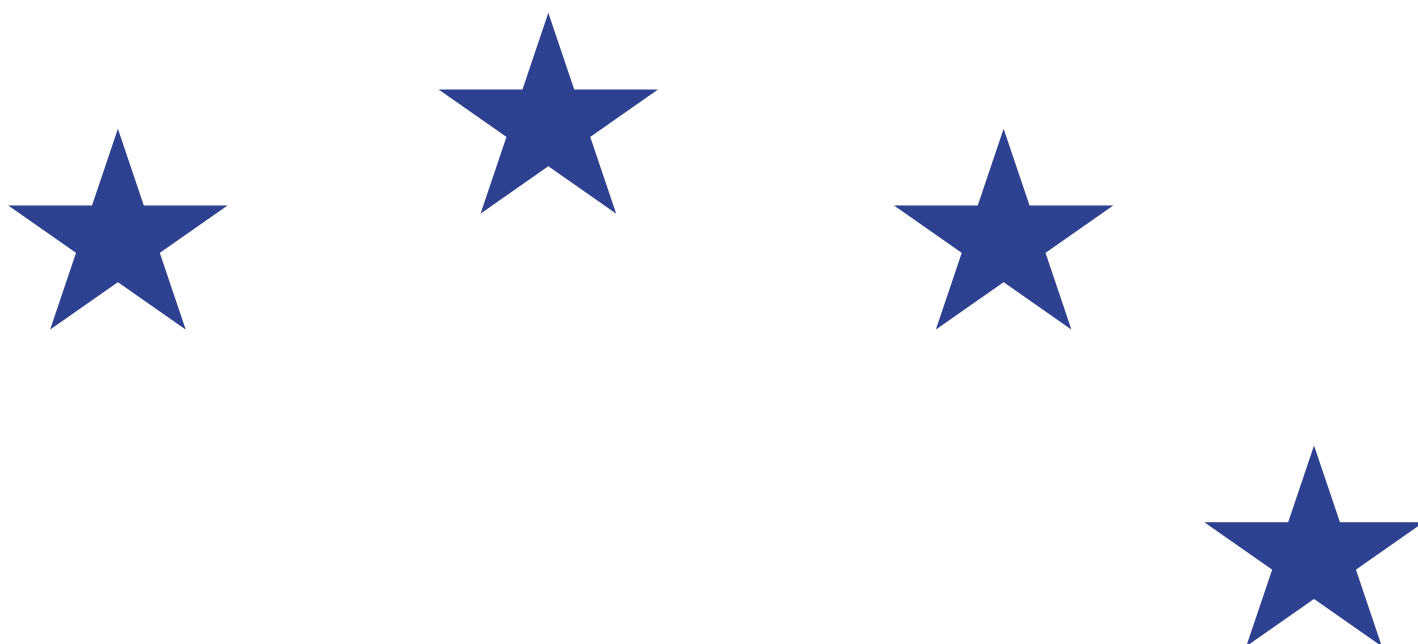


# EU Derivatives Markets

ESMA Annual Statistical Report 2020

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16 November 2020

ESMA-50-165-1362

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ESMA Annual Statistical Report on EU Derivatives Markets 2020

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# Executive summary

## Market monitoring

**Market structure:** In 2019 the EU derivatives market shrank to EUR 681tn in outstanding total notional amount in 4Q19 from EUR 715tn a year earlier. The market was slightly more dominated by interest rate derivatives (IRDs) at 82% of notional amount, up from 78%, while 11% of the notional amount was in currency (down from 13% in 2018), with the remaining 8% in equity, credit and commodities. As in 4Q18, most of the notional amount was in contracts held by investment firms, credit institutions and central counterparties (CCPs). Exposures in intragroup transactions increased significantly, to EUR 107tn from EUR 70tn a year earlier. Over-the-counter contracts (OTC) still accounted for most of the outstanding notional amount (92%). The remaining 8% were in exchange traded derivatives (ETDs), down 2pps from 4Q18. Central clearing rates in 4Q19 were 69% of the notional amount in IRDs and 32% in credit derivatives, both up significantly (6pps and 7pps respectively). The UK remained the locus of most derivative trading in Europe in 2019 with 82% of notional amount involving a UK-domiciled counterparty, unchanged from 2018.

**Market trends:** Key trends in European derivatives markets in 2019 included: a 5% decrease in the total notional amount of the overall market, from EUR 715tn in 4Q18 to EUR 681tn in 4Q19. Strong growth in central clearing rates for both IRDs and credit derivatives, from 63% to 69% for IRDs; and from 25% to 32% for credit derivatives. Underlying this was growth in the clearing rates for the specific products subject to the clearing obligation. The proportion of ETD contracts over all assets fell to 8% in 4Q19 from 10% a year earlier, driven by falls in ETD contracts in IRDs and equities. However, the proportion of notional associated with contracts executed on trading venues (ETD and some OTC) remained broadly stable for IRDs, currencies and credit derivatives throughout 2019. Interconnectedness was largely unchanged across asset classes during 2019, but remained high. Finally, there was a relative increase in the share of long maturities to short maturities for IRDs and commodities.

## Statistical methods

**Progress on EMIR data quality:** EMIR data are vast and contain detailed information about European derivatives markets. The data are based on reports from EEA counterparties that are submitted to trade repositories (TRs), which in turn report to ESMA. The RTS and ITS implemented in November 2017, which relate to data reporting under EMIR, continue to contribute significantly to improved data usability and quality. ESMA also identified one case of data over-reporting which was investigated and addressed. This change improved the 2018 and 2019 data used in this report.

**The EU CDS market in 2019:** Credit default swaps (CDSs) are one of the most common derivatives used to hedge and trade credit risk. The total notional amount outstanding for CDS was about EUR 10tn in 4Q19, accounting for the bulk of the EUR 12tn outstanding in credit derivatives. The CDS market grew in the first three quarters in 2019 before a decline in 4Q19 brought the market back to 1Q19 levels. Concentration metrics indicate that the CDS market was highly concentrated among a few, mainly non-CCP, counterparties. Most of the counterparties fell into two main categories: credit institutions and investment firms, with over 90% of the notional amount held by these. In 2019 multi-name CDS gradually increased their share in a market that once was fully dominated by single name instruments, continuing a trend in CDS towards more diversified underlying entities.

**CCP initial margins in 2019:** This article presents statistics on the initial margins posted to CCPs over 2019, as reported by EU CCPs as part of their reporting to trade repositories under EMIR. It looks first at the margins by asset class, showing that margins associated with interest rate products dominate, in line with the asset distribution of total market size in notional amount terms. Looking at concentration of margins by clearing members in CCPs, the top five share metric, although low on average, shows high dispersion across CCPs, with some CCPs having a higher concentration of initial margin among a few clearing members. Similarly, the HHI of EU CCPs, though low on average (0.04 in 4Q19) ranges widely, from 0.02 to 0.3. Finally, we show how EMIR data can be used to measure systemic risk, using the SRISK indicator, and explore how this evolved over 2019.

# Essential statistics 2019

## Derivatives asset class

	All	Commodities	Credit	Currency	Equity	Interest rate
<b>Size</b>						
Total notional amount (EUR tn)	681	7	12	79	26	557
Proportion (% of notional amount)	100	1	2	12	4	82
Change 4Q18 to 4Q19 (%)	-5	-37	-7	-15	-35	0
Contracts (number in mn)	50	6	1	15	20	8
Proportion (% of total)	100	12	2	31	40	15
Change 4Q18 to 4Q19 (%)	3	-5	-4	-14	32	-3

## Underlying instruments

Instrument with largest notional	swap	futures	swap	forward	option	swap
Proportion (% of notional amount)	62	44	85	73	54	72
Instrument with most transactions	CFD	futures	swap	CFD	CFD	swap
Proportion (% of transactions)	40	40	92	44	56	81

## Counterparty exposures

By type (% of notional amount)						
Investment firms	35	47	44	49	58	31
CCPs	35	17	10	2	2	41
Credit institutions	20	9	20	27	23	19
Non-financial firms	5	24	11	12	10	4
By domicile (% of notional amount)						
Intra-EEA	40	46	30	31	47	41
Intra-EEA excluding UK	8	12	7	12	24	7
UK to rest of EEA	18	11	15	12	16	18
Intra-UK	15	23	8	7	8	16
EEA with a third country	59	53	67	68	52	57

## Intragroup exposures

Intragroup total notional amount	79	3	1	21	12	42
Proportion (% of notional amount)	12	45	11	27	46	7
Intragroup transactions (number in mn)	6.2	0.9	0.1	2.0	2.0	1.3
Proportion (% of all transactions)	13	15	13	13	10	17

## Execution venue and clearing

ETD proportion (% of notional)	8	62	4	0.7	42	7
OTC proportion (% of notional)	92	38	96	99	58	93
On-trading venue	7	0.007	3	10	0.03	7
Off-trading venue	85	38	93	89	58	86
Clearing rate (% of OTC notional)	n/a	10	32	2	1	69

## Concentration

Top five (% of notional amount)						
Excluding CCPs	n/a	30	51	39	36	28
Including CCPs	n/a	41	53	39	36	65

Note: All values as of 4Q19 (13 December 2019). 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.

Source: TRs, ISO, GLEIF, ESMA.

# Market monitoring

# Market structure

In 2019 the EU derivatives market shrank to EUR 681tn in outstanding total notional amount in 4Q19 from EUR 715tn a year earlier.<sup>1</sup> The market was slightly more dominated by interest rate derivatives (IRDs) at 82% of notional amount, up from 78%, while 11% of the notional amount was in currency (down from 13% in 2018), with the remaining 8% in equity, credit and commodities. As in 4Q18, most of the notional amount was in contracts held by investment firms, credit institutions and central counterparties (CCPs). Exposures in intragroup transactions increased significantly, to EUR 107tn from EUR 70tn a year earlier. Over-the-counter contracts (OTC) still accounted for most of the outstanding notional amount (92%). The remaining 8% were in exchange traded derivatives (ETDs), down 2pps from 4Q18. Central clearing rates in 4Q19 were 69% of the notional amount in IRDs and 32% in credit derivatives, both up significantly (6pps and 7pps respectively). The UK remained the locus of most derivative trading in Europe in 2019 with 82% of notional amount involving a UK-domiciled counterparty, unchanged from 2018.

## The EU derivatives market in 2019<sup>2</sup>

At the end of 2019 the **total notional amount outstanding** in EU derivatives market, including both over-the-counter (OTC) and exchange-traded derivatives (ETDs), stood at EUR 681tn, held in 50mn open derivative transactions. Overall market size was down 5% from a year earlier, when total notional amount stood at EUR 715tn in some 48mn transactions.<sup>3</sup> The decrease in market size was driven largely by falls in notional amounts in currency and equity.

In 4Q19 exposures between counterparties in the same group, **intragroup transactions**, accounted for EUR 107tn of the total notional

amount in 6mn transactions outstanding. This was a sizeable increase up about 50% from the EUR 70tn held in 5mn trades in 4Q18. The large increase in intragroup exposures appears to be linked to one very large exposure within one international investment bank in 4Q19. Excluding intragroup transactions, the total notional amount outstanding was EUR 574tn in 44mn transactions.

Note that to more accurately compare 2019 statistics to 2018, in this report we recalculated 2018 statistics using data whose quality had improved since last year's report.<sup>4</sup>

<sup>1</sup> Please note statistics for 2018 have been revised in light of improvements to the data, as a result some do not match those published in the [Annual Statistical Report EU Derivatives Markets 2019](#). See the 'Progress on EMIR data quality' article at the end of this report for details.

<sup>2</sup> 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 transactions at the end of the reference day, based on the state of each transaction along the derivatives life cycle. Statistics are presented as the number of contracts outstanding, or the notional amount value of contracts outstanding, with notional amount outstanding defined as the nominal or notional value of all transactions reported and not yet settled at the reporting date. The total notional amount is the sum of the reported outstanding notional amounts.

The reporting period for this report is the 2019 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 2019, the four reference dates are 15 March 2019, 7 June 2019, 6 September 2019 and 13 December 2019. Where 2018 data are presented, the four reference dates are those from the previous year's report: 23 March 2018, 15 June 2018, 21 September 2018 and 14 December 2018.

<sup>3</sup> See the Annual Statistical Report EU Derivatives Markets 2019.

<sup>4</sup> The data was improved by removing over-reporting from one counterparty. This improvement primarily affected CFDs (currency, equities and commodities) and some equity futures. The statistical methods article, 'Progress on EMIR data quality', at the end of this report provides additional details.

As a result of using these improved data, some key statistics for the 2018 report have been revised. The main changes are lower overall notional amounts and numbers of contracts for currency CFDs (EUR 17tn lower notional amount and 14mn fewer transactions), equity CFDs (EUR 0.5tn lower and 1.6mn fewer trades), commodity CFDs (EUR 0.7tn lower and 2.2mn fewer trades) and equity futures (EUR 3.5tn lower and 0.04mn fewer trades). These changes account over 95% of the changes in the overall market size in both the notional amount and number of contracts. Other than the changes to statistics for currency, equities and commodities CFDs, and equity futures, and their impacts on other more aggregate statistics, changes are minimal. The derivative statistics section at the end of this report presents the key statistics for 2018 based on the improved data.

## ASRD.1

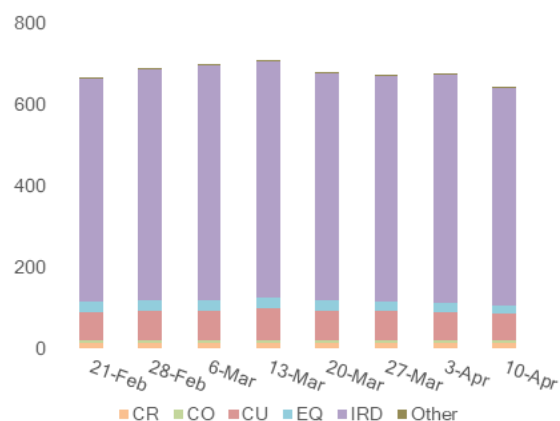
2020 snapshot: the COVID-19 crisis

**Sharp jumps in notional amounts for some assets, and in CCP margins**

Since the outburst of the COVID-19 pandemic, most financial markets experienced drastic price and volume movements and EU derivative markets were no exception. The following box shows how notional amounts evolved during the crisis.

## ASRD.2

Notional amounts by asset class

**Sharp increase from mid-February to March**

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

The magnitude and the timing of the COVID-19 impact on derivatives market varied across asset classes. The IRD market increased by 6% between 21 February and 13 March where the notional amount reached EUR 579tn. Notional amounts then decreased to below pre-crisis levels, to EUR 534tn (as of 10 April). Currency derivatives followed a similar pattern with a notional of EUR 78tn on 13 March, 13% above the 21 February level, with a decrease thereafter.

For credit derivatives, the asset class where the pandemic had the widest impact, the peak in notional was reached during the week of 20 March, at EUR 14.8tn, 22% above the 21 February level of EUR 12.1tn. Notional amounts later on decreased to EUR 13.7tn in April. The increased activity on credit derivative markets during the turmoil was related to an increased usage of CDS indices and was accompanied by an increase in central clearing for these products.

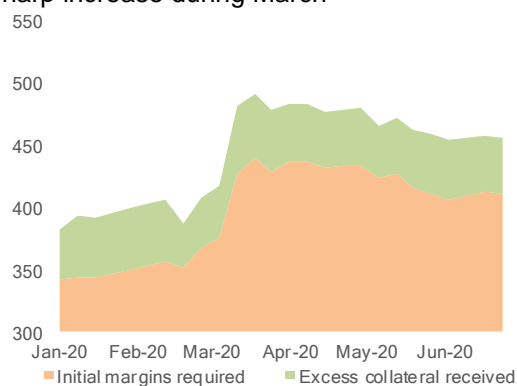
For commodities, amounts declined throughout the crisis to EUR 5.8tn on 10 April, a decrease of 15% compared to 21 February, reflecting continued deteriorating conditions on some of the big commodity markets, including oil. Finally, equity derivative notional amounts stood still until the week of 20 March and declined by 15% between then and 10 April,

potentially reflecting the introduction of short-selling bans in several member states.

The massive increase in volatility also translated into an increase in margins through a number of channels. The key drivers were increased volumes and volatility leading to increased variation margins, reflecting mechanically large mark-to-market gains and losses for derivative counterparties. A second order effect was that margin models were adapted to the period of heightened volatility (through parameter updates or from the inclusion of new observations in the lookback sample of Value-at-Risk models), after a large number of margin breaches were observed.<sup>5</sup> The increase in margins is visible in ASRD.3 below which shows that Initial Margins (IMs) required, as reported by EU28 CCPs to Trade Repositories, increased strongly from mid-February.

## ASRD.3

Initial margins received by EU 28 CCPs

**Sharp increase during March**

Note: Outstanding amounts of initial margins required and excess collateral received by EU28 CCPs for derivatives (data for CC&G missing), in EUR bn. Data points for 22, 29 May and 12 June missing (extrapolated on the chart) due to incompleteness in data for these dates.  
Sources: TRs, ESMA.

In particular, IMs increased by 29% between 21 February and 20 March, then reached a plateau when CCP margin model parameters updates and stress data intake stabilised. One can also see that excess collateral was depleted first and used as a safety cushion before the initial margin required increased.

Widespread intraday-margin call and overall increases in margins collected by CCPs can put additional liquidity demands on clearing members and their clients during times of liquidity shortage in other market segments. However, liquidity in the EU central clearing framework was never put under critical stress, as illustrated by the development of excess collateral received by EU CCPs (ASRD.3), which never reached critical lows at an aggregate level over the period of the crisis. Excess collateral started to decrease slightly from end-January, i.e. before the gradual increase in initial margins, which points to excess collateral serving as a cushion, limiting procyclicality of margins. Later on, when volatility returned to lower levels, initial margins remained at a higher level while excess collateral built up, again showing signs of controlled liquidity provision from clearing members.

<sup>5</sup> Margin breaches occur each time the actual margin coverage held against an account falls below the mark-to-

market value of the position of the account owner, based on the results of daily back-testing.

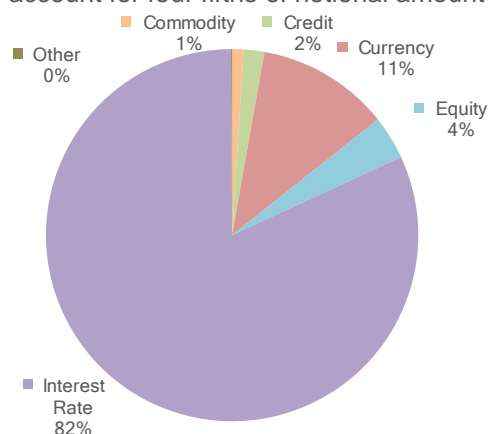


Looking at all transactions (including intragroup and non-intragroup) in terms of the **underlying assets**, interest rate derivatives (IRDs) accounted for 82% of the total notional amount outstanding. As in 4Q19, currency derivatives were the second largest by notional amount, at 11% of the total. The remaining assets classes accounted for smaller proportions, with 1% in commodities, 2% in credit derivatives, to 4% in equities in 4Q19.

Compared to a year earlier, the proportion of notional amount grew in IRDs (+4pps) and fell in currency (-2pps) and equities (-2pps). The proportions of total notional for commodities and credit derivatives were broadly unchanged (ASRD.4).

#### ASRD.4

Total notional amount outstanding by asset class  
IRDs account for four fifths of notional amount



Note: Percentages of total notional amount outstanding by asset class.  
Sources: TRs, ESMA

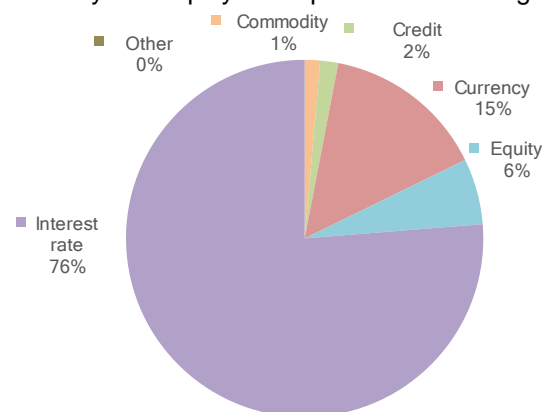
The changes in relative share were driven by falls in the notional amounts in currency (EUR 79tn in 4Q19 from EUR 93tn in 4Q18) and equities (EUR 26tn from EUR 40tn), and to a lesser extent commodities (EUR 7tn from EUR 11tn) rather than an increase in the notional amount in IRDs, which was unchanged from 4Q18 to 4Q19. Together, the falls in notional amounts for currency, equity and commodity accounted for EUR 32tn of the EUR 34tn fall in the overall market size since 4Q18.

The asset composition for intragroup transactions 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).

Although 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

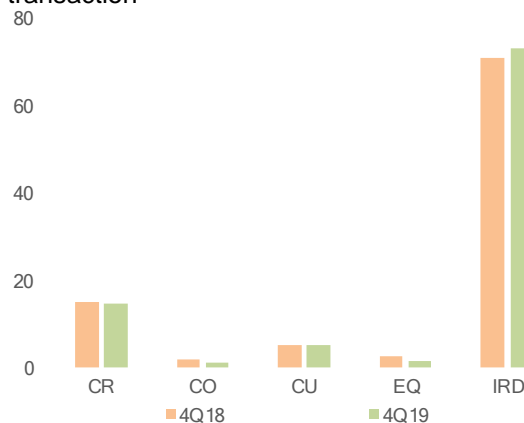


Note: Percentages of intragroup notional amount outstanding by asset class.  
Sources: TRs, ESMA

Looking at the average notional amount per transaction by asset class for the market overall (ASRD.6), IRDs continued to have by far the largest average size (at EUR 73mn per transaction) followed by credit derivatives (EUR 15mn), currency (EUR 5.1mn), equities (EUR 1.3mn) and commodities (EUR 1.1mn).<sup>6</sup> Values here were broadly similar to those observed in 4Q18.

#### ASRD.6

Notional amount per transaction by asset class  
IRDs have the largest notional amount per transaction



Note: Notional amount per outstanding transaction in EUR millions. CR - credit, CO - commodity, CU - currency, EQ - equity, and IR - interest rate.  
Sources: TRs, ESMA

The distribution of derivatives by asset class as measured by the **number of transactions** is quite different from the distribution of notional

relative size of trades between asset classes, rather than on the average amount per trade.

<sup>6</sup> Note that as transactions can include positions which combine multiple trades and net notional amount, the metric of average size here is more informative as to the

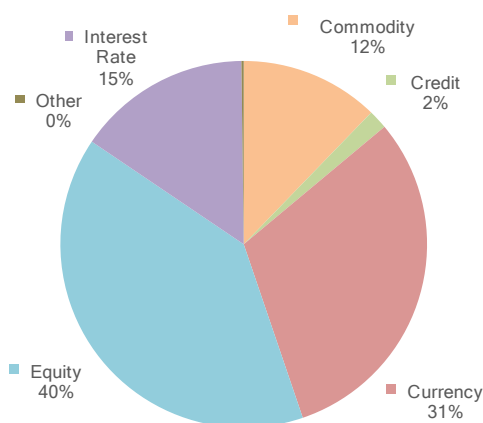
amounts. Under this metric, equity derivatives accounted for 40% of the outstanding trades reported in 4Q19, currency derivatives accounted for 31%, commodities accounted for 12%, IRDs accounted for 15%, and credit derivatives accounted for 2% (ASRD.7).

Compared to a year earlier, equity accounted for a greater proportion (+9pps), while currency accounted for a lower proportion (-6pps), with IRDs and commodities both up 1pps. Underlying these were an increase in equity transactions from 15mn to 20mn and a decrease in currency transactions from 18mn to 15mn, from 4Q18 to 4Q19.

#### ASRD.7

Number of transactions by asset class

Equities account for the largest proportion of transactions



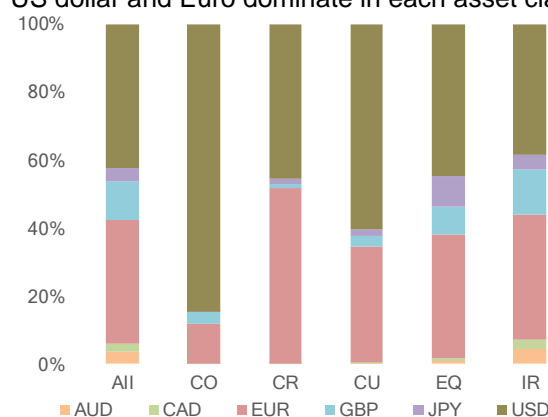
Note: Percentages of outstanding derivative contracts by asset class.  
Sources: TRs, ESMA.

The distribution of total notional amount in terms of the **currency of denomination** remained largely similar to 4Q18, with 39% in USD (-3pps from 4Q18), 33% in EUR (+1pps) and 11% in GBP (-1pp). With the exception of equities, the relative share of notional amount denominated in EUR grew slightly while that in USD fell as compared to 4Q18 (ASRD.8). In equities, the share denominated in USD and EUR grew more strongly (up 8pps and 7pps respectively).

#### ASRD.8

Total notional amount by currency of denomination

US dollar and Euro dominate in each asset class



Note: Proportions of total notional amount outstanding by currency and asset class, in %.  
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 (35% in USD, 33% in EUR and 12% in GBP). For currency derivatives, the distribution in 4Q19 was 60% in USD, 34% in EUR and 3% in GBP.

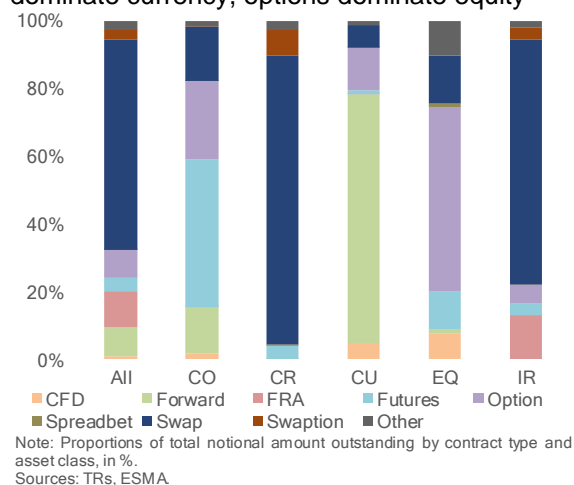
As in 4Q18, commodities were largely denominated in USD, with 84% of the total notional amount associated with contracts in USD, 12% in EUR and 3% in GBP. Credit derivatives were largely split between EUR (52%) and USD (45%), with a greater share in EUR than a year earlier. Equity derivatives remained the most diversified, though USD and EUR still dominated. Here the distribution was 41% in USD, 34% in EUR, 8% in GBP and 8% in JPY.

During 2019 the notional amount by **contract type** and instrument changed to some extent. The share of the overall notional amount in swaps grew from a year earlier, to 62% from 56%. This was largely driven by an increase in the notional amount of IRD **swaps** from EUR 388tn to EUR 402tn, while the notional amount over all assets fell. In IRDs, swaps accounted for 72% of the notional amount. The increase in swap notional amount in IRDs was largely offset by falls in notional amount for other contract types. Thus, the increase in swaps reflected changes in the types of IRDs being used over 2018 rather than growth in IRD usage. Swaps also accounted for 85% in credit (up 1pp from 4Q18), 16% in commodities (-13pps) and 14% in equities (-4pps) (ASRD.9).

## ASRD.9

Total notional amount by contract type

Swaps dominate IRDs and credit, forwards dominate currency, options dominate equity



Forward rate agreements (FRAs) accounted for 13% of IRD notional amount at the end of 2019, down 1pp from a year earlier. Forwards also fell, from EUR 67tn to EUR 59tn in notional amount outstanding. **Forwards** were almost entirely in currency (97% of forwards were in currency in both 4Q18 and 4Q19). Despite their fall in notional amount, forwards actually increased their share of notional in currency derivatives to 73% from 70% in 4Q18. This was due to a proportionately much larger fall in the notional amount of currency CFDs, which fell from EUR 8tn to EUR 4tn.

In commodities, **futures** again accounted for the largest amount of notional amount at 44%, up 11pps from 4Q18. Here forwards accounted for 13% of the notional amount, an increase of 4pps. Despite these increases in proportions, the notional amounts for futures in commodities decreased (from EUR 4tn to EUR 3tn) while that of forwards remained largely unchanged at EUR 1tn. The increase in share for both of these was driven by proportionately larger drops in the notional amount of commodity swaps and options (from EUR 3tn to EUR 2tn and from EUR 3tn to EUR 1tn respectively). These falls also accounted for most of the drop in the commodity notional amount overall.

In equities futures accounted for 11% of the notional amount, significantly down from the 19% of a year earlier. The fall in notional amount was also sizeable from EUR 7tn to EUR 3tn between 4Q18 and 4Q19.

Equity **options** also fell sharply over the year, from EUR 24tn to EUR 14tn. Despite this fall, they remained by far the largest instrument by

notional amount in equities, accounting for 54% of the total notional amount. Options also remained the second largest instrument in commodities, accounting for about 23% of the total notional amount for these. Swaptions accounted for 8% and 4% of the notional amount in credit derivatives and IRDs respectively, similar to 4Q18.

Overall, the notional amount of **CFDs** fell in 2019, from EUR 8tn in 4Q18 to EUR 6tn in 4Q19. This fall was driven by a large drop in CFDs among currency derivatives. Currency CFDs accounted for 5% of the total notional amount in currency derivatives in 4Q19, down from the 8% reported in 4Q18. Their notional amount fell from EUR 8tn to EUR 4tn. However, in stark contrast, CFDs significantly increased their share for equities to 8%, up from 2%, associated with an increase in notional amount from EUR 1tn to EUR 2tn. Although relatively small in notional amount, CFDs also grew strongly in commodities from EUR 60bn in 4Q18 to EUR 130bn in 4Q19, doubling their share from 1% to 2% over the year.

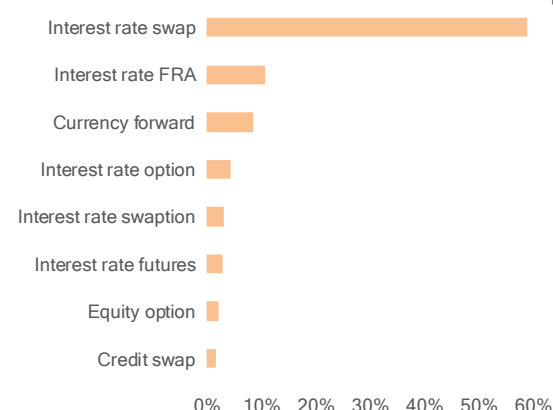
**Spreadbets** – similar to CFDs – continued to account for a very small amount of the overall notional amount, but unlike CFDs grew sharply, from EUR 40bn to EUR 260bn over 2019. Their notional amount remained almost entirely in equities (where CFDs also grew) where they accounted for only 0.97% of the notional amount. This, however, was a very significant increase on the 0.07% of a year earlier. Together with the increase in CFDs in equities, this shows that, unlike in currencies where there was a marked fall, in equities there was significant growth in CFD-like instruments (CFDs and spreadbets) over 2019. We discuss this further in the market trends section.

The asset and instrument type together provide an indication of the largest derivative markets by notional amount in 4Q19. 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 83% of the total notional amount at the end of 2019, up 4pps from a year earlier (ASRD.10).

## ASRD.10

Top 8 notional amount proportion by asset and instrument

Almost 60% 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 **transactions by contract type**, CFDs remained the most common (40%, up 9pps from 4Q18), followed by swaps (23%, +1pp), forwards (14%, -1pp), options (9%, -2pps) and futures (8%, -6pps). Within asset classes, swaps accounted for most of the transactions in IRDs (81%, +12pps) and credit (92%, -1pp). CFDs were the most numerous in currency (44%, -4pps), and in equities (56%, +24pps), and also account for increasingly significant but not the largest share of commodities transactions (34%, +9pps). The increases in the number of transactions for CFDs mirror the patterns observed for notionals, that is, a decrease for currency CFDs, and significant increases for equity and commodity CFDs.

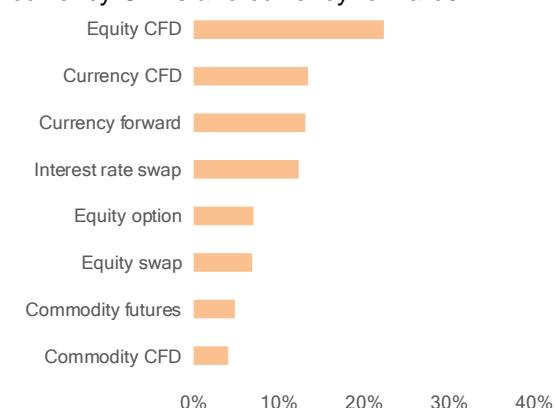
Futures still accounted for the largest number of commodities (40%, down 9pps). Currency forwards showed an increase in the number of outstanding currency transactions (43% of currency transactions, up 5pps). Equity options also continued to account for a significant proportion of equity derivatives (18%, -10pps).

Looking at these numbers by the combination of underlying asset and instrument, equity CFDs accounted for 22% (+12pps) of outstanding transactions, while currency CFDs and currency forwards together accounted for 27% (-5pps) (ASRD.11). The almost doubling of their share over 2019 meant that equity CFDs were by far the most numerous in 4Q19. The fall in currency CFDs, second most numerous in 4Q19, increased the gap between these and equity CFDs.

## ASRD.11

Top 8 proportion of transactions by asset and instrument

Just under half of contracts are in equity CFDs, currency CFDs and currency forwards



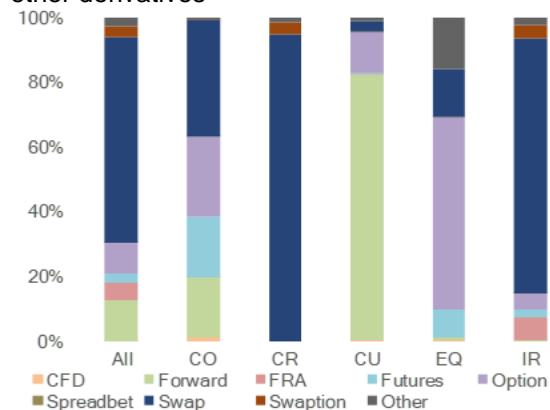
Note: Largest 8 proportions of the number of transactions by asset class and instrument.  
Sources: TRs, ESMA.

Looking briefly at **intragroup distribution by contract type** the distribution was, as in 2018, similar to that of derivative contracts more generally. Swaps again dominated overall and specifically in credit, IRDs and commodities. Forwards predominated in currency. While options dominated in equities and were present to a lesser extent in commodities (ASRD.12).

## ASRD.12

Intragroup notional amount by contract type

As in 2018, intragroups pattern similar to that for other derivatives



Note: Shares of intragroup notional amount outstanding by contract type and asset class, in %.  
Sources: TRs, ESMA.

One noticeable difference from the distribution of instruments generally was the quasi-absence of CFDs and spreadbets from intragroup transactions. Here these accounted for a miniscule share of intragroup overall (<0.05%) and in most asset classes, with the only exception being commodities where they accounted for 1% of the intragroup notional. Another marked difference was the increased prevalence of

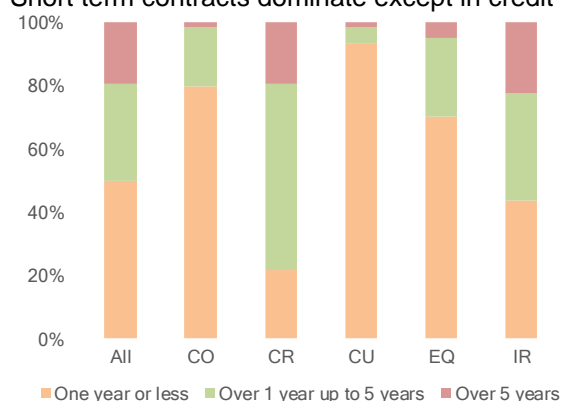
swaps in commodities for intragroup trades, these accounted for almost 40% of intragroup commodity derivative notional amount, more than double the swap share in commodities more generally.

The distribution of notional amount by the remaining **maturity** of derivatives remained largely similar to 4Q18, with generally longer maturities except in credit derivatives where maturities shortened slightly (ASRD.13). Overall, shorter maturities still dominated, with half (50%) of the total notional amount in derivatives having one year or less of maturity remaining, slightly down from 52% a year earlier. The proportion of the notional amount in contracts with maturity remaining of 5 years or more also increased slightly, from 17% in 4Q18 to 19% in 4Q19.

ASRD.13

Proportion of total notional amount by remaining maturity

Short term contracts dominate except in credit



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

## Slight fall in amount in contracts executed on trading venues

Exchange trade derivatives (ETDs) are standardised contracts with transparent characteristics and prices. Their 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.

Under EMIR, ETDs are those traded on an EU regulated market<sup>7</sup> or a third country venue that is considered equivalent to an EU regulated market.<sup>8</sup> All remaining derivatives are OTC. As we did in last year's report, 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.<sup>9</sup>

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 types offer similar benefits in terms of transparency, liquidity and efficiency as regulated markets. For this reason, OTC derivatives executed on trading venues are arguably more like ETDs than conventional OTC contracts executed bilaterally.<sup>10</sup> So, higher levels of OTC on trading venues, like higher levels of ETDs, are also an indicator of higher levels of market transparency, standardisation and liquidity.

In 4Q19 ETDs accounted for 8% of the total notional amount, down from 10% in 4Q18. The proportion of on-trading-venue OTC derivative notional amount was unchanged from a year earlier at 7% in 4Q19, while that for off-trading-venue OTC derivatives was 85%, up 2pps from a year earlier (ASRD.14). As a result, the overall notional amount for contracts executed on trading venues (ETD and OTC) fell to 15% in 4Q19, down from 17% a year previously.

<sup>7</sup> Definition, Article 4(1)(21), Markets in Financial Instruments Directive (MiFID) II.

<sup>8</sup> 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](https://www.esma.europa.eu/sites/default/files/library/equivalent_tc-markets_under_emir.pdf)

<sup>9</sup> 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.

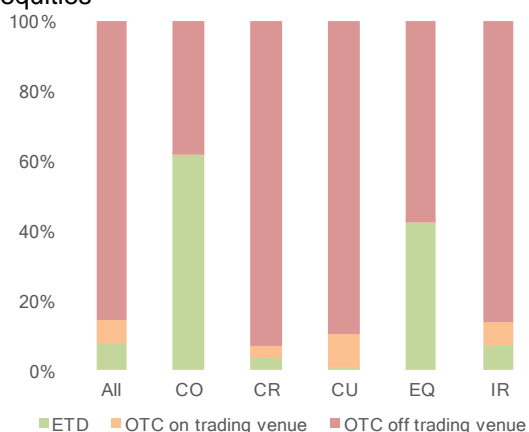
<sup>10</sup> In what follows, we described OTC derivatives traded on MTFs or OTFs as 'on trading venue'; other OTC contracts

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](https://www.esma.europa.eu/sites/default/files/library/esma35-43-349_mifid_ii_qas_on_investor_protection_topics.pdf)



## ASRD.14

ETD versus OTC proportion of total notional amount  
OTC dominates except in commodities and equities



Note: Proportions of total notional outstanding by ETD, OTC on trading venue and OTC off trading venue, in %.  
Sources: TRs, ISO, ESMA.

Looking at the underlying asset classes, commodities and equities have relatively large proportions of ETDs. This is to be expected given the greater proportion of instruments in these asset classes, such as futures, that are traded on regulated markets. For commodities the proportion of notional amount in ETDs grew to 62% in 4Q19, up from 54% in 4Q18. This increase of ETD share in commodities was largely due to a EUR 2tn fall in OTC commodity swaps from 4Q18 to 4Q19. In contrast, the exchange-traded share for equities fell to 42%, down significantly from 56% a year earlier. The decrease in the share of ETD in equities stemmed largely from a EUR 10tn fall in the notional amount in ETD instruments, made up of almost entirely of a EUR 6tn drop in equity options and a EUR 4tn drop in equity futures from 4Q18 to 4Q19.

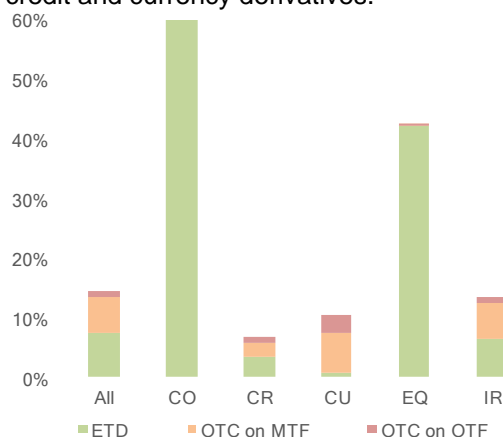
For other assets, OTC derivatives still accounted for almost all of the notional amount outstanding and showed little change compared to 4Q18. Notional amount proportions for OTCs were 93% for IRDs, 99% for currency, 97% for credit derivatives in 4Q19 (ASRD.15). All of these were largely unchanged from their corresponding 4Q18 OTC proportions.

Contracts executed on MTFs and OTFs became more significant for currency derivatives,

increasing to 10% of notional amount, from 8% in 4Q18. As in 4Q18, the proportion of notional amount executed on MTFs and OTFs for credit and interest rate derivatives was very similar to that for ETDs. In credit derivatives, 3% of the notional amount was OTC on trading venue (compared with 4% for ETD), while for interest rate derivatives 7% of notional amount was OTC on trading venue and 7% was ETD. This was likely to be related to the Markets in Financial Instruments Directive (MiFID) II derivative trading obligation.<sup>11</sup> For commodities and equities, where there is significant on-exchange trading, the notional amounts for OTCs executed on MTFs and OTFs remained negligible as a share of notional amount (ASRD.15).

## ASRD.15

Proportion of total notional amount on trading venues  
OTC on trading venue significant for interest rate, credit and currency derivatives.



Note: Proportions of total notional on trading venues (ETD, OTC executed on MTFs and OTFs).

In summary, while proportions of ETDs and OTC derivatives overall remained broadly similar to 4Q18, the share of ETDs remained significant for commodities and equities, rising for commodities, but falling for equities compared to a year earlier. As in 4Q18, OTC notional amounts on trading venues were small but significant for currencies, credit derivatives and IRDs.

### Central clearing: strong increases for both interest rate and credit

The EMIR clearing obligation<sup>12</sup> requires that certain OTC derivatives contracts be cleared

<sup>11</sup> The MiFID II 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-](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2417&from=EN)

[content/EN/TXT/PDF/?uri=CELEX:32017R2417&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2417&from=EN)

<sup>12</sup> Under EMIR, as amended by EMIR Refit text, two types of counterparties are subject to the obligation: Financial counterparties (FC) (such as banks, insurers, and asset

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

As of end of 2019, the clearing obligation applied to specific classes of interest rate and credit OTC derivatives. 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 are above or below the clearing thresholds.<sup>13</sup>

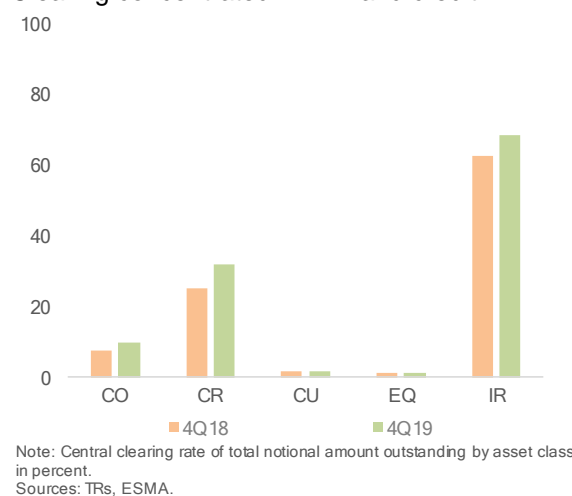
In 2019 the IRD classes subject to the obligation were basis swaps, fixed-to-float interest rate swaps, forward rate agreements, and overnight index swaps. For credit derivatives certain European untranch index credit default swap (CDS) classes were subject to the obligation. The products subject to the clearing obligation were unchanged from a year earlier, with no new derivative classes becoming subject to the clearing obligation during 2019 for all counterparty types.<sup>14</sup>

As in our reports for 2017 and 2018, **central clearing** in 2019 took place almost entirely in asset classes with products subject to the clearing obligation. For both IRDs and credit, the clearing rate increased strongly over 2019. For IRDs overall, the clearing ratio was 69% in 4Q19, up 6pps from a year earlier. While for credit the clearing ratio increased to 32%, up by 7pps. (ASRD.16).<sup>15</sup> While there was some growth in cleared notional amounts for both asset classes, the growth in clearing rates for interest rate and credit derivatives is largely attributable to a fall in uncleared notional amount (down by EUR 25tn for IRDs, 1tn for credit) from 4Q18 to 4Q19. We

discuss the underlying cleared instruments in detail in the trends section.

#### ASRD.16

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



### Reporting counterparties: investment firms, credit institutions and CCPs largest

The exposures of counterparties to different derivatives products is informative on the levels of counterparty risk in EU derivative markets. Here our data on the sector of the reporting counterparties again shows, as in 2018, that investment firms, CCPs and credit institutions were the counterparties in derivative markets with the largest exposures in 2019.

Together they accounted for about 89% of the notional amount in the market (ASRD.17), with proportions of 35%, 35% and 20% respectively. However, the exposure measures for investment firms and credit institutions will overstate these

managers) which decide not to calculate their aggregate month-end average position in OTC derivatives or the result of which is above any of the clearing thresholds, and non-financial counterparties (NFCs) which include any EU firm whose positions in OTC derivatives contracts (unless for hedging purposes) exceed the EMIR clearing thresholds. Intra-group transactions are 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 is granted under EMIR Refit (see <https://www.esma.europa.eu/regulation/post-trading/otc-derivatives-and-clearing-obligation>)

<sup>13</sup> 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](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/PDF/?uri=uriserv:OJ.L\\_.2016.103.01.0051.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=uriserv:OJ.L_.2016.103.01.0051.01.ENG)).

[lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2016.103.01.0051.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.103.01.0051.01.ENG).

<sup>14</sup> 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](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))

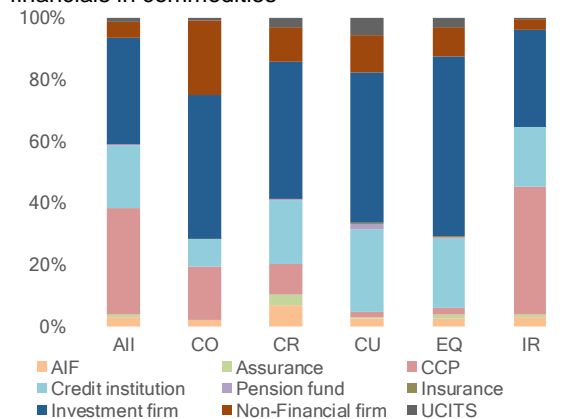
<sup>15</sup> Clearing ratios are calculated here over all interest rate and credit derivatives, some of which are not subject to the clearing obligation, so we would not expect clearing rates here to be 100%.

firms' exposures somewhat because these firms also conduct trading on behalf of end clients that are not explicitly captured in EMIR data.

#### ASRD.17

Notional amount by sector of counterparty

CCPs have major exposures in IRDs and credit, non-financials in commodities



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty and asset class, in %.  
Sources: TRs, ESMA.

Considering each counterparty type in turn we see that **investment firms** continued to hold particularly significant exposures across all derivative classes in 4Q19, ranging from 31% in IRDs to 58% of equity derivatives. They accounted for just under half of the notional amount in both currency (47%), commodities (49%) and credit derivatives (44%) in 4Q19.<sup>16</sup>

The distribution of investment firm exposures was broadly similar to a year earlier, with the exception of commodities and currencies, where the notional amount of investment firm exposures increased by 11pps and 7pps respectively. In both cases the shift was largely from non-financial counterparties.

As expected, given their role in central clearing, **CCPs** also had sizeable exposures in 2019. They accounted for 35% of the total notional amount outstanding. 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 41% of the total notional amount in IRDs, and 10% in credit derivatives.<sup>17</sup> With the exception of commodities (where their exposures accounted for 17% of total notional). CCPs accounted for very small notional amount proportions in other

categories. Proportions were similar to those a year earlier (within 2pps in all categories).

For **credit institutions** the main exposures were in IRDs (19% of notional amount), currency (27%), equities (23%) and credit (20%). Figures were similar to 4Q18, with currency share unchanged, credit, commodities and equities shares increasing (by 5pps, 3pps and 3pps respectively) and IRD shares falling (down 2pps)

**Non-financial firms** accounted for 5% of the overall notional amount in 4Q19, down from 7% in 4Q18. As in 4Q18, their exposures still accounted for a large share of the total notional amount in commodity derivatives, at 24% of the total notional amount, but this was much lower than in 4Q18 (-17pps). The large change is attributable to a sharp fall in commodity swaps (EUR 1.5tn drop) held by NFCs. Non-financial firms also accounted for small but significant proportion in currency derivatives (12%, -6pps).

Similar to 2017, **alternative investment funds** have significant exposures in credit (7% of the notional, up 2pps since 4Q18), IRDs (3% of the notional, down 1pp) and currency derivatives (2%, also down 1pp). **Undertakings for collective investment in transferable securities (UCITS)** remained minor players in the market in 2019, with their most significant presence still in currency and credit derivatives (6% and 4% of notional amount respectively).

**Assurance** firms,<sup>18</sup> **insurance** firms and **pension funds** also had relatively small presences. Assurance firms accounted for 3% of the notional amount in credit derivatives and 2% in currency derivatives. Pension funds registered only in currency derivatives, with 2% of the total notional amount. Insurance firms accounted for the smallest notional amount, with their exposures accounting for only 0.1% of the total notional amount overall. However, for these types of firms' exposures are likely to materially understate actual exposures, as these firms are likely to be the end clients of some of the exposures captured under other counterparty types. Overall, exposures for these types of firms were similar to a year earlier.

The sectoral split of notional amount for intragroup exposures shows the absence of CCPs, with investment firms, credit institutions

<sup>16</sup> Note that these proportions are reduced from the 2017 figures because of CCPs, Non-financial firms and assurance firms now also figure as counterparties in our calculations.

<sup>17</sup> These percentages are not based on reconciled transactions and do not exclude intragroup transactions,

so are not comparable to the clearing ratios presented above.

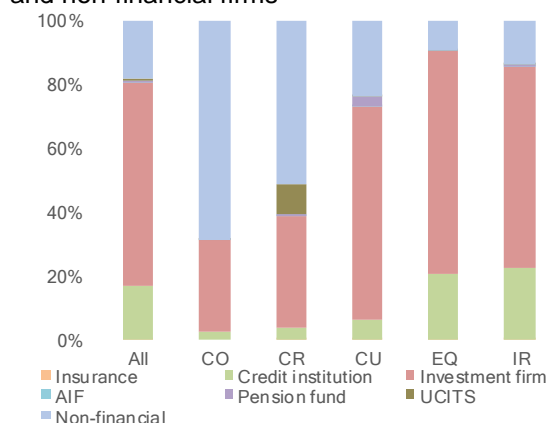
<sup>18</sup> By assurance we mean an assurance undertaking authorised in accordance with [Directive 2002/83/EC](#).



and non-financial firms dominant overall (ASRD.18). Non-financial firms were particularly present in commodities and currencies in 4Q19. This distribution remains broadly unchanged from a year earlier.

#### ASRD.18

Intragroup notional amount by sector of counterparty  
Dominated by investment firms, credit institutions and non-financial firms

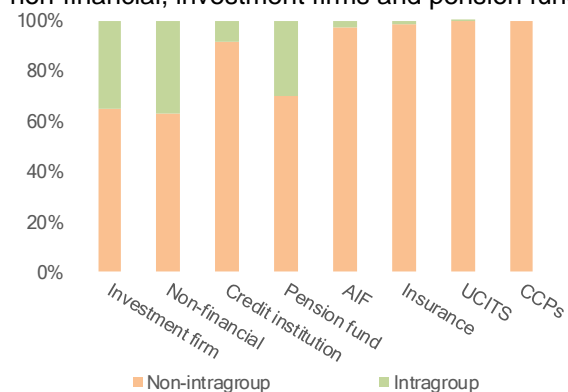


Note: Total notional intragroup amounts by sector of the reporting counterparty and asset class, in %.  
Sources: TRs, ESMA.

In 4Q19 intragroup exposures were particularly significant for non-financial firms, investment firms and pension funds. These respectively held 37%, 35% and 30% of their total notional amount in intragroup transactions. In contrast, credit institutions intragroup exposures were only 8% of the total notional amount of their exposures (ASRD.19).

#### ASRD.19

Intragroup proportion of exposures by counterparty  
Intragroup exposures particularly important to non-financial, investment firms and pension funds



Note: Total notional intragroup versus non-intragroup amounts outstanding by sector of the counterparty, in %. Insurance category also includes assurance and reinsurance firms.  
Sources: TRs, ESMA.

## Exposures between counterparties: non-financial firms' exposures larger

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 relied on the mandatory reporting of sector by the reporting counterparties to identify sectors. The difference is that 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 (about 80% of the notional amount is captured). As a result, figures here are not directly comparable to those presented above. The aim is instead, as in last year's report, to illustrate which sectors are exposed to which and to what extent.

The table below presents **exposures between counterparties for interest rate derivatives** (ASRD.20). As in 4Q18, the largest exposures were between CCPs and investment firms (20%) and between CCPs and credit institutions (20%).

In both of these, exposures fell as a share of total notional amount since 4Q18, down by 8pps for exposures between CCPs and investment firms and down 5pps for those between CCPs and credit institutions.

Exposures increased to non-financial firms, with non-financial firms' exposures to investment firms at 16% (+9pps) and with CCPs at 12% (+4pps). Exposures among non-financial counterparties stood at 4% (+2pps). In part the increase is likely to have arisen from improvements in identifying non-financial firms among non-reporting counterparties in 2019. In particular, the notional amount in IRDs with a non-financial as a counterparty was much higher in 4Q19 than in 4Q18 (EUR 170tn vs. EUR 100tn). As this is well in excess of the trend in the market size overall, the increases in non-financial exposures (and fall in other shares) are very likely to be due in part to more non-financials being revealed in the data in 2019.

## ASRD.20

## Matrix of cross sectoral exposures - IRDs

## Non-financial firms have larger exposures

	CI	IF	AIF	PF	UCITS	CCP	NF
IC	0.4	1.5					0.1
CI	4.1	4.9	2.0	0.2	0.5	20.1	4.4
IF		6.4	2.6	0.4	0.7	19.8	16.0
NF					0.6	12.4	2.4

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 between investment firms (6%, -4pps) and those between investment firms and credit institutions (5%, -4pps). Exposures in between credit institutions themselves accounted for 4% (-1pp) while those between credit institutions and alternative investment funds accounted for about 2% (-2pps), with those between investment firms and AIFs accounting for 3% (+1pp). Exposures among other counterparties remained relatively small.

For **credit derivatives**, CCPs were also important counterparties, though less than in IRDs, which is intuitive given clearing rates for credit derivatives are generally lower than for IRDs. In credit CCP exposures to investment firms, credit institutions and non-financials respectively amounted to 9% (-3pps), 9% (+1pp) and 5% (+1pp) of the total notional amount. Investment firms' exposures to credit institutions, non-financials and other investment firms made up most of the remaining exposures respectively at 8% (-12pps), 18% (+1pp) and 12% (+1pp) of the total. The drop in investment exposures to credit institutions sat alongside a correspondingly large increase in exposures among non-financial firms themselves, whose exposure stood at 11% in 4Q19 (up from just 0.3% in 4Q18).

As with IRDs, the increase here was likely to be due to more non-financials being identified in the data in 2019. In credit derivatives, the notional amount with non-financials as a counterparty increased from EUR 2.7tn in 4Q18 to EUR 3.9tn in 4Q19 in credit derivatives, indicating data

improvements are likely to be playing a role in the sharp increase in exposures here.

For **commodity derivatives**, non-financials' exposures to investment firms made up 19% (down 21pps) of the total, while CCPs' exposures to investment firms amounted to 26% (up 7pps). Here the very sharp fall in non-financial exposures correlated with a very sizeable drop in commodity swaps (of about EUR 2tn). Non-financials also continued to have sizeable exposures to credit institutions, at 4% of total notional amount, and to other non-financials in commodities markets, which accounted for 4%.

Just under a quarter (23%) of the **equity derivative** notional amount was held between investment firms, down from 34% a year earlier. Exposures of investment firms to credit institutions (10%, -10pps) and non-financials (7%, unchanged) remained significant. Credit institutions exposures to themselves (11%, +4pps) and non-financial institutions (8%, +4pps) were also increasingly substantial.

For **currency derivatives** non-financials' exposures to investment firms was the largest (21%, +7pps), followed by exposures in between investment firms themselves (16%, +1pp), between credit institutions and non-financials, and exposures between credit institutions and non-financials, which were both at 14% (up 3pps and down 8pps respectively). As with IRDs and credit, the increase in non-financial firms' exposures here also appears due in part to increasing exposure of non-financial firms in the data (the notional amount for non-financial firms in currency derivatives increased from EUR 22tn to EUR 29tn).

## Concentration and connectedness: many counterparties connected to a few

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.<sup>19</sup> It also captures the concentration for counterparties outside the top five. Lastly, we use the number of

<sup>19</sup> 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](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52004XC0205(02)&from=EN).

counterparties in each asset class, measured by the number of unique reporting counterparties.<sup>20</sup>

The **top five** measure (ASRD.21), excluding CCPs, shows credit and currency markets were again the most concentrated with the top five holding 51% (up 4pps from 4Q18) and 39% (+1pp) of the outstanding notional amount respectively in each. For equity, commodities and interest rate derivatives the figures were 36% (-3pps), 30% (-12pps) and 28% (+3pps) respectively. The fall for commodities is in line with an earlier trend in 2018. The top five is also a volatile metric in commodities (ASRD-S.77) indicating rapid fluctuations in the shares of largest counterparties in the market.

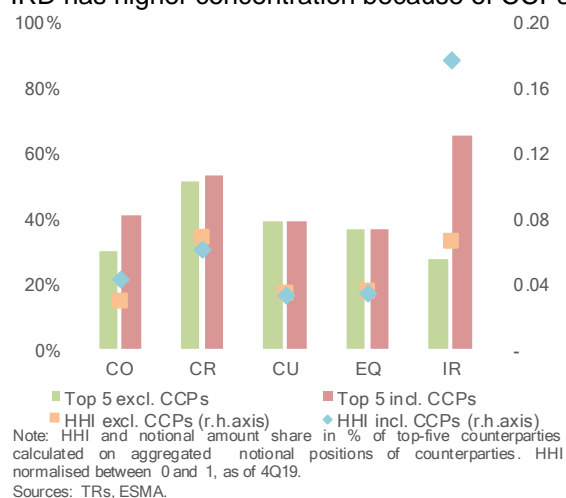
As one would expect, including CCPs in the top five increased the proportion of exposures held for credit and interest rates. Similar to what we saw in our report for 2018, for interest rates the effect was particularly dramatic (from 28% to 65%) reflecting the major role CCPs have as the largest counterparties in that market, as a result of the clearing obligation.

For the **HHI** the concentration picture is similar to that for the top five (ASRD.21), with the exception of IRDs where the HHI is higher, suggesting a greater concentration of the top five share in fewer counterparties, a change from a year earlier. IRDs again had the most concentrated exposures among asset classes if one includes CCPs. We also observe a significant fall in HHI for commodities from 4Q18, in line with the drop in top 5 share observed above (ASRD-S.77).

#### ASRD.21

Concentration measures: the HHI and top-five counterparties

IRD has higher concentration because of CCPs



Also relevant is the **number of counterparties** in each market. In 4Q19, there were about 4,000 in credit, 8,000 in commodities, 26,000 in equities, 57,000 in currency and 90,000 in interest rate derivatives (see ASRD-S.30, ASRD-S.42, ASRD-S.54, ASRD-S.66 and ASRD-S.78). These numbers are all similar to 4Q18, with an increase in equities (+2,000) and IRDs (-4,000), and a decrease in currencies (-2,000). Numbers for commodities and credit were essentially unchanged.

As in 2018, while there were large numbers of counterparties in each asset class, the top five counterparties still held between 30% and 60% of total notional amounts in 4Q19. The relative concentration between asset classes is similar using the top five measure and the HHI. Under both concentration measures, IRDs were the most concentrated with CCPs included.

We now look at the **interconnectedness** of markets using the ranking of counterparties by the number of counterparty connections they have.<sup>21</sup> As in 4Q18, the top 0.01% most connected reporting counterparties in each asset class still had extremely large numbers of connections in all asset classes in 4Q19 (ASRD.22). For example, in commodities there was only one counterparty in the top 0.01% and it was connected to over 160,000 other counterparties, down 70,000 on a year earlier.<sup>22</sup> Credit also had only one reporting counterparty in

<sup>20</sup> This will under-report counterparties because only firms domiciled in the EU or EEA report trades under EMIR.

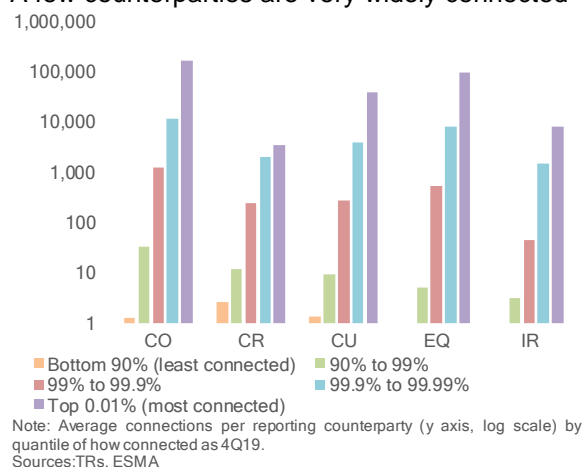
<sup>21</sup> A connection is counted when a reporting counterparty reports one or more outstanding positions with another counterparty.

<sup>22</sup> Figures here include non-reporting counterparties so can be exceeded those presented earlier, which only included reporting counterparties.

the top 0.01% and it is connected to about 3,500 counterparties, down from 4,300 a year earlier. In interest rate derivatives, there were nine reporting counterparties in the top most connected 0.01%. On average, these were each connected to over 8,000 counterparties, up about 1,000 from 4Q18. Overall, the picture remains similar to that of a year earlier, with high connection concentration among the most connected counterparties.

#### ASRD.22

Average connections by quantile of how connected:  
A few counterparties are very widely connected



At the other extreme, in 4Q19 each asset class continued to have a large proportion of counterparties with very few connections. Like in 4Q18, in every asset class except credit, between 70% and 80% of the reporting counterparties had 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.

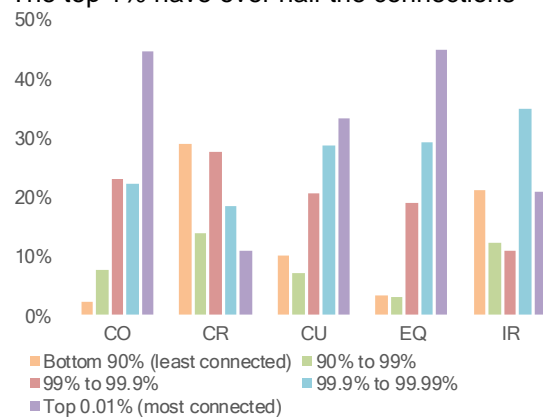
The chart below presents the distribution of counterparty connections (ASRD.23). It shows, that in 4Q19 the top 0.01% most connected counterparties' connections accounted for 20% or more of all the connections into reporting counterparties (with the exception of credit). Moreover, the top 1% of the most connected reported counterparties in each of the asset classes also accounted for over half of the

connections in every asset class. Proportions for the top 1% ranged from 57% (down 2pps from 4Q18) in credit to 90% (-3pps) in commodities.

#### ASRD.23

Distribution of connections by quantile of how connected

The top 1% have over half the connections



As in 4Q18, 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. This was likely to be linked with specific instruments, for example CFDs, that are generally more prevalent in these asset classes, where a few large counterparties transact with a large number of counterparties with only one derivative position, and where the markets are more intermediated, with smaller players transacting through large high-connected intermediaries.

### Network: UK continues to dominate, notable shifts in equities

Here we look at the cross-border dimension of derivatives exposures.<sup>23</sup> We map derivatives exposures using the reporting counterparty's domicile information.<sup>24</sup> For **intra-EEA**

<sup>23</sup> 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.

<sup>24</sup> 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



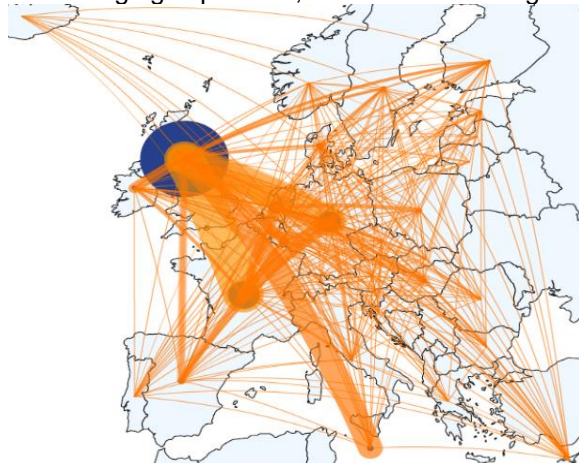
**exposures**, most of the market was still located within the United Kingdom or involved at least one UK-domiciled counterparty.

As 2019 involved the negotiations on the exit of the United Kingdom from the European Union, this section is particularly relevant as it may reveal changes in the exposures between the United Kingdom, other EEA countries and third countries, related either to the anticipated departure of the United Kingdom, or uncertainties about the outcome of the process.

Looking at exposure patterns across asset classes, we can see that the basic patterns remained similar to those in 4Q18 (see ASRD-S.11 to ASRD-S.15). As in 2018, patterns for currencies were distinctive in having more numerous exposures between different EEA states. The main exposures were again UK-UK, FR-UK, DE-UK, IT-UK and DE-FR the large blue area over the United Kingdom also shows how most of the intra-EU transactions were intra-UK in 4Q19. Unlike other asset classes, however, there were numerous exposures between the United Kingdom and other EEA states here and some significant non-UK cross-member state exposures, particularly between France and Germany. (ASRD.24)

#### ASRD.24

Currency derivatives: intra EEA and UK network  
Wide ranging exposures, with UK dominating



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.

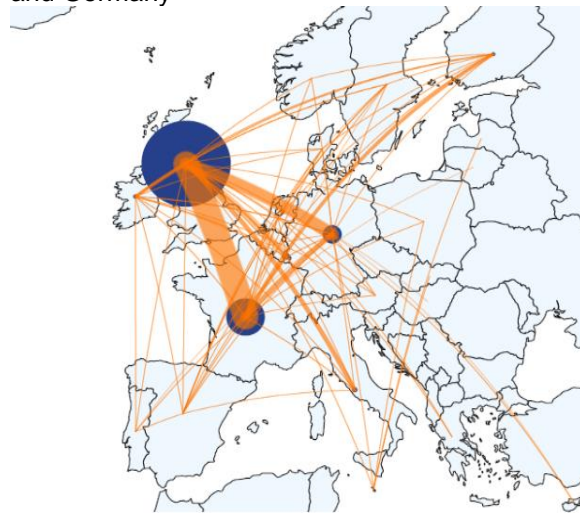
Credit exposures, in contrast, presented a simpler picture. As in other asset classes, most

transactions were intra-UK, or UK with France, Germany (ASRD.25). As with other asset classes, France was the second largest domicile for transactions, with Germany third. The picture here remained similar to that in 4Q18.

#### ASRD.25

Credit derivatives: intra EEA network

Mainly in and between United Kingdom, France and Germany



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.

Global charts of the exposures between counterparties in EU and EEA member states and those domiciled in **third countries**<sup>25</sup> show how the majority of third-country exposures continued to be between the United Kingdom and the United States in 4Q19, across all asset classes (ASRD-S.16 to ASRD-S.20).

The chart below (ASRD.26), for example, shows the global exposures reported under EMIR for interest rate derivatives. The bulk of exposures were between the United Kingdom and the United States, with smaller connections between the UK and other third countries. As in 4Q18, the pattern was largely replicated in other asset classes, particularly in credit and commodities (see ASRD-S.17 and ASRD-S.20). Overall, exposure patterns again remained very similar to a year earlier.

Exposures for currency and equity were somewhat more dispersed, though the US-UK exposure was still the largest (See ASRD-S.18 and ASRD-S.19).

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).  
<https://www.gleif.org/en/about/this-is-gleif>

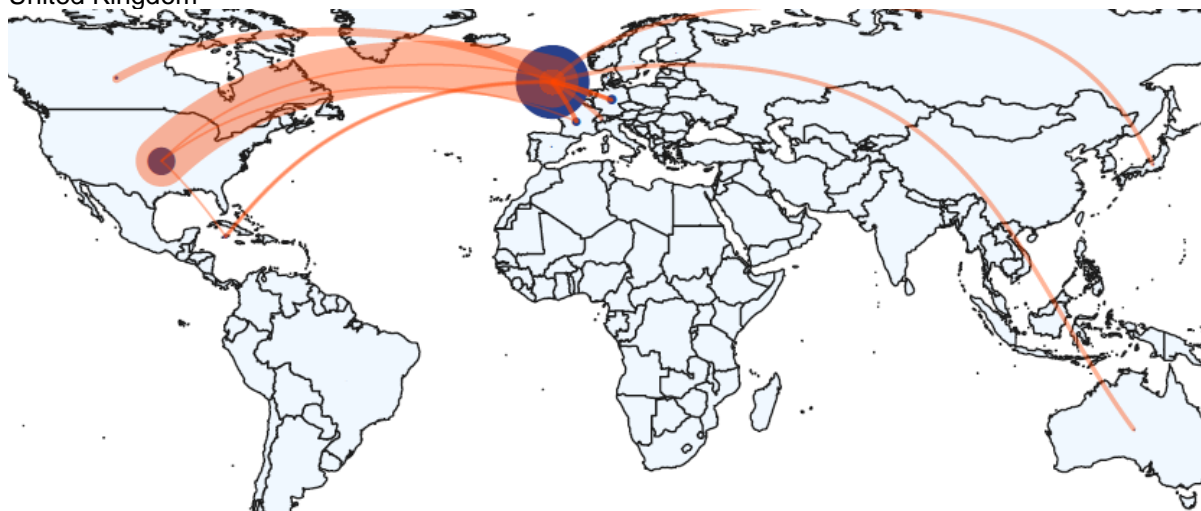
See

<sup>25</sup> As EMIR data includes only data reported by EEA counterparties, the global charts presented do not show exposures between third countries.

## ASRD.26

Interest rate derivatives: global network of positions involving an EU or EEA counterparty

Vast bulk of exposures remain between the United Kingdom and the United States and within the United Kingdom



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.

While the overall patterns of exposures remained similar to 4Q18, there were noticeable shifts over the year that become visible only by looking at the relative sizes of exposures within the EEA and with the United Kingdom, and with third countries. The first table below shows the extent of such links in 4Q19 (ASRD.27), while the second shows by how many percentage points exposures changed since 4Q18 (ASRD.28).

The first table shows that over the whole market, exposures involving third countries were predominant, now accounting for over half of notional amount across all asset classes. Exposures involving at least one UK counterparty dominated, at 82% of notional amount over all assets, which was unchanged from 4Q18, compared with 35% for exposures involving only one EEA counterparty, down 2pps from a year earlier.

Looking in more detail, there was a 3pps shift away from exposures involving two EEA counterparties to exposures involving a third country counterparty between 4Q18 and 4Q19. This was mainly driven by similar shifts for IRDs and in other assets classes, with the exception of commodities where there was a 1pp shift in the other direction, and in equities where there was a

much more sizeable shift away from intra-EEA counterparties to third country counterparties (9pps shift).

The case of equities is interesting as there were two marked shifts, one shift 8pps away from exposures between UK and other EEA counterparties to exposures between non-UK EEA counterparties. There was also a second shift, 9pps, away from UK to other EEA exposures, to exposures involving third countries. In high-level terms, this indicates a slightly less geographically connected market with greater third country-UK exposures and greater intra-EEA (excluding UK) exposures, and a reduction in exposures between the UK and the rest of the EEA.

As only equities experienced such a sizeable shift over the year, it is not immediately clear that this is a phenomenon that relates to the United Kingdom's exit from the European Union. However, it is noteworthy that in all asset classes except commodities, one observes a less pronounced, but similar type of shift to exposures involving third country exposures, and less exposure between the EEA (excluding the UK) and the UK.

## ASRD.27

4Q19 cross-border exposures notional amount as a percentage of total outstanding notional amount

**Exposures with third-countries account for over half of exposures in all asset classes**

	All	Commodities	Credit	Currency	Equity	Interest rate
Proportion of total notional amount (%)	100	1	2	12	4	82
Proportion by counterparty domicile (%)						
Intra-EEA	40	46	30	31	47	41
Intra-EEA excluding UK	8	12	7	12	24	7
UK - rest of EEA	18	11	15	12	16	18
Intra-UK	15	23	8	7	8	16
With a third country	59	53	67	68	52	57
EEA (ex UK) with third-country	9	12	14	26	18	6
UK with third-country	49	41	53	42	35	51
Unclear if intra-EEA or with third-country	1	1	2	1	0	1

Note: Derivatives that do not fall into the asset classes above are excluded as these are a very small proportion of the total.

Source: TRs, GLEIF, ESMA

## ASRD.28

Changes in geographical exposures from 4Q18 to 4Q19 in percentage points

**General shift to third country exposures, with more sizeable shifts in equities**

	All	Commodities	Credit	Currency	Equity	Interest rate
Proportion of total notional amount	n/a	-1	0	-1	-2	4
Proportion by counterparty domicile						
Intra-EEA	-3	1	-2	-1	-9	-3
Intra-EEA excluding UK	1	5	2	2	8	1
UK - rest of EEA	-2	-4	-2	1	-16	-1
Intra-UK	-3	0	-2	-4	-2	-3
With a third country	3	-2	3	1	9	2
EEA (ex UK) with third-country	-2	6	2	1	4	-2
UK with third-country	4	-8	1	0	5	4
Unclear if intra-EEA or with third-country	1	1	-1	0	0	1

Note: Derivatives that do not fall into the asset classes above are excluded as these are a very small proportion of the total.

Source: TRs, GLEIF, ESMA

# Market trends

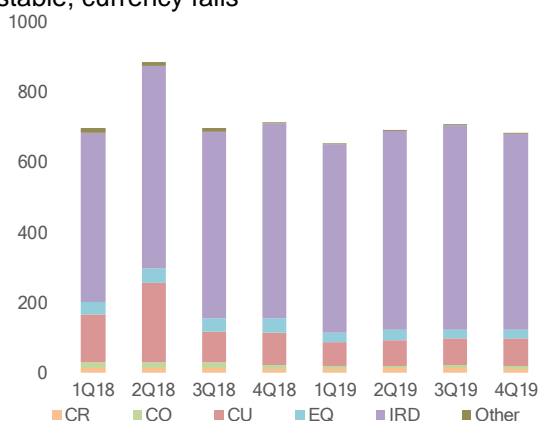
Key trends in European derivatives markets in 2019 included: a 5% decrease in the total notional amount of the overall market size, from EUR 715tn in 4Q18 to EUR 681tn in 4Q19. Strong growth in central clearing rates for both IRDs and credit derivatives, from 63% to 69% for IRDs; and from 25% to 32% for credit derivatives. Underlying this was growth in the clearing rates for the specific products subject to the clearing obligation. The proportion of ETD contracts over all assets fell to 8% in 4Q19 from 10% a year earlier, driven by falls in ETD contracts in IRDs and equities. However, the proportion of notional associated with contracts executed on trading venues (ETD and some OTC) remained broadly stable for IRDs, currencies and credit derivatives throughout 2019. Interconnectedness was largely unchanged across asset classes during 2019, but remained high. Finally, there was a relative increase in the share of long maturities to short maturities for IRDs and commodities.

## Market size generally stable in 2019

In terms of size of the EU derivatives market, the data on the **overall notional amount outstanding** show a fall in 1Q19 followed by generally stable notional amounts (ASRD.29). The total notional amount dropped to EUR 681tn by 4Q19, down from about EUR 715tn in 4Q18 (a 5% fall). The peak size in 2019 was EUR 706tn in 3Q19, driven by the IRD market also peaking in size in that quarter.

ASRD.29

Total notional amounts outstanding by asset class  
During 2019 IRD notional amounts relatively stable, currency falls



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

From 4Q18 to 4Q19, **interest rate** derivative notional amount barely changed, standing at EUR 557tn in both 4Q18 and 4Q19. During 2019, the market was at its lowest size in 1Q, EUR 537tn, before increasing to EUR 581tn by 3Q, largely due to increasing notional amounts in interest rate swaps, before falling down again in 4Q (ASRD-S.21).

**Currency** derivative notional amounts fell over 2018, from EUR 93tn in 4Q18 to EUR 78tn in 4Q19 (a 15% decrease year-on-year). The fall

occurred in early 2019, with the currency derivative market size reaching its lowest level of EUR 68tn in 1Q19. This was associated largely with a fall in currency forwards that occurred between 4Q18 and 1Q19 (ASRD-S.58). After 1Q19 the currency market then grew, as forwards notional amounts increased through the rest of the year.

**Equity** derivatives fell sharply, from EUR 40tn in 4Q18 to EUR 26tn in 4Q19 (a 35% decrease). The drop in equities largely occurred at the beginning of 2019, with the notional amount already dropping to EUR 27tn in 1Q19, as a result of a sharp fall in the notional amounts in options. The fall in equities overall was later compounded by a fall in equity futures from 2Q19 to 3Q19. (ASRD-S.45)

**Credit** notional amounts finished 2019 at a lower level than 4Q18, at EUR 12tn, a decrease of about EUR 1tn year-on-year (7% decrease), with higher levels observed in the intervening quarters. CDSs continued to account for most of the credit derivative notional amounts and to drive the trends in credit derivatives (ASRD-S.33). CDS are discussed in more detail in the dedicated article at the end of this report, which constructs and presents CDS statistics from EMIR data.

**Commodity** derivative notional amounts fell significantly, from EUR 11tn in 4Q18 to about EUR 7tn in 4Q19. This large 37% fall was driven by significant falls in commodity swap and options notional amounts from 4Q18 to 1Q19, down by EUR 2tn and EUR 1.5tn respectively (ASRD-S.69).

Looking at the number of **transactions by asset class**, these fell in early 2019, continuing the falls observed in late 2018 before recovering, to finish slightly up in 4Q19 (ASRD.30). Overall, numbers of contracts increased by 3% from 4Q18 to 4Q19.

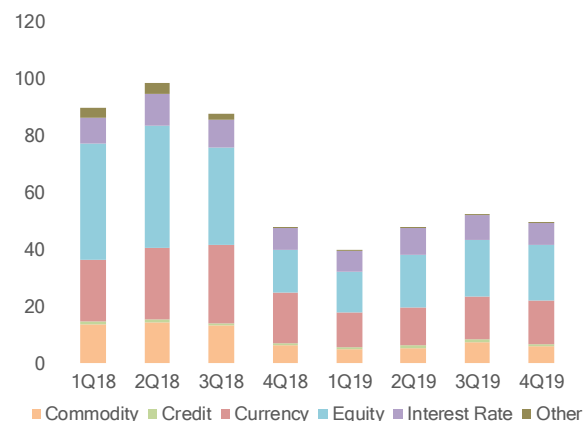


Underlying the changes were some more substantive changes in certain asset classes (equities +32pps, currency -14pps, commodities -5pps, credit -3pps and IRDs -2pps). Overall, the net year-on-year increase in the number of contracts was driven by significant and consistent growth in equity CFDs through 2019, which more than doubled from 4Q18 to 4Q19.

#### ASRD.30

Total number of trades outstanding

Currency and equity derivatives most numerous

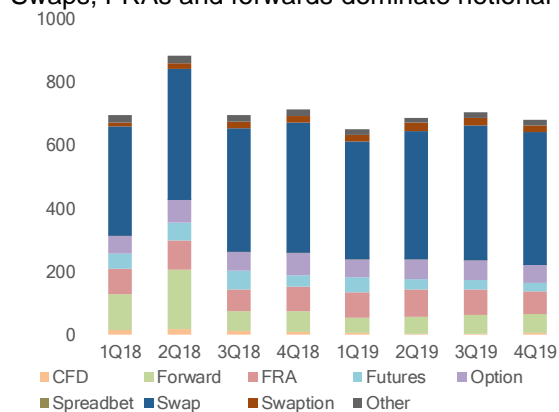


Note: Total number of outstanding transactions by asset class in millions.  
Sources: TRs, ESMA.

Looking at **contract types** more broadly, notional amounts across most contract types remained largely stable, with a few notable exceptions. Equity and interest rate futures (down EUR 4tn and EUR 5tn respectively from 4Q18), equity options (down EUR 10tn) and commodity swaps (down EUR 2tn) all fell significantly in 2019. In addition, there was a fall in swaps between 4Q18 and 1Q19 and a subsequent recovery in 2Q19; both changes were driven by IRD swaps (ASRD.31).

#### ASRD.31

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



Note: Total notional outstanding in trillions by product type.  
Sources: TRs, ESMA

Swaps continued to account for by far the most notional amount throughout 2019, reflecting their dominance in IRDs. The second asset class by notional amount throughout 2018 and 2019 was forwards, including FRAs, given the significance of FRAs in IRDs and forwards in currency derivatives.

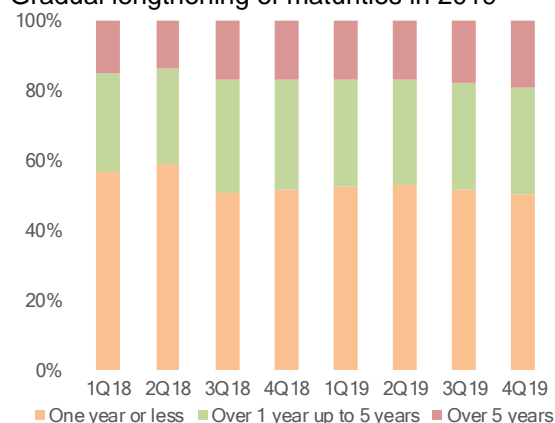
#### Maturities gradually lengthening

The **remaining maturity** of contracts lengthened gradually through 2019 (ASRD.32). Notional amounts in contracts with a remaining maturity of one year or less fell slightly from 52% in 4Q18 to 50% in 4Q19. The proportion of the one-to-five year category was unchanged at about 31% over the year, while the over 5-year maturity grew from 17% in 4Q18 to 19% in 4Q19. Overall, the distribution shows a gradual lengthening of the maturity of contracts through 2019.

## ASRD.32

Total notional amount by maturity

## Gradual lengthening of maturities in 2019



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 an increase in maturities in IRDs over 2019 (ASRD-S.24).

Other asset classes, with the exception of commodities, tended not to show a clear trend to shorter or longer maturities over 2019 (ASRD-S.36, ASRD-S.48, ASRD-S.60). For commodities there was more a pronounced trend to longer maturities over 2019, continuing a trend seen over 2018 (ASRD-S.72). In particular, for commodities there was growth in the share of notional amount in contracts with maturity over one year, and a corresponding fall in the proportion with a maturity of less than one year.

## ASRD.33

CFD trends in 2018 and 2019

## Steep fall in CFDs in second half of 2018

The removal of the over-reporting entity in 2018 presents an opportunity to look again at the trends on CFDs, as this over-reporting obscured the picture of CFDs in our report last year.

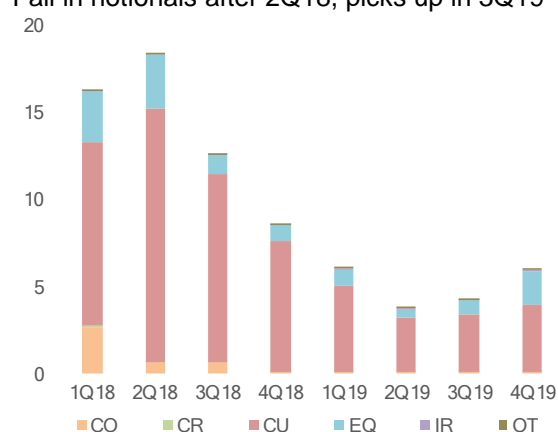
ASRD.34 presents CFD notional amounts by asset class and shows a sharp fall in notional amounts after 2Q18, absent in last year's report. Between 2Q18 and 4Q18, total notional amounts in CFDs fell by around EUR 10tn, amounting to a 54% drop in notional amount from the peak in 2Q18, most of the fall was due to fall in currency CFDs, though equity and commodity CFDs also fell.

There was an even more dramatic reduction in the number of CFD trades outstanding (ASRD.35). Here we see that the number of CFDs fell by 70% from 2Q18 to 4Q18. Here the fall in equity CFDs accounted for most of the drop, followed by currency and then commodities.

## ASRD.34

CFD notional amounts by asset class 2018-19

## Fall in notionals after 2Q18, picks up in 3Q19



Note: Notional amount by asset in CFDs in EUR trillions.  
Sources: TRs, ESMA

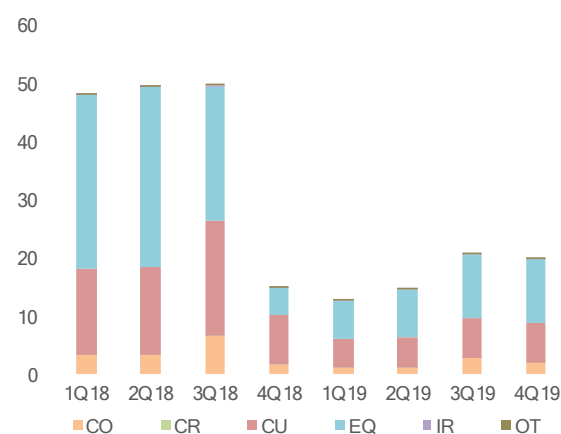
The time of the fall in CFDs aligns with the introduction of ESMA product intervention measures in August 2018 that aimed to restrict the sale of CFDs to retail investors.

The dramatic falls here in CFD market size are suggestive, if not conclusive, that the intervention measures may have helped to reduced sales of CFDs. Other products not in scope did not show similar sharp falls. That said, some caution is required as the drop in CFDs in 4Q18 may in part reflect a reporting correction by a TR discussed in last year's report. This is because the change in number of contracts is partly associated with the TR for which over-reporting was identified and cleaned in 1Q18 and 2Q18.<sup>26</sup>

## ASRD.35

CFD numbers of trades by asset class 2018-19

## Step decrease after 3Q18



Note: Number of CFD trade positions by asset in millions.  
Sources: TRs, ESMA

Looking at 2019, we observe a pattern that is quite different from 2018. After some falls in notional and numbers early in the year, there were subsequent increases in CFDs, particularly for equity CFDs, where

<sup>26</sup> See the Annual Statistical Report EU Derivatives Markets 2019.

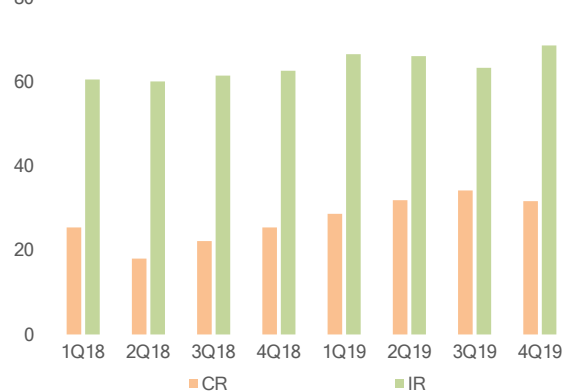
from 4Q18 to 4Q19, notional and trade numbers more than doubled (both increasing by about 130%) and for commodity CFDs, where notional amounts doubled and number of trades increased by 30%. In contrast, currency CFDs fell year-on-year (notional amounts down 50% and trade numbers down 22%). A related concern are developments in the spreadbets, which are very similar products to CFDs, which, although still very small, also increased very strongly in 2019 for equities.

## Over-the-counter central clearing: grew strongly in 2019

In this section we analyse **central clearing trends** during 2019. As in previous reports, the focus is on IRDs and credit derivatives, as these are the two asset classes with products subject to the clearing obligation.

The proportion of the notional amount of outstanding OTC transactions that was cleared grew markedly for both IRDs and credit, from 63% in 4Q18 to 69% in 4Q19 for IRDs, and from 25% in 4Q18 to 32% in 4Q19 for credit. (ASRD.36)

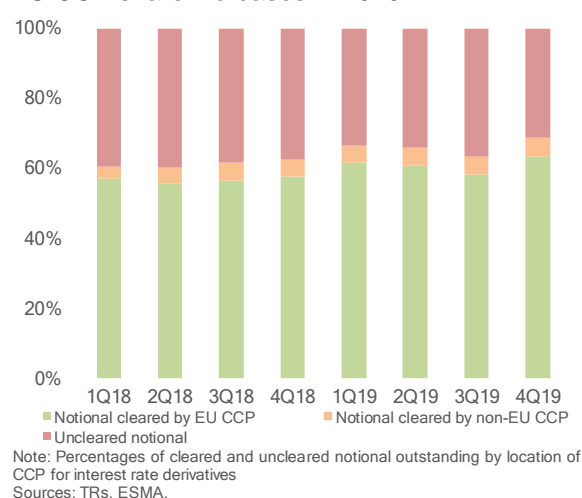
ASRD.36  
Central clearing – credit and interest rate derivatives  
Growth in rates during 2019 for IRDs and CRs



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

For **interest rate derivatives** the increase in central clearing ratio was due to a fall in the amount of uncleared notional (down by a quarter from 4Q18), while the amount of cleared notional remained stable. As in 2018, in 2019 central clearing was carried out mostly by CCPs in the EU, with the share cleared in the EU increasing from 58% in 4Q18 to 63% in 4Q19. On average 5% of the total notional amount outstanding was cleared by CCPs located in a third country, with the remainder of outstanding IRD notional uncleared (ASRD.37).

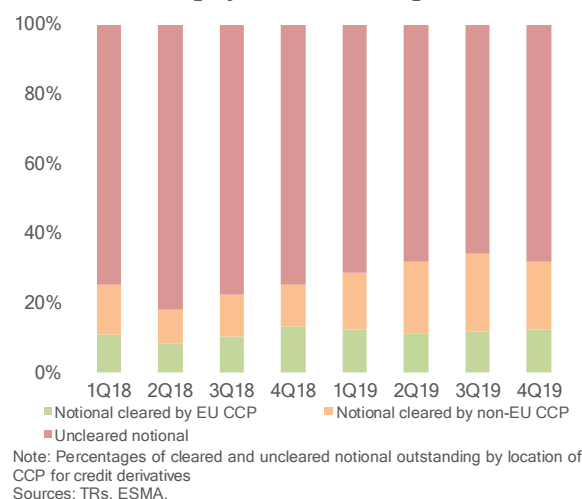
ASRD.37  
Interest rate derivatives clearing by CCP location  
EU CCP share increases in 2019



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

For **credit derivatives** the proportion of total notional amount cleared by EU CCPs was broadly stable during 2019 at around 12%, down slightly on 4Q18 (13%). The proportion of notional amount cleared in third country CCPs grew reaching 19% in 4Q19, up 7pps (ASRD.38). Thus, the increasing clearing rate of credit derivatives was, unlike IRDs, associated with an increasing clearing share in third-country CCPs.

ASRD.38  
Credit derivatives clearing by CCP location  
Share of clearing by non-EU CCPs grew in 2019



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

Commodities also had higher clearing rates in 2019, continuing the increase trend in clearing rates observed at the end of 2018. Central clearing rates in commodities finished 2019 just under 10% (ASRD-S.68).

In other asset classes, as in 2017 and in 2018, central clearing in OTC markets remained very limited in 2019. For equities clearing rates ranged from between 1% to 1.7%, while for currencies

they were around 1.5% throughout the year (see ASRD-S.44 and ASRD-S.56).

Next, we dig deeper and present notional amounts cleared and clearing rates by quarter for specific products subject to the clearing obligation.<sup>27</sup> It should be noted 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.<sup>28</sup>

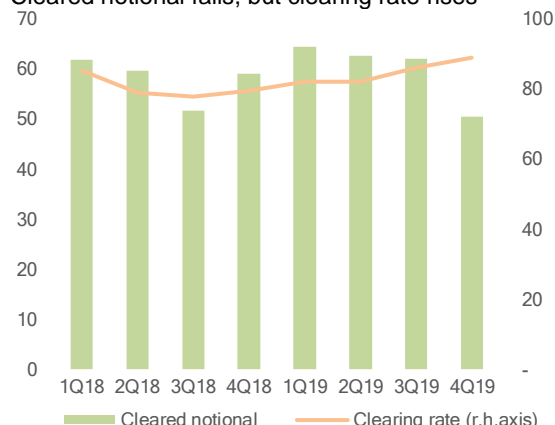
For **OTC interest rate derivatives** classes denominated in the G4 currencies (USD, EUR, GBP and JPY) the quarterly clearing rate for new contracts grew steadily in 2019, increasing from 80% in 4Q18 to 89% in 4Q19 (ASRD.39).

Behind the growth in the clearing rate were falls in both cleared and uncleared notional, with uncleared notional amounts falling more significantly than cleared amounts (in 4Q19 the uncleared notional amount was down 59% from 4Q18, compared to a 14% fall in cleared notional amounts).

#### ASRD.39

IRDs in G4 currencies

Cleared notional falls, but clearing rate rises



Note: Total cleared notional outstanding in EUR trillions and clearing rate of interest rate derivatives in G4 currencies.  
Sources: TRs, ESMA.

Clearing rates for OTC interest rate derivatives classes denominated in NOK, PLN and SEK also grew significantly. In 2019, clearing rates rose

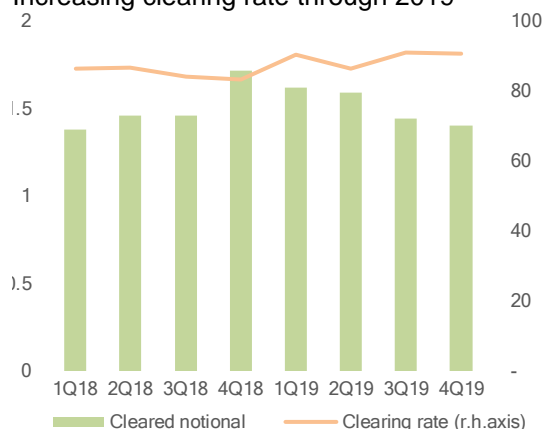
from 83% in 4Q18 to 91% in 4Q19, continuing the growth trend observed from mid-2018 (ASRD.40).

Year-on-year changes in cleared and uncleared notionals were similar to IRDs in G4 currencies, with uncleared notional amounts falling 59% from 4Q18, and cleared notional amounts falling by 18%. Thus, for all IRDs subject to the clearing obligation, the clearing rate grew strongly in 2019, driven by larger falls in uncleared notional amounts than in cleared.

#### ASRD.40

IRDs in NOK, PLN and SEK

Increasing clearing rate through 2019



Note: Total cleared notional outstanding in EUR trillions and clearing rate of interest rate derivatives in NOK, SEK and PLN.  
Sources: TRs, ESMA.

In 2019 credit derivative clearing rates and cleared notional amounts for **CDSs on European indices** were less volatile than in 2018 (ASRD.41).<sup>29</sup>

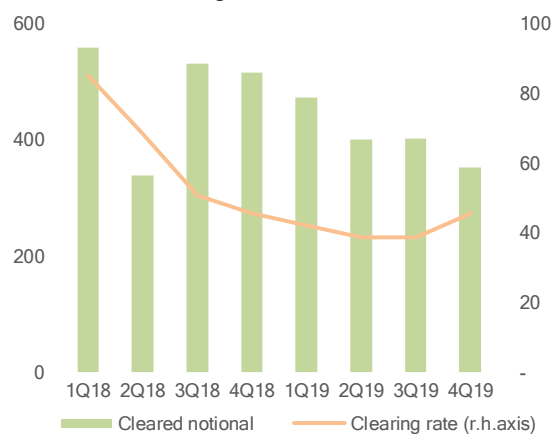
<sup>27</sup> Note that because of data limitations, we identify the instrument but not the counterparties here. This means in some cases the transaction would not be subject to the clearing obligation (e.g. for an NFC or a FC below the clearing thresholds). For an overview of the clearing obligation and risk-mitigation techniques under EMIR see: <https://www.esma.europa.eu/regulation/post-trading/otcderivatives-and-clearing-obligation>.

<sup>28</sup> For example, for the 1Q18 reference date (23 March 2018), we consider only contracts outstanding at that date that were executed after 1 January 2018 (to construct a starting point). For dates after 23 March 2018, we consider only contracts executed after the previous

reference date to avoid double counting trades. There is also some survival bias because contracts that matured before a reference date are not reported in our data for that date. This bias will decrease for trades executed closer to the reference date, because a smaller proportion of these will have matured or been closed and so been omitted from the data. Note also that there are a couple of weeks at the end of December 2018, between our 4Q18 and 1 January 2019 that are not captured in the charts.

<sup>29</sup> 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>)

## ASRD.41

Clearing trends for CDS on Indices  
Increased clearing rate in late 2019

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

Quarterly clearing rates changed little over the year from 45% in 4Q18 to 46% in 4Q19. Amounts for both cleared and uncleared notional fell at the end of the year (both down by 32% from 4Q18), in line with the more general fall in credit derivative notional amounts at that time.

## ASRD.42

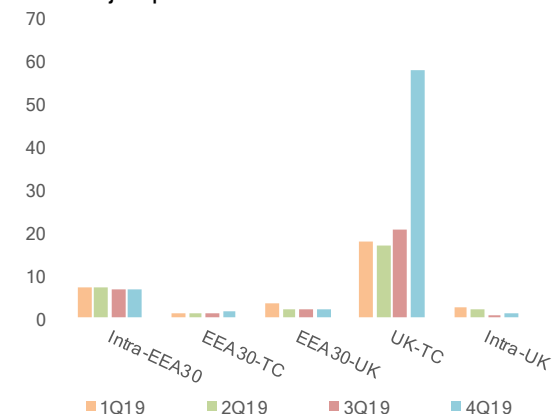
## Intragroup geographical exposures for products subject to the clearing obligation

## Sharp jump in UK-US exposures in 4Q19

The geographical intragroup exposures of IRDs and credit derivatives subject to the clearing obligation by and large maintained similar patterns to those presented in our 2018 report with one important difference.

In 4Q19 we see a sharp jump in intragroup exposures for IRDs contracts subject to the clearing obligation. ASRD.43 presents the jump for IRDs denominated in the G4 currencies (EUR, USD, GBP and JPY).

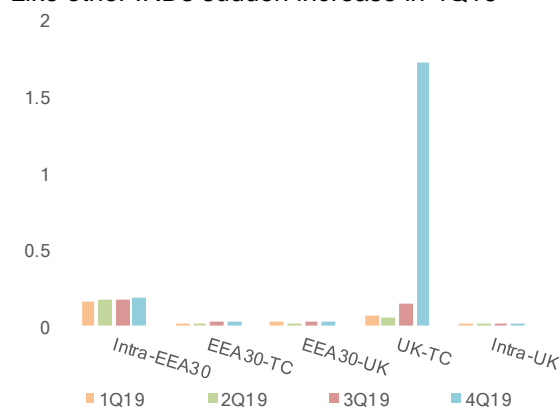
## ASRD.43

IRD in G4 currencies intragroup exposures in 2019  
Sudden jump in 4Q19

Note: Total notional amounts for interest rate derivatives in G4 currencies (EUR, USD, GBP, JPY) outstanding by zone of both counterparties, in EUR trillions. TC denotes third-country (non-EEA30 and non-UK).

The chart shows a sharp jump in UK-third country exposures (almost all US), from EUR 20tn to EUR 60tn between 3Q19 and 4Q19. A similar jump is visible for IRDs in NOK, SEK and PLN, which increased from EUR 140bn to EUR 1.7tn, as shown in ASRD.44.

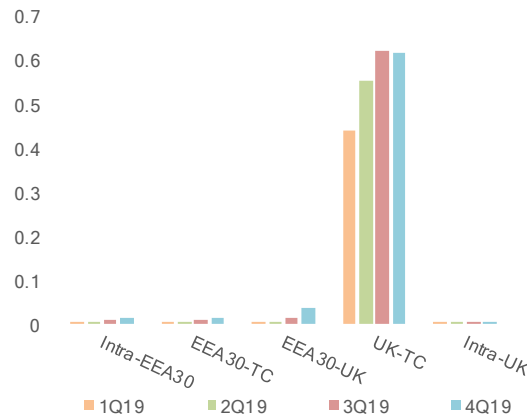
## ASRD.44

IRD in NOK, SEK and PLN intragroup exposures  
Like other IRDs sudden increase in 4Q19

Note: Total notional amounts outstanding for interest rate derivatives in NOK, SEK and PLN by zone of both counterparties, in EUR trillions. TC denotes third-country (non-EEA30 and not UK).  
Sources: TRs, ESMA.

In contrast CDS on European indices did not show a similar pattern (ASRD.45), although UK to third country exposures dominated other exposures strongly throughout 2019.

## ASRD.45

CDS in European indices intra-group exposures  
No sudden increase in 4Q19

Note: Total notional amounts outstanding by zone of both counterparties, in EUR tn. TC refers to third-country (non-EEA30 and non-UK).  
Sources: TRs, ESMA.

To explore this further we looked at the trade reports at counterparty level and identified that the sharp increase in trades were driven from the positions taken by one major financial institution, making it unlikely to indicate a systematic effect on the market. This analysis also did not find evidence to suggest the jump resulted from poor-quality data reporting. Instead the evidence, including the fact that the jump is seen for both types of IRDs subject to the clearing obligation, suggested the reported positions were accurate.

Without information beyond that available from EMIR data, it is not possible to assess what incentivised the large increases in these positions by the firm. It may be that the increases were related to uncertainty on the

United Kingdom's exit from the EU, as the withdrawal agreement had not yet been ratified at that time. Also, our 4Q19 reference date (13 December 2019) fell one day after the 2019 UK general election and the EU announcement of a one-year extension of derivative clearing by UK-based CCPs.<sup>30</sup> So, the reference date comes too early to capture the effects of these in reducing uncertainty. Therefore, the large jump could reflect effects of the firm in question preparing for the UK's exit, including managing the risk of an exit in January 2020 without the withdrawal agreement having been agreed.

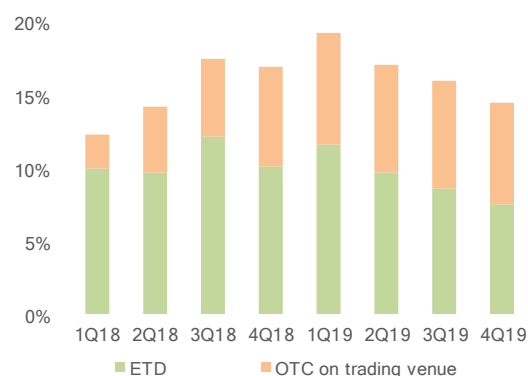
However, this is speculative based on the timing of the increase and the fact that the position fell back down in 1Q20 after the uncertainty had dissipated. More analysis would be needed to assess what drove the jump. This, however, would require data beyond that collected under EMIR and is outside the scope of the report.

## Execution: ETD share fell, OTC on trading venue grew

In 2019 the overall proportion of notional amount outstanding in ETDs fell from 10% in 4Q18 to 8% in 4Q19, peaking at 11% in 1Q19 (ASRD.46).

### ASRD.46

Trading venue proportions split by ETDs and OTC  
**More derivatives traded on trading venues**  
25%



Note: ETD, OTC trading venue and other OTC share of outstanding notional  
Sources: TRs, ISO, ESMA.

At asset level, the proportion of notional amounts in ETDs fell in equities (from 61% in 4Q18 to 42% in 4Q19), but grew in commodities (54% in 4Q18, 62% in 4Q19). It decreased very slightly in IRDs (from 8% in 4Q18 to 7% in 4Q19) and remained stable in credit (4% in both 4Q18 and 4Q19). As in 2018, the proportion of notional amounts in ETDs in currency remained low at under 1% throughout.

In terms of instrument types, almost EUR 20tn of the EUR 30tn fall in ETD notional amount outstanding from 4Q18 to 4Q19 resulted from reductions in ETD contracts in interest rate futures (EUR -5tn), equity futures (EUR -4tn) and equity options (EUR -10tn). In commodities the ETD notional amount also fell (EUR -2tn) mainly due to a EUR 1tn fall in exchanged-traded commodity options. However, the share of exchange traded contracts grew in commodities because of a larger fall in OTC contracts, mainly from a sizeable fall in commodity swap notional amounts (EUR -2tn).

Looking at the broader category of contracts executed on trading venues, which includes OTC contracts executed MTF and OTF in addition to ETDs, then the proportion of the notional amount **executed on trading venues** fell slightly over 2019, after the growth observed in 2018. The proportion of notional amount executed on trading venues fell from 17% in 4Q18 to 15% in 4Q19 (ASRD.39). The fall was driven by the fall in exchange traded derivatives in IRDs, which drove a fall in on-trading venue notional amounts in IRDs from 15% in 4Q18 to 14% in 4Q19. However, at the same time, on-trading venue IRD OTC swaps increased over the year (EUR 5tn). There was growth in the share of contracts executed on trading venues for currencies, from 10% to 11%, driven by a relatively large fall in non-trading venue contracts, while for credit the share on-trading-venue was broadly flat year-on-year starting and finishing on 7%.

Looking purely at trends in the notional amounts outstanding for OTC-on-trading venue, we observe increases over 2019 for both currencies and IRDs (both up 1pp), while for credit there was minimal net change over the year (ASRD.47).

<sup>30</sup> See Financial Times, 'EU confirms one-year Brexit reprieve for derivatives industry' December 13 2019,

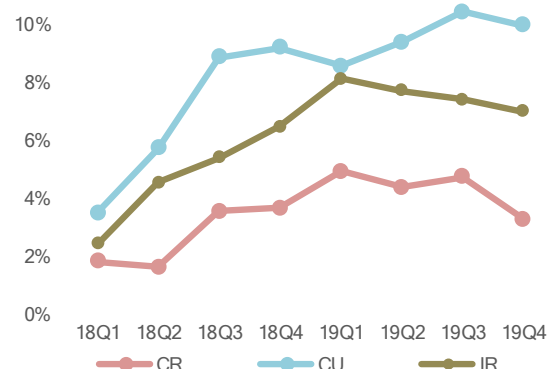
available at: <https://www.ft.com/content/40bf76ae-1c9f-11ea-97df-cc63de1d73f4>.



## ASRD.47

Proportion of notional amount that is OTC on trading venue

Growth in OTC on trading venue for CR and IR  
12%



Note: Proportions of total notional amount that is OTC on trading venue (MTF or OTF) by asset class, EQ and CO omitted as shares are negligible.  
Sources: TRs, ISO, ESMA.

## Concentration: mixed changes in 2019 across assets

Looking at **concentration**, we see growth in counterparty numbers from 4Q18 to 4Q19 for equities (+10%), interest rates derivatives (+5%) and commodities (+1%). In contrast, counterparty numbers fell for currency and credit derivatives, with a 4% decrease in both (see ASRD-S.22, ASRD-S.34, ASRD-S.46, ASRD-S.58, ASRD-S.70). In 4Q19 counterparty numbers ranged from about 4,000 for credit derivatives to just under 90,000 for IRDs.

Looking at the HHI and top five metrics, we see a **fall in concentration for commodities** over 2019 (ASRD-S.77), 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 fell from 42% in 4Q18 to 30% in 4Q19, while over the same period the HHI fell from 0.07 to 0.04. This continued the trend for falling concentration seen in 2018.

There were falls also in the concentration for equities. From 4Q18 to 4Q19, the top 5 metric for equities fell from 39% to 36% and the HHI fell from 0.04 to 0.03. For currencies the top 5 metric grew slightly from 38% to 39%, while the HHI remained stable at 0.03. In both market segments concentration remained low. In credit changes in concentration were limited, HHI was 0.06 in 4Q19 unchanged from a year earlier, while the top 5 metric was 51% in 4Q19, up 4pps from 4Q18.

As in 2018, the most concentrated market continued to be interest-rate derivatives (HHI 0.18 in 4Q19, up from 0.17 in 4Q18). The top 5

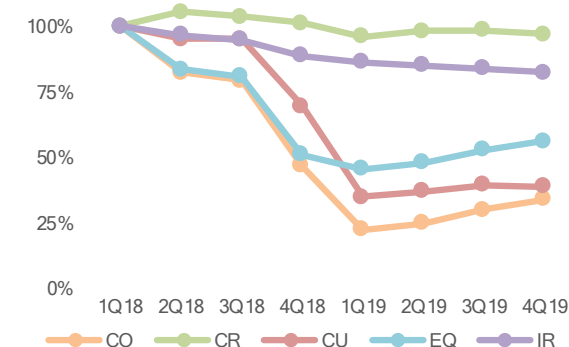
metric (including CCPs) rose from 61% in 4Q18 to 65% in 4Q19). Concentration measures fall significantly if CCPs are excluded. This highlights just how much of the concentration in the IRD segment results from central clearing and the corresponding large positions by CCPs.

## Interconnectedness: falls in currencies and commodities in early 2019

Regarding **interconnectedness trends**, we look first at the trends in the average connections per counterparty for reporting counterparties. The chart below (ASRD.48) indexed at 100% at 1Q18, shows significant falls for both currency and commodity derivatives in 1Q19, before it levelled over the rest of 2019. The average connections per counterparties for commodities fell by 28% from 4Q18 to 4Q19, and by 44% for currencies. These falls were also similar to those observed in 2018, which we suspected in the last report were due to the removal of over-reported trades in 4Q18 by the affected TR.

## ASRD.48

Average connections per counterparty  
Falls over 2019 except for equities  
125%



Note: Average connections per counterparty by asset as percentage of 1Q18 value.  
Sources: TRs, ESMA.

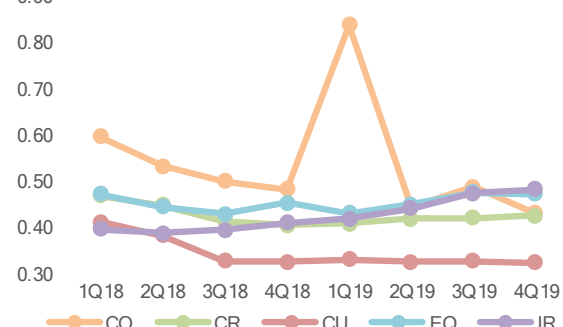
In other asset classes trends were flatter, the average number of connections for equities was unchanged between 4Q18 and 4Q19, that for credit derivatives fell by 4%, while for interest rate derivatives it fell by 7%.

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 rose slightly from 4Q18 to 4Q19 for IRDs, equities and credit and fell slightly for currencies and commodities. There was also a sharp but temporary jump in commodities in 1Q19 (ASRD.49).

#### ASRD.49

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



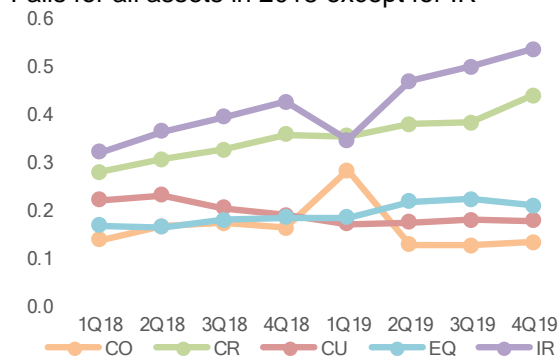
Note: Eigenvector interconnectedness indicator by asset. This measures a participant's influence based on the number of links it has to other participants within the network and takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).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

The increase in connectedness for commodities is also reflected in a simpler metric, degree connectedness, which measures connectedness of each participant based on how many connections it has with other counterparties.

Here we again see the jump in commodities, indicating that a few (or one) participants temporarily increased the number of trade positions it had with other counterparties (ASRD.50). With the exception of IRDs, where there was a dip in 1Q19, trends for degree connectedness were similar to those for eigenvector connectedness.

#### ASRD.50

Degree interconnectedness by asset  
Falls for all assets in 2018 except for IR



Note: Degree interconnectedness indicator by asset. This measures a participant's influence based on the number of links it has to other participants within the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).  
Sources: TRs, ESMA.

The connectedness charts for IRDs and credit thus present a mixed picture, average connectedness fell over 2019 for IRDs and credit, while both eigenvector and degree connectedness are increasing. This may be indicative of increasing clearing ratios, as fewer connections overall as bilateral OTC connections were replaced by fewer CCP connections, but with greater concentration of those connections to a few CCPs, leading to increased degree and eigenvector connectedness.

## Summary

Some of the key trends from 4Q18 to 4Q19 by asset class were as follows.

- **Interest-rate derivatives:** the outstanding notional amount of IRDs remained unchanged over the year, at EUR 557tn in both 4Q18 and 4Q19, while the number of transactions fell by 3%. Clearing rates grew from 63% in 4Q18 to 69% in 4Q19. Over the same period, the notional amount of IRD contracts executed on trading venues (ETD and OTC) fell from 15% to 14% of all the outstanding notional amount, despite an increase in on-venue OTC swaps which was overcompensated by a more substantive fall in interest rate futures (which are ETD) in 2019.
- **Credit derivatives:** notional amounts fell in size by 7%, driven by CDSs, the dominant instrument. Clearing rates grew strongly for credit in 2019, reaching 32% by the end of 2019, from 25% at the end of 2018. ETD notional amounts outstanding also grew before falling in 4Q, finishing 2019 at 10%, 1pp down from a year earlier. OTC contracts



executed on trading venues fell slightly from 4% to 3% of the notional amount.

- **Equity derivatives:** Notional amounts for equity derivatives decreased steeply, falling by 35% between 4Q18 and 4Q19. Most of this drop occurred between 4Q18 and 1Q19, driven by a steep fall in notional amounts for equity futures and options. In contrast, notional amounts and trade numbers grew for equity CFDs. Trading venue notional amounts, almost entirely ETDs, also fell over the year, from 61% to 42% of the outstanding notional amount, a fall almost entirely attributable to falls in futures and options.
- **Currency derivatives:** Currency derivatives experienced a fall of 15% in notional amount over the year, associated with falls in reported in currency CFDs between 4Q18 and 1Q19,

continuing the trend seen during 2018. The trading venue notional amount, largely OTC, continued its 2018 growth, albeit more slowly, increasing from 10% to 11% of the total amount over the year.

- **Commodity derivatives:** Commodities notional amounts fell sharply between 4Q18 and 1Q19. This was associated with falls in outstanding swaps and options notional amounts. Overall, the notional amount outstanding fell by 37% from 4Q18 to 4Q19. The share of ETD grew from 54% in 4Q18 to 62% by 4Q19, the increase in ETD was driven by the fall in the notional amount of non-ETD contracts, mainly in swaps, rather than an increase in ETD notional amounts.

# Statistical methods

# Progress on EMIR data quality

EMIR data are vast and contain detailed information about European derivatives markets. The data are based on reports from EEA counterparties that are provided to trade repositories (TRs), which in turn report to ESMA. The RTS and ITS implemented in November 2017, which relate to data reporting under EMIR, continue to contribute significantly to improved data usability and quality. ESMA also identified one case of data over-reporting which was investigated and addressed. This change improved the 2018 and 2019 data used in this report.

## Introduction

In the previous year's report, we provided an extensive overview of the main steps that we undertook to prepare the data for the report.<sup>31</sup> In the same spirit, this year's methodological section provides a short overview about the methodology employed and data-quality-enhancing measures taken by ESMA and the national competent authorities (NCAs). We continue to see an increase of data quality which has facilitated the production of this report. This is linked to the new data reporting EMIR RTS and ITS that came into force in November 2017. The second part of this article provides descriptive statistics related to the data cleaning and correction measures taken.

## EMIR data overview

This report is based on data reported under Article 9 of EMIR. Article 9 requires all counterparties concluding derivatives transactions located in the EEA<sup>32</sup> to report their trade (double-sided reporting regime). 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,<sup>33</sup> to the relevant authorities. These authorities include the European supervisory authorities, NCAs and

central banks. Like last year, we used data coming from all TRs that were registered in 2019.<sup>34</sup> Noteworthy here is that Bloomberg TR was deregistered on the 31st 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 reports.<sup>35</sup>

The three main types of EMIR reports provided by TRs to the 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). For trade-state data (also referred to as stock data), the trade-activity messages are applied to each outstanding transaction. Hence, these data show a snapshot with the latest information on each individual derivatives contract. The third type of report, position data, provides the information on outstanding derivatives between two counterparties at an instrument level.<sup>36</sup>

To be consistent with previous editions of the report, we use trade state data because we aim to quantify European market as a whole at a given point in time. Hence, we capture all open transactions within the EEA, but also observe transactions that go outside of the EEA to a third

<sup>31</sup> Previous editions of the report are available here: <https://www.esma.europa.eu/market-analysis/financial-stability>

<sup>32</sup> This also includes the AIFs that are managed by AIFM authorised or registered under Directive 2011/61/EU

<sup>33</sup> Please compare articles 18 and 20 of <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R0150>.

<sup>34</sup> For an updated list of registered TRs see <https://www.esma.europa.eu/document/list-registered-trade-repositories>.

<sup>35</sup> TRACE is the Access to Trade Repositories System. ESMA's TRACE provides a single point of access to trade repository data for authorities.

<sup>36</sup> 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](https://www.esma.europa.eu/sites/default/files/library/esma70-151-1272_guidelines_on_position_calculation_by_trade_repositories_under_emir_final_report.pdf)

country. 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 are based on the following four months: March, June, September and December (2019). The number of records, after the rigorous cleaning exercise explained below, ranges from 54mn to 70mn per quarter and totals 255mn, aggregated over the four quarterly dates of this report.

Concerning the overall data quality, we continue to see improvements in the reporting consistency of data fields for this report. In particular the changes in the reporting of counterparties to TRs introduced with the new RTS and ITS in November 2017 have helped the data preparation process because the fields specifying the asset class and contract type have become more consistently reported. This has also made previous proprietary identification techniques obsolete.

Despite these data quality improvements, however, we identified another case of a counterparty over-reporting to a TR. This required further attention, as discussed in the box below.

#### ASRD.51

Increase in records in one TR in 2019

#### Coordinated actions to improve data quality

ESMA noticed in 2019 that the market share of one TR had risen drastically, with its number of records increasing threefold. From an initial analysis it became clear that the increase in records was due to one counterparty, mainly trading CFDs.

While ESMA is normally able to verify derivative transactions thanks to the double reporting, by comparing reports with those of the other entity, this was not possible here. CFDs are typically traded by retail traders, who are not subject to the dual-sided reporting requirements. Extending the investigation, it became evident that the entity had not closed transactions in the EMIR data even though the CFDs were concluded leading to the increase in records.

Therefore, a supervisory action together with the NCA was performed to solve the overreporting issue. This resulted in improved data covering both 2018 and 2019, which have been used in this report.

## Results and statistics from the 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 this year a multi-step data preparation procedure. The **outlier removal** exercise is the first step. As expected, it reduced the notional amount very significantly, down to EUR 3,904tn while keeping 99.842% of the records (ASRD.52). The total notional amount at this stage of cleaning is slightly lower than in 2018, where we observed EUR 4,297tn after outlier removal for our quarterly dates.

#### ASRD.52

Cleaning and reconciliation results

#### EMIR data need complex cleaning steps

	Raw	Outliers removed	Double reporting removed	Expired trades removed
Commodity	991,089	44	30	30
Credit	247	67	51	51
Currency	1,936	391	299	296
Equity	436,449	163	108	108
Interest rate	12,779	3,234	2,242	2,242
Other	10	6	4	4
<b>Total</b>	<b>1,442,511</b>	<b>3,904</b>	<b>2,733</b>	<b>2,730</b>

Note: Total notional amounts in EUR trillion, aggregated over the four quarters. '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; 'Expired trades removed' indicates the total notional amount after expired trades removed. As the totals in this table aggregate the four quarters in 2019, 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 take 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. As a large proportion of derivative transactions are conducted between EEA 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 2,733tn.

Interestingly, the relatively large notional amount removed at this step also indicates how much is traded among EEA counterparties relative to the other categories. Like last year we can observe that currency and credit derivatives, for which less of the notional amount is removed at this step, are traded the most with counterparties in third countries (e.g. U.S. or Japan). On the other side, equity, commodity and "other" derivatives, for which more of the notional amount is removed, are traded more within the EEA and less with third countries.

In the final step trades that had expired were removed. The impact here was minimal, hardly any records were removed (0.09% of the sample) and only a relatively small notional amount (EUR 3tn) was removed.

## 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 (ASRD.53).

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### ASRD.53

EMIR data quality peer review in 2019

#### Improving data supervision

In 2018 the Board of Supervisors (BoS) decided, within their annual planning for the Supervisory Convergence Work Programme, to conduct a peer review into the data quality supervision of EMIR data. As part of this, the BoS highlighted the importance of EMIR data within the EU, as these play a pivotal role for identifying risks in financial markets and provides the public with valuable insights into the structure of derivatives markets.

The focus of the peer review, which covered the period between January 2017 and December 2018, was two-fold: data quality supervision of counterparties and of TRs. While the supervision of the counterparties is conducted by national competent authorities (NCAs) the supervision of TRs is performed by ESMA. Hence six NCAs (AFM, AMF, BaFin, CBol, CySEC, FCA) and ESMA underwent a detailed assessment which consisted of a self-assessment questionnaire, a detailed evaluation of related policies and procedures and on-site visits. During the on-site visits additional stakeholders (e.g. employees from central banks and counterparties) were interviewed.

The review delivered mixed results. The majority of NCAs had a supervisory approach on EMIR data quality in place. However, two NCAs lagged behind when it came to integrating EMIR data quality controls into their overall supervisory approach, which negatively impacted the NCAs' ability to access, assess and analyse EMIR data.

The review also identified good supervisory practices by the six authorities. The review concluded that these good practices should be considered by all NCAs and, where appropriate, incorporated into existing supervisory approaches. ESMA has also put forward several initiatives to improve the supervision of EMIR's data quality in the short and long-term.

Short-term initiatives include revising NCAs' annual Data Quality Review exercises, identifying how NCAs can regularly use the data as part of their overall supervisory approach and a stronger senior management oversight.

In the long-term, training for the NCA staff will be provided along with a supervisory briefing on overseeing and enforcing data quality. In addition, NCAs and ESMA will discuss and share tools to analyse data quality. The delegation of certain EMIR data processing tasks to ESMA in the form of a delegated project is also being considered. Overall, measures should increase the EMIR data quality substantially and potentially improve other regulatory data sets. It further highlights the importance of such peer reviews.<sup>37</sup>

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The review found room for improvement at NCAs and set out good practices to enhance data quality supervision.

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.

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<sup>37</sup> More details are available in the public report. Please see: <https://www.esma.europa.eu/press-news/esma-news/esma-sees-significant-room-improvement-in-national-regulators%E2%80%99-supervision>

# The EU CDS market in 2019

Credit default swaps (CDSs) are one of the most common derivatives used to hedge and trade credit risk. The total notional amount outstanding for CDS was about EUR 10tn in 4Q19, accounting for the bulk of the EUR 12tn outstanding in credit derivatives. The CDS market grew in the first three quarters in 2019 before a decline in 4Q19 brought the market back to 1Q19 levels. Concentration metrics indicate that the CDS market was highly concentrated among a few, mainly non-CCP, counterparties. Most of the counterparties fell into two main categories: credit institutions and investment firms, with over 90% of the notional amount held by these. In 2019 multi-name CDS gradually increased their share in a market that once was fully dominated by single name instruments, continuing a trend in CDS towards more diversified underlying entities.

## Introduction

Credit default swaps (CDSs) allow counterparties to swap their risk exposure to a credit event, such as a borrower defaulting on a loan. They are used to hedge and to trade credit risk. The credit default swap (CDS) market is extensive and experienced **rapid changes in the recent decades**. The market experienced exponential growth in the years prior to the financial crisis in 2008 and the sovereign debt crisis, but declined markedly afterwards. According to the BIS, the outstanding global notional amount of CDS contracts amounted to USD 61.2tn in 2007 but had fallen to only USD 9.4tn 10 years later.<sup>38</sup>

Many observers identified in the CDS one of the main drivers and propagator of the financial crisis in 2008.<sup>39</sup> The fact that CDSs were mostly traded bilaterally, over-the-counter and in absence of adequate risk management, represented an important channel for contagion and systemic risk.

In the aftermath of the crisis, the increased use of compression practices and the growth in central clearing as a result of policy actions across jurisdictions contributed to a rapid **reduction of the outstanding notional and to a stabilization** of the market. In the EU, the EMIR regulation in 2012 introduced central clearing and other risk mitigation techniques for OTC contracts to increase the resilience and reduce the risk of the market and to promote transparency in a market that until then had been largely opaque.

In part due to the policy interventions, the size and the structure of the CDS market subsequently changed, with new actors (CCPs in particular) entering the market, leading to improvements in the effective transfer of risks and also increasing the efficiency of credit risk management. In this article we shed some light on the EU CDS market developments in 2019, and present some key statistics on the CDS market for 2019 using EMIR data reported to trade repositories.

These statistics bring out some important features of the market that are also relevant to understanding potential risks. For example, the CDS market is the most concentrated after IRDs. Reference entities in CDS are roughly evenly split between single and multi-name entities. Single name entities are in turn dominated by non-financial firms, which makes explicit how risks in the CDS market are tied to the performance of these.

## Identification of CDS contracts

In EMIR data CDS contracts are identified using the fields asset class reporting “CR” (credit) and contract type reporting “SW” (swap). The reporting standards in EMIR also include specific fields for credit derivatives. Counterparties of CDS contracts must report the LEI (or the country code) of the reference entity underlying the CDS in the field “Reference entity”, or must report the underlying security in the “Underlying Identification” field (detailing the ISIN code or the name of the index). A CDS can have as an

<sup>38</sup> [BIS Quarterly Review, June 2018](#)

<sup>39</sup> See [Cont and Minca \(2010\)](#).



underlying a specific security (in which case we refer to it as “single name CDS”), or a basket of securities or an index (referred to as a “multi-name CDS”).

Identifying a single-name CDS is relatively straightforward in EMIR using the ISIN of the security or the LEI of the reference entity. In contrast, as there is no standard identifier for indices, counterparties have to report the full name of the index in underlying identification using a free text format. Given that, here we identified the main indices by searching for a selection of strings chosen to capture indices as broadly as possible.<sup>40</sup>

## The CDS market in the EU in 2019

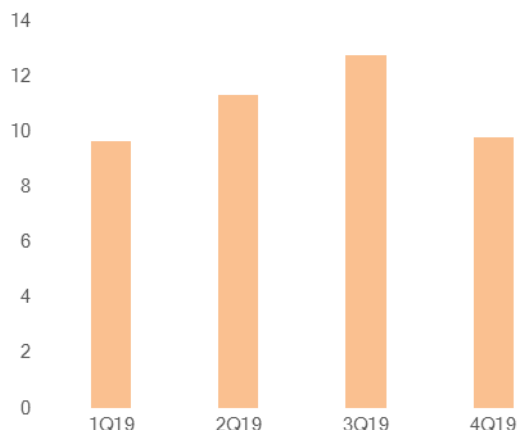
The identification of CDS in EMIR data enables us to construct statistics that shed light on the state and on trends in the CDS market, which we present in this section.

At the end of 2019, the total notional amount outstanding for CDSs stood at around EUR 10tn. CDS are by far the dominant type of credit derivatives, accounting for most of the total notional amount outstanding, EUR 12tn, in credit derivatives generally in 4Q19. The chart below presents the trend of CDS notional amount over 2019. It shows growth in the first three quarters before a decline, bringing the 4Q19 level close to the 1Q19 level (ASRD.54).

ASRD.54

Outstanding notional amount for CDS

CDS market in 2019 rises and then falls in 4Q



Note: Outstanding notional of CDS contracts, in EUR tn.  
Sources: TRs, ESMA.

The CDS market is also **highly concentrated** in a small number of dealers.<sup>41</sup> Using EMIR data, we identify the credit market as the most concentrated of all derivatives markets (excluding IRDs with CCPs included). In credit derivatives market the top 5 counterparties accounted for just over half of total outstanding notional.

Interestingly, unlike IRDs where the high level of concentration is due to the large share of exposures held by CCPs, here the higher level of concentration does not appear due to be CCP related, as removing CCPs from the measure from the top-five measure for credit derivatives generally, does not reduce concentration much (ASRD.18). This indicates that the CDS market is highly concentrated among a few counterparties which includes several large non-CCP counterparties.

In 4Q19, around 3,500 different counterparties had exposures to CDS contracts. Most of the **counterparties fall into two main categories**: credit institutions and investment firms. The distribution of notional amount outstanding by counterparty type also paints a similar picture (ASRD.55).

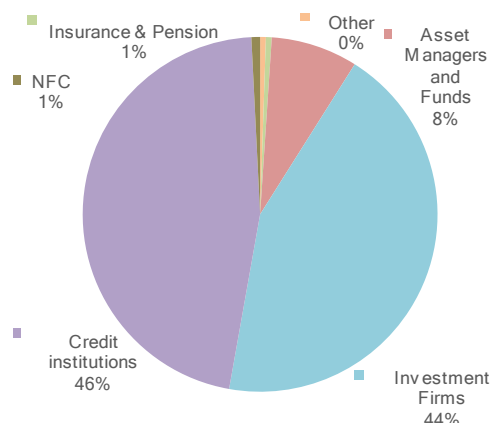
<sup>40</sup> The indices were identified with a simple string-matching technique where the field underlying identification – standardised to upper cases – includes the strings

“ITRAXX”, “CDX”, “CMBX”, “MCDX”, “LCDX”, “IOS”, “IBOXX”, “IRXX”, “HPI”, “PRIMEX”.

<sup>41</sup> See, for example, [Stulz \(2010\)](#).

## ASRD.55

CDS outstanding notional by counterparty type  
Credit institutions and investment firms dominate



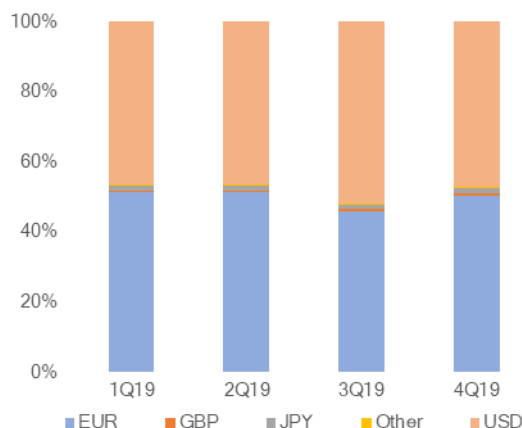
Note: Outstanding amount by sector of the counterparty, in %.  
Sources: TRs, ESMA

Credit institutions and investment firms together account for 90% of the notional amount outstanding in CDS exposures. However, as these also act on behalf of clients not explicitly captured in EMIR data, other counterparty types will be implicitly be captured within these shares.

In terms of **currency**, the vast majority of the contracts are denominated in EUR or USD, with only 3% of notional amount outstanding of the contracts in other currencies, mainly GBP or JPY (ASRD.56). The trends in 2019 indicate relatively equal shares through time between EUR and USD.

## ASRD.56

Outstanding notional for CDS by currency  
About half EUR, half USD



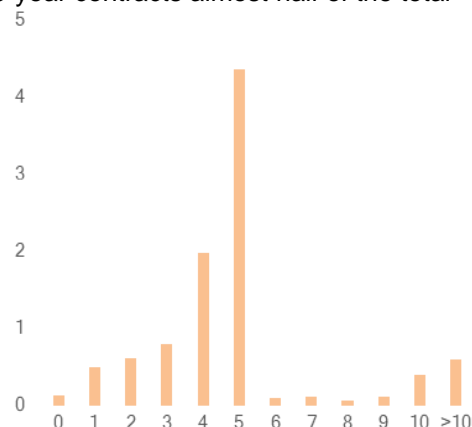
Note: Outstanding amount of CDS contracts by currency, in %.  
Sources: TRs, ESMA

The majority of the CDS contracts have a **tenor** (the difference between the maturity date and the execution date) of around 5 years. This tenor has always been the most common in the market, even more so after the crisis, with the 2009 Standardisation initiative promoting further standardisation of CDS contracts, with maturity dates set around predefined calendar dates.<sup>42</sup>

The chart below presents the distribution of notional amount for CDS contracts by maturity at execution. The predominance of five years is clearly visible. Shorter maturities (<5 years) are also prevalent, while longer maturities (>5 years) are much less widely used (ASRD.57).

## ASRD.57

Outstanding notional for CDS by maturity  
5-year contracts almost half of the total



Note: Distribution of notional by maturity at execution, in years and EUR tn.  
Sources: TRs, ESMA

<sup>42</sup> See [Culp and van der Merwe \(2016\)](#)



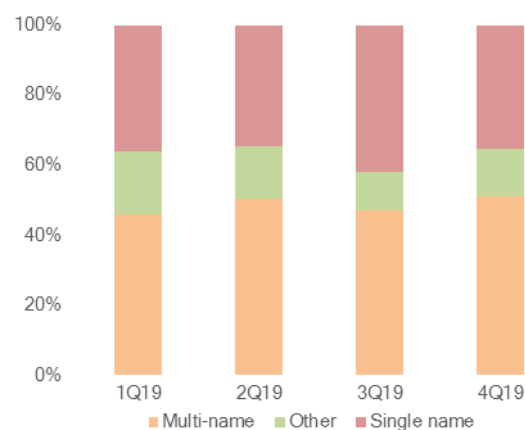
## Single-name and multi-name CDS

In this section we look at the different types of CDS contracts by reference entity. We observe that the notional amount is about equally divided between multi-instrument and single names CDS. This evidence is also in line with different findings that show **multi-name CDS gradually increasing their share** in a market once fully dominated by single name instruments. Over 2019, multi-name CDS accounted for between 46% and 51% of CDS, single-name CDS between 36% to 41%, with the remaining in the unclassified 'other' category (ASRD.58).

ASRD.58

Single name vs. multi-name CDS

Split evenly with growth in multi-name



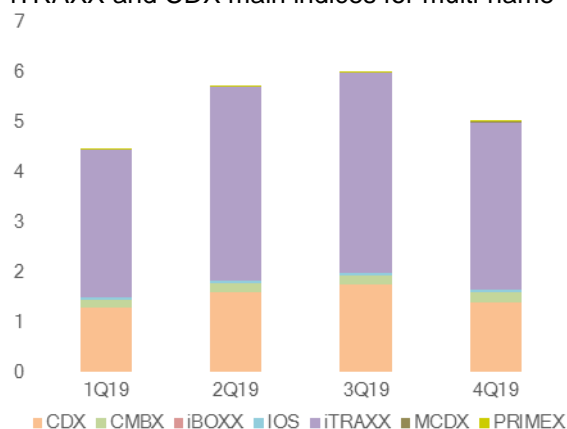
Note: Outstanding notional by type of CDS, in EUR tn  
Sources: TRs, ESMA.

Multi-name instruments are mostly constituted of CDS on indices. Indices underlying a CDS cover different regions and different levels of liquidity and credit risk. As shown in ASRD.59, **iTRAXX and CDX** stand out in terms of share of outstanding notional, accounting for the vast majority of CDS on indices.

ASRD.59

Notional amount outstanding by indices CDS

iTRAXX and CDX main indices for multi-name



Note: Outstanding notional for main indices underlying CDS contracts, in EUR tn  
Sources: TRs, ESMA.

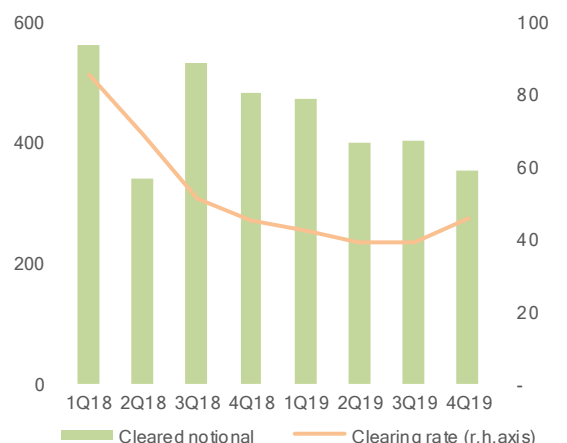
iTRAXX indices cover companies and sovereign states located in Europe, Australia and Asia while CDX indices have a regional focus on North American and Emerging markets companies. Of these two types, CDS on iTRAXX have the larger share, perhaps intuitively given iTRAXX indices include some with a European focus.

The EMIR clearing obligation also applies to CDS on European indices. As presented in the main report, we include here the chart showing clearing rates for multi-name CDS for completeness (ASRD.60). As discussed above, EMIR data and the identification of CDS enables us to track clearing rates for these instruments and shows how the clearing rate for these instruments started increasing in late 2019 is due to falls in uncleared notional outpacing falls in cleared notional.

ASRD.60

Clearing trends for CDS on Indices

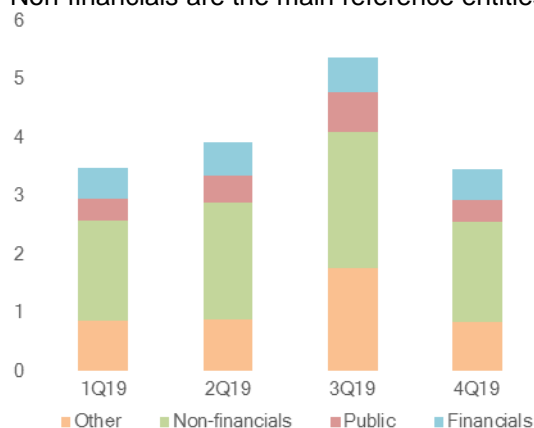
Increased clearing rate in late 2019



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

For single-name CDS the largest share of outstanding notional is in CDS that refer to **non-financial** firms. These account for about half of the total outstanding notional amount. This is followed by financial companies (about 15%) and sovereign and public entities (just over 10%). It is worth noting that a non-negligible part of the reference entities could not be better classified here and is captured here within the 'other' category (ASRD.61).

ASRD.61  
Notional amount outstanding by indices CDS  
Non-financials are the main reference entities



Note: Sector of reference entity underlying single name CDS, in EUR tn.  
Sources: TRs, ESMA

The extent of the non-financials in single-name CDS show clearly the extent of the direct link of

the CDS market to the real (non-financial) economy, and also illustrates the extent of a channel of direct contagion from credit risk events in non-financial sectors to derivative markets.

## References

The Bank of International Settlements (2018), Quarterly Review June 2018.

Cont, R. and A. Minca (2010), 'Credit default swaps and financial stability', Financial Stability Review, 14.

Culp. C. and A. van der Merwe (2016): 'Single-name Credit Default Swaps: A Review of the Empirical Academic Literature', ISDA.

Stutz, R. (2010), 'Credit Default Swaps and the Credit Crisis', Journal of Economic Perspectives, vol. 24, no. 1, winter 2020.

# CCP initial margins in 2019

This article presents statistics on the initial margins posted to CCPs over 2019, as reported by EU CCPs as part of their reporting to trade repositories under EMIR. It looks first at the margins by asset class, showing that margins associated with interest rate products dominate, in line with the asset distribution of total market size in notional amount terms. Looking at concentration of margins by clearing members in CCPs, the top five share metric, although low on average, shows high dispersion across CCPs, with some CCPs having a higher concentration of initial margin among a few clearing members. Similarly, the HHI of EU CCPs, though low on average (0.04 in 4Q19) ranges widely, from 0.02 to 0.3. Finally, we show how EMIR data can be used to measure systemic risk, using the SRISK indicator, and explore how this evolved over 2019.

## Introduction

An important element of the 2009 G-20 commitment on global financial reform, later embedded in EMIR, was the promotion of central clearing on derivatives markets. In particular, requirements on central clearing, and on the collateralisation for both centrally cleared and non-centrally cleared transactions were introduced in the EU and in other jurisdictions.

Previous editions of the annual statistical report have focused on the analysis of notional amounts outstanding, with enhancements in the quality of data reported on collateral, especially by CCPs. As our aim is to extend our market monitoring to other aspects relevant to financial stability monitoring, we provide an overview here of collateral practices on EU derivative markets. We focus specifically on EU CCPs, which are at the core of the post-EMIR system to limit counterparty risk in derivative markets.<sup>43</sup>

## Background: collateral reporting in EMIR

Following the changes in EMIR reporting introduced by the 2017 RTS, for each trade both counterparties report initial margins, variation margins and excess collateral posted and received. The amounts reported by the two counterparties are supposed to coincide, which improves data quality.

Margins are also separated into three types: Initial margins, variation margins and excess collateral. Combined with the separation between

the received and posted, this implies six fields containing margin amounts in EMIR.

In addition, collateral is typically posted for a portfolio of trades rather than for a single derivative, so a field containing a collateral portfolio code, which is unique for a given portfolio and reporting counterparty, enables one to map the collateral reported at portfolio level to each of the portfolio components.

In this article the focus is on the initial margins and excess collateral received by EU CCPs. Initial margin is what a CCP requires a clearing member to post, as determined by its margining policy. Excess collateral is any additional collateral posted by the clearing member on top of the required initial margin.

Given the improved quality of data reported by CCPs and the more easily tractable dataset containing data reported by only a handful of counterparties (the EU CCPs), we limit ourselves to EU CCP reports in this analysis. Also as CCPs usually only receive and do not post initial margins to their clearing members, the figures displayed have been sourced from the initial margin received and excess collateral received fields.

Variation margins are not considered in this article because the weekly frequency of the dataset used for this analysis does not allow calculation of daily margin flows. Heterogeneity in reporting practices across counterparties also

<sup>43</sup> While, strictly speaking, CCP margins are a very special type of collateral, in the rest of this article the terms collateral and margins are used interchangeably.

makes it difficult to aggregate variation margins meaningfully at this stage.

### CCP initial margins by asset class

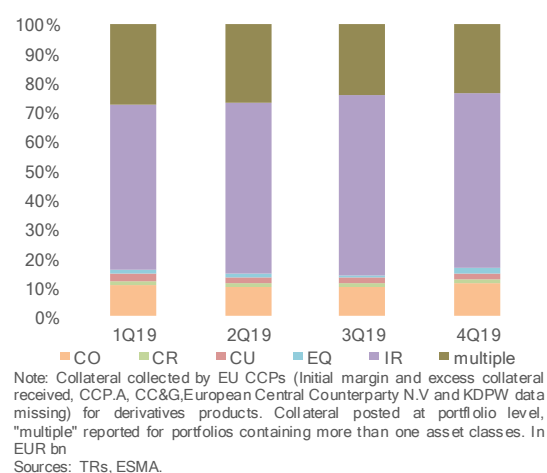
The following sections present the aggregate margins reported and received by EU CCPs in 2019, broken down by asset class. One difficulty here is due to the fact that, as mentioned earlier, margins are mostly reported at portfolio level, with portfolios potentially containing more than one asset class. For this reason, we capture cases where one collateral amount is reported for several trades and asset classes under the 'multiple' category.

The chart below presents initial margins collected by CCPs by asset class (ASRD.62). It shows that the collateral reported for IRD transactions dominated in 2019. This is consistent with the large share of IRDs in notional amount outstanding, though the share of margins of IRDs is lower than the corresponding IRD notional share. Also, noteworthy is the significant 'multiple' category, where collateral is associated with multiple assets, and which accounts for about a quarter of the total. The presence of the sizeable multiple category obscures the picture somewhat.

#### ASRD.62

##### CCP initial margins by asset classes

##### IRD accounted for largest collateral share in 2019



In the next chart, we used a simple adjustment to allocate the multiple category to different asset classes. We used the "value of the contract" field containing the mark-to-market or the mark-to-model valuation of the contract, because these are reported at trade level and not at portfolio level like the margins. For each portfolio, the collateral reported was then reallocated to

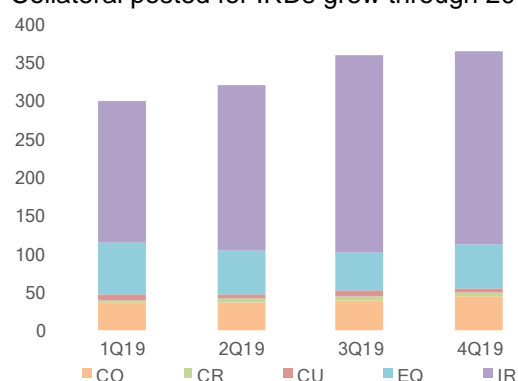
specific asset classes according to their share of the (absolute) contract value.

Using this method, 61% on average over 2019 of the collateral in the multiple category was assigned to equity derivatives and 35% to interest rates. The chart below presents the distribution of initial collateral by asset class once again, this time after the multiple category has been allocated to different asset classes. Here absolute rather than relative amounts are presented to illustrate quantities and their trends (ASRD.63)

#### ASRD.63

##### CCP initial margins by asset classes

##### Collateral posted for IRDs grew through 2019



The chart above shows how reported EU CCP collateral increased continuously between the first and last quarter of 2019, starting at EUR 298bn in 1Q19 and ending at EUR 363bn in 4Q19. IRDs were dominant, ranging from 62% in 1Q19 to 72% in 3Q19. The dominance of IRDs is in line with their dominant share of the EU derivatives market in notional amount terms (82% in 4Q19), though the share in margins is somewhat lower.

Collateral collected for equities, the second largest, decreased in share over the reporting period from 22% in 1Q19 to 14% in 4Q19. This was largely driven by growth in the overall collateral collected (from the interest rate collateral increase) rather than a fall in the equity collateral amount. Commodities, currency and credit margins collected remained largely at the same levels throughout 2019 (at 11-12%, 2-3% and 1% respectively).

### Concentration analysis

This section investigates clearing member concentration of margin. This is important

because the concentration of clearing member collateral can have a range of financial stability implications.

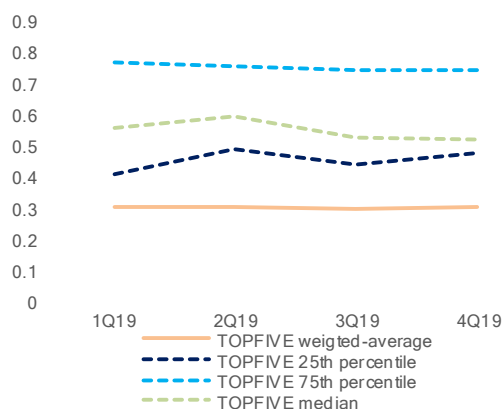
First, the collateral posted is highly correlated to the size of the risk position of the clearing member. As a result, high concentration in margins indicates a high concentration of positions and thus high concentration risk. More concentrated positions have wider impacts in case of shock, for example through liquidation costs. Finally, we do not investigate here concentration in the type of collateral provided (single security, same issuers) as this data is not part of the EMIR reporting framework.

To explore the concentration of posted margins, we use the two measures used elsewhere in this report, the top-five share and HHI. Both are calculated at CCP level, with CCPs scores then averaged by the weight of each CCP's market share in terms of collateral. The chart that follows presents this for the top 5 metric (ASRD.64).

ASRD.64

Top 5 CM's initial margin contribution

Low on average, but high dispersion



Note: Top-five clearing members market share in terms of margin contribution to ten EU CCPs aggregated using a weighted average (by CCP's margins collected), and quartiles.  
Sources: TRs, ESMA.

On average, the top-five margin share of clearing members of EU CCPs was about 30% in 2019. However, this weighted average was driven by one large CCP that had a relatively low level of concentration.

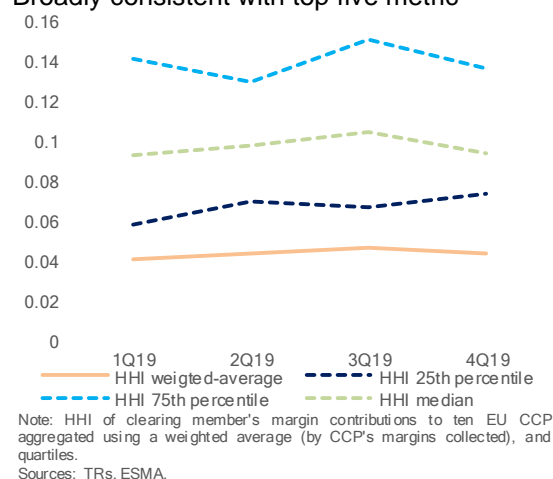
Quartiles provide a more nuanced picture. Here they show a dispersion among CCPs. One CCP, for example, consistently had a top-five market share above 90% for each of the four reporting dates (with 96% in 1Q19). For this CCP, almost all of its collected margin was posted by its five largest clearing members.

For the HHI, the results were also low on average, but again, like the top-five metric, dispersed across CCPs with scores ranging from 0.02 and 0.3 (ASRD.65). This again suggests that for some CCPs there was significant concentration in the margin posted by clearing members. These also illustrate how that the top-five and HHI indicators will be important measures going forward to monitor CCPs with high concentration levels and how these evolve over time, to help identify potential systemic risks.

ASRD.65

HHI index

Broadly consistent with top five metric



Note: HHI of clearing member's margin contributions to ten EU CCP aggregated using a weighted average (by CCP's margins collected), and quartiles.  
Sources: TRs, ESMA.

## A systemic risk indicator using margin data

In the following section we introduce the SRISK measure for financial companies that are clearing members, as suggested by Cecchetti et al.<sup>44</sup> The SRISK measure was introduced by Brownlees and Engle and provides one measure of the systemic risk contribution of a financial firm,<sup>45</sup> by estimating the expected capital shortfall of a firm in case of a severe market decline. It is a function of its size, leverage and risk.

The SRISK for more than 3000 financial institutions has been calculated and publicly available on the website of NYU's Volatility Laboratory (V-Lab).<sup>46</sup> Using the SRISK measures collected for the four dates of our report, we mapped these to the list of clearing members and found matches for 125 of the biggest clearing members, covering more than 95% of the market (in terms of collateral). We then weighted this measure by each clearing member's collateral

<sup>44</sup> See [Cecchetti et al. \(2019\)](#).

<sup>45</sup> See [Brownlees and Engle \(2017\)](#).

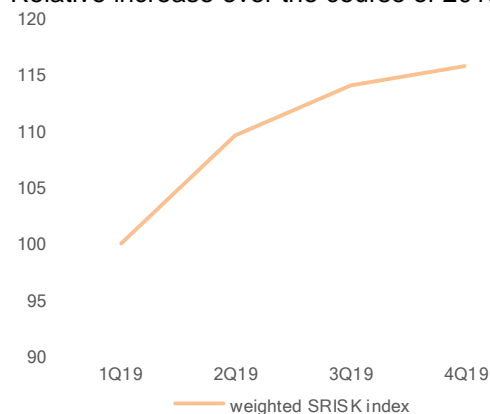
<sup>46</sup> Available at: <https://vlab.stern.nyu.edu/welcome/srisk>.

posted at EU CCP (at group level) and set that figure at 100 in 1Q19 to index the time series below (ASRD.66).

ASRD.66

SRISK index of average clearing member shortfall risk

Relative increase over the course of 2019



Note: Weighted SRISK index using initial margin posted by big financial companies to EU CCPs.  
Sources: TRs, NYU V-lab, ESMA.

The chart shows a 15% increase in this measure of systemic risk over 2019. While this could

appear significant, it should be remembered this is a short time series, showing a relative increase in risk, which by itself is not informative on absolute levels of systemic risk. Nonetheless, it provides a potentially helpful indicator for ongoing monitoring and shows how EMIR data can help to monitor systemic risks.

## References

Cecchetti, Berner and Schoenholtz (2019), 'Stress Testing Networks: The Case of Central Counterparties', NBER working paper no. 25686.

Brownlees and Engle (2017), 'SRISK: A Conditional Capital Shortfall Measure of Systemic Risk', The Review of Financial Studies, vol. 30, issue 1.



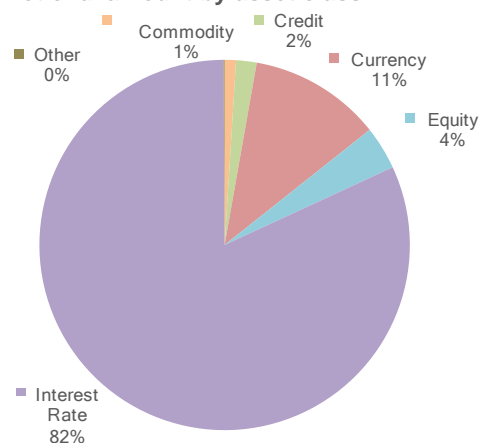
# Derivatives statistics

# Market structure

## EU derivatives market

ASRD-S.1

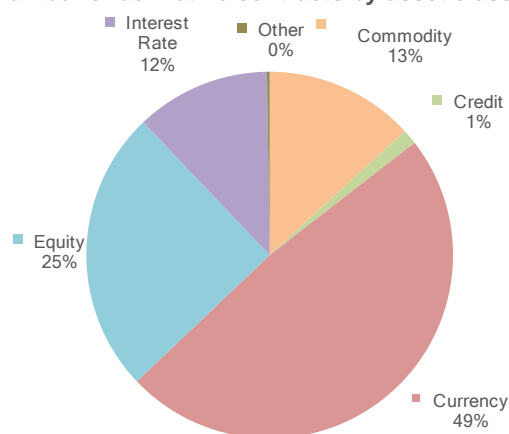
### Total notional amount by asset class



Note: Percentages of total notional amount outstanding by asset class.  
Sources: TRs, ESMA.

ASRD-S.2

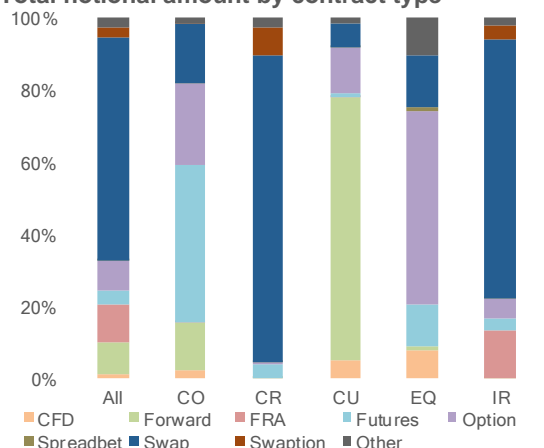
### Number of derivative contracts by asset class



Note: Percentages of outstanding derivative contracts by asset class.  
Sources: TRs, ESMA.

ASRD-S.3

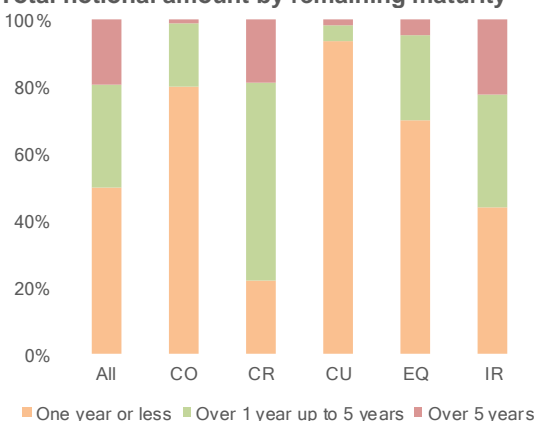
### Total notional amount by contract type



Note: Proportions of total notional amount outstanding by contract type and asset class, in %.  
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 %.  
Sources: TRs, ESMA.

ASRD-S.5

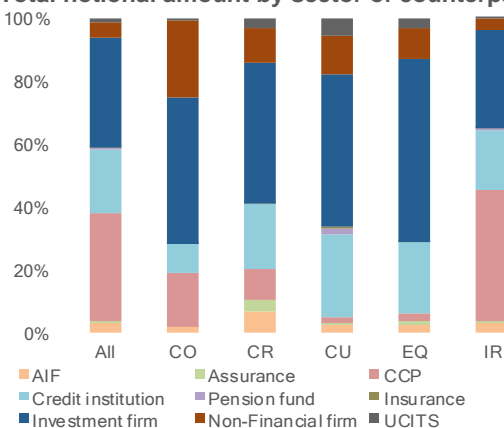
### Total notional amount by maturity at execution



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

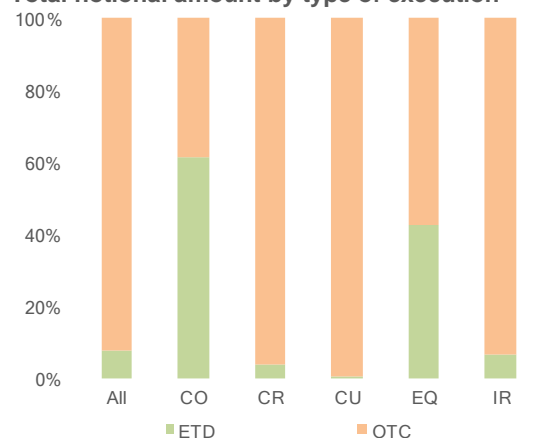
ASRD-S.6

### Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty and asset class, in %.  
Sources: TRs, ESMA.

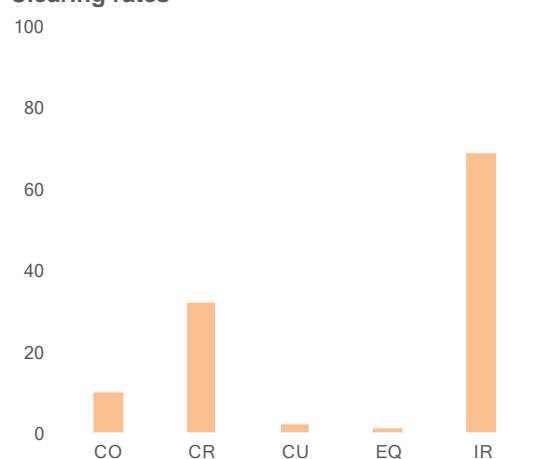
ASRD-S.7

**Total notional amount by type of execution**

Note: Percentages of total notional amount outstanding by ETD and OTC by asset class.

Sources: TRs, ESMA.

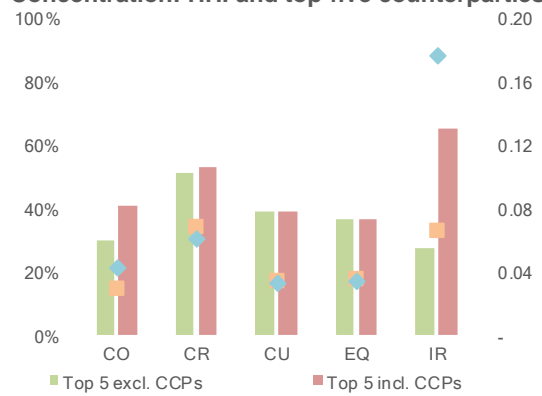
ASRD-S.8

**Clearing rates**

Note: Central clearing rate of total notional amount outstanding by asset class, in %.

Sources: TRs, ESMA.

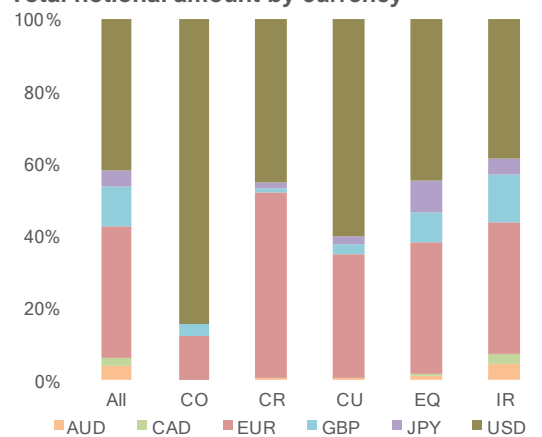
ASRD-S.9

**Concentration: HHI and top-five counterparties**

Note: HHI and notional amount share in % of top-five counterparties calculated on aggregated notional positions of counterparties. HHI normalised between 0 and 1, as of 4Q19.

Sources: TRs, ESMA.

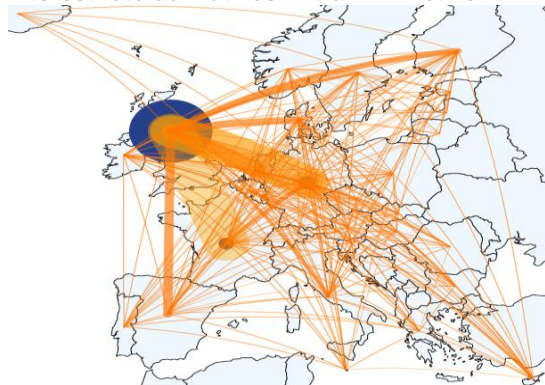
ASRD-S.10

**Total notional amount by currency**

Note: Proportions of total notional amount outstanding by currency and asset class, in %.

Sources: TRs, ESMA.

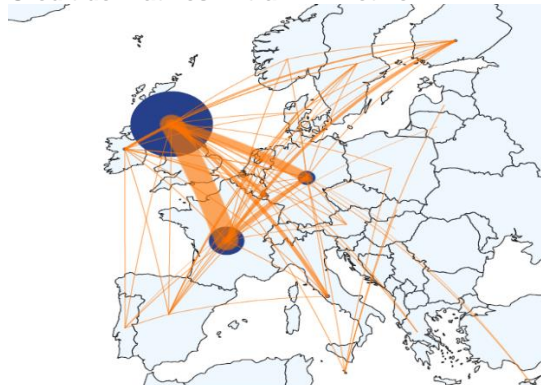
ASRD-S.11

**Interest rate derivatives: Intra-EEA 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-EEA 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.

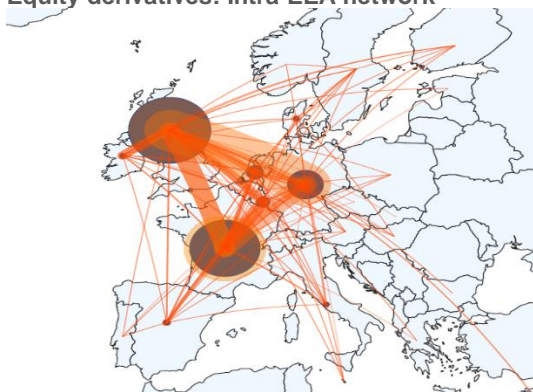
ASRD-S.13

**Currency derivatives: Intra-EEA 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.

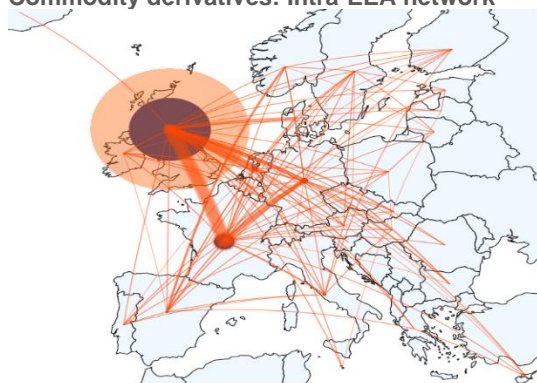
ASRD-S.14

**Equity derivatives: Intra-EEA 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.

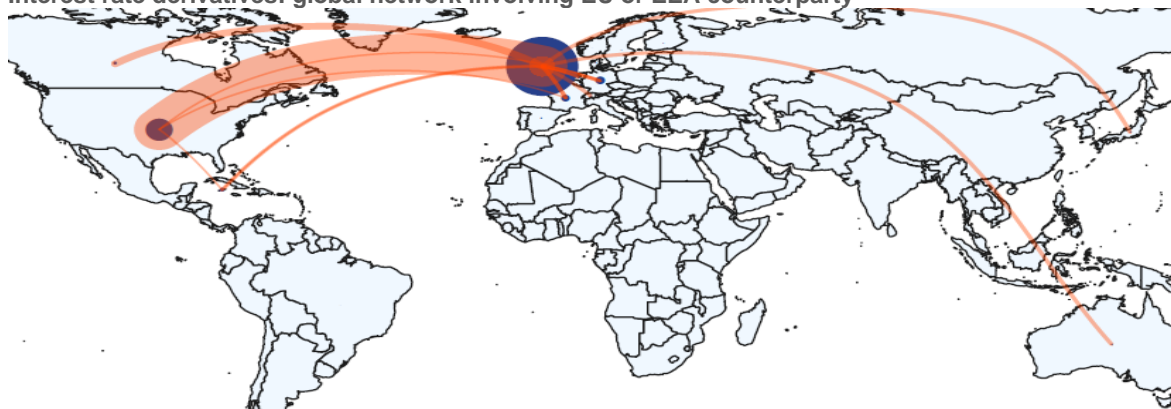
ASRD-S.15

**Commodity derivatives: Intra-EEA 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.

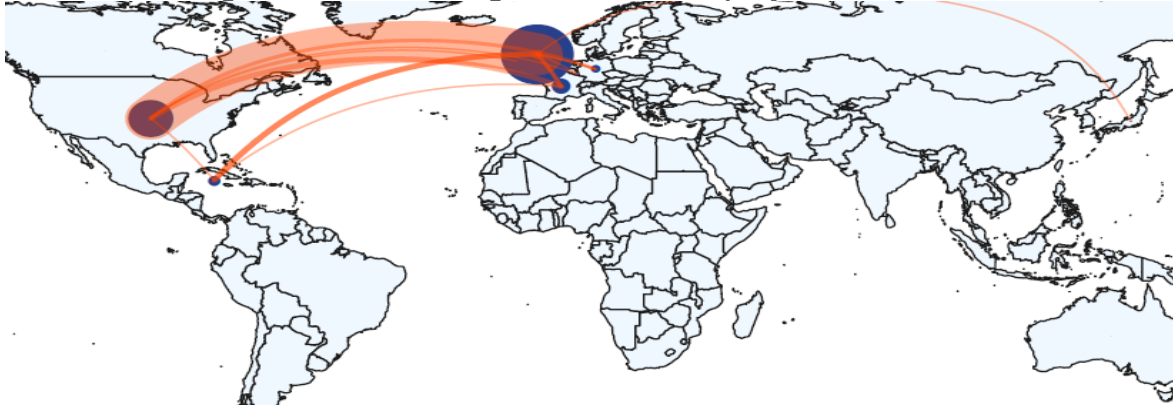
ASRD-S.16

**Interest rate derivatives: global network involving EU or EEA 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.

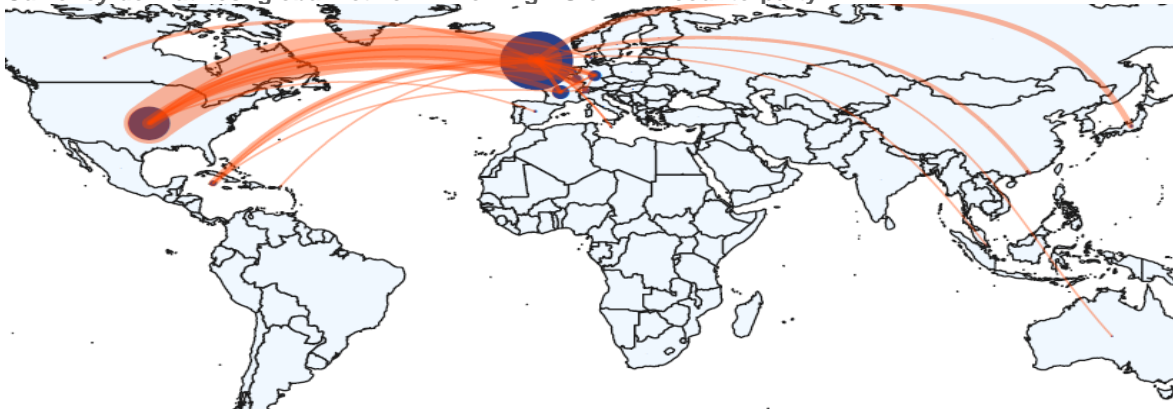
ASRD-S.17

**Credit derivatives: global network involving EU or EEA 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.

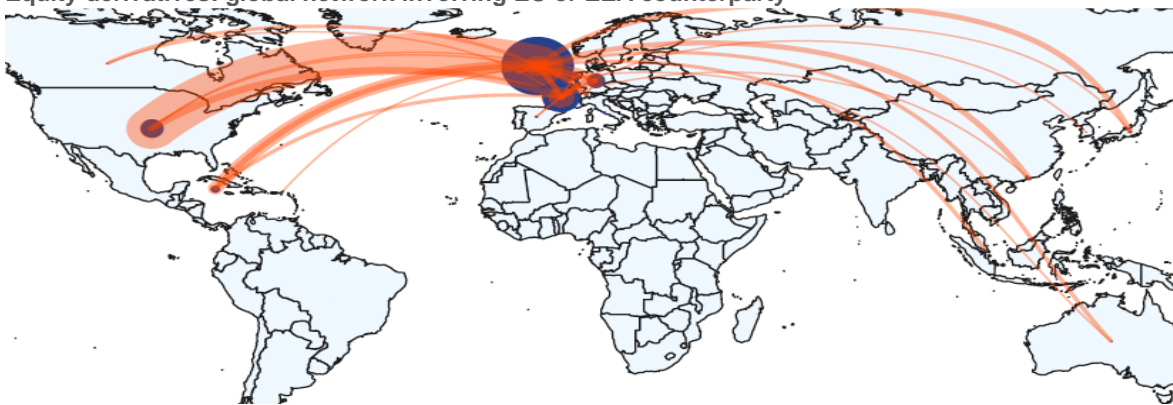
ASRD-S.18

**Currency derivatives: global network involving EU or EEA 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.

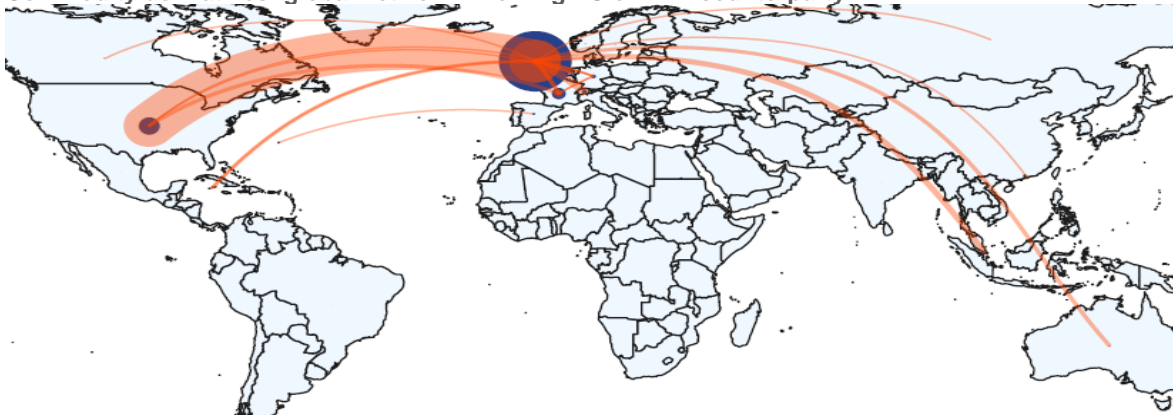
ASRD-S.19

**Equity derivatives: global network involving EU or EEA 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 EU or EEA 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.

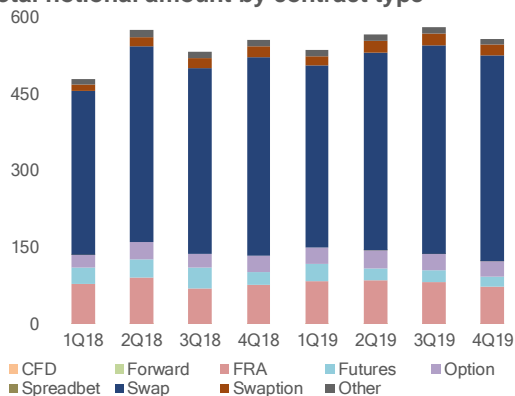


# Market trends

## Interest rate derivatives market

ASRD-S.21

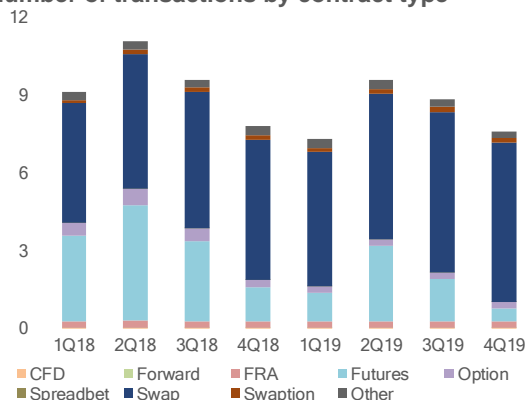
### Total notional amount by contract type



Note: Total notional amount outstanding by contract type, in EUR tn.  
Sources: TRs, ESMA.

ASRD-S.22

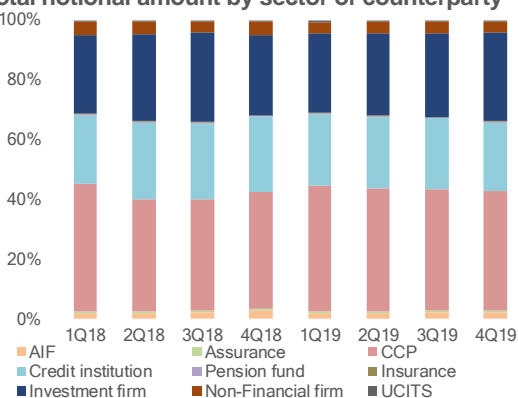
### Number of transactions by contract type



Note: Number of derivatives by contract type, in million.  
Sources: TRs, ESMA.

ASRD-S.23

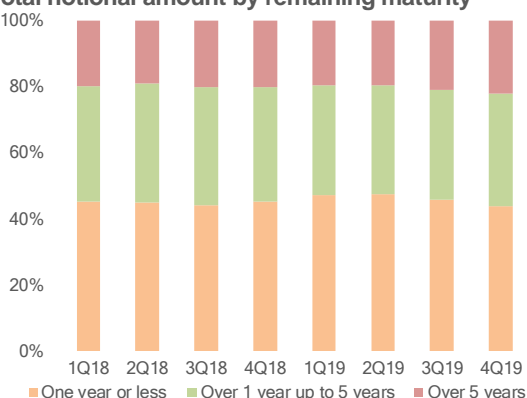
### Total notional amount by sector of counterparty



Note: Shares of total notional amount outstanding (not reconciled) by counterparty, in %.  
Sources: TRs, ESMA.

ASRD-S.24

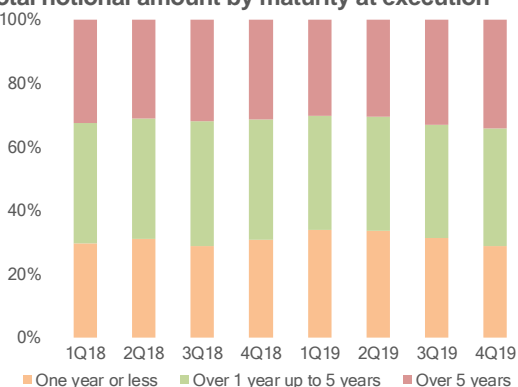
### Total notional amount by remaining maturity



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

ASRD-S.25

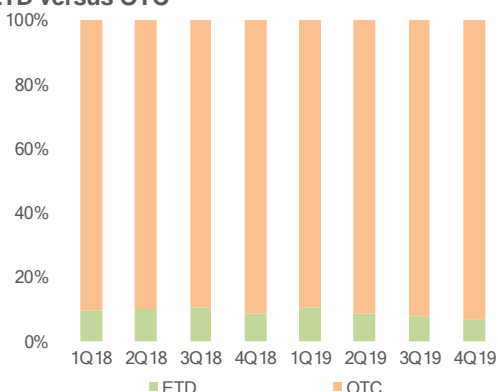
### Total notional amount by maturity at execution



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

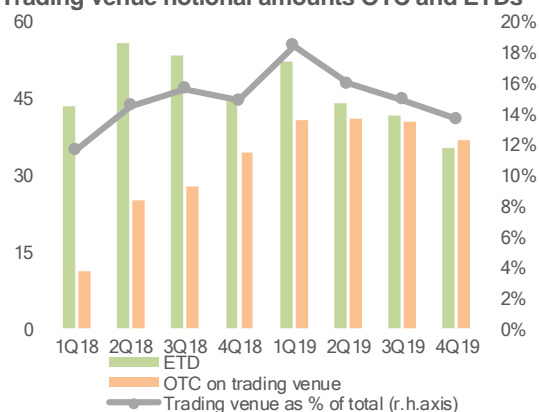
ASRD-S.26

### ETD versus OTC



Note: Shares of total notional amount outstanding, in %.  
Sources: TRs, ISO, ESMA.

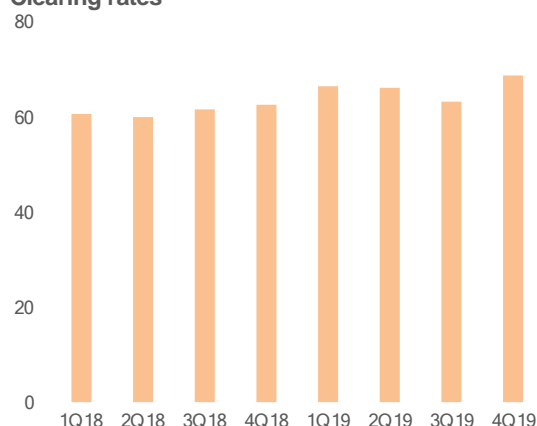
ASRD-S.27

**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).

Sources: TRs, ISO, ESMA.

ASRD-S.28

**Clearing rates**

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

Sources: TRs, ESMA.

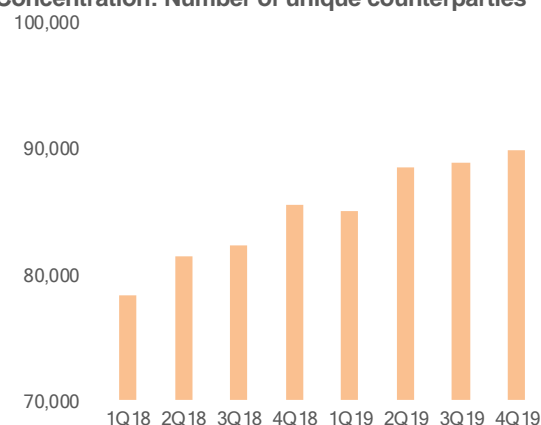
ASRD-S.29

**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.

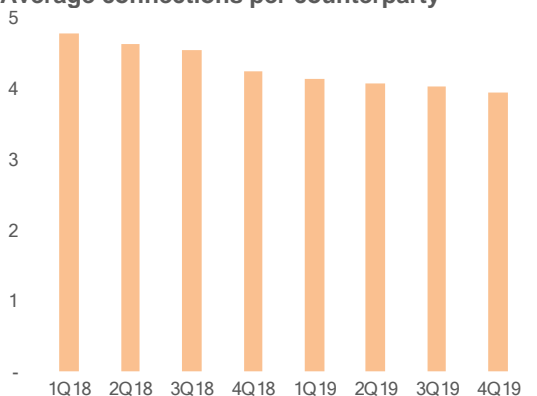
ASRD-S.30

**Concentration: Number of unique counterparties**

Note: Number of unique counterparties.

Sources: TRs, ESMA.

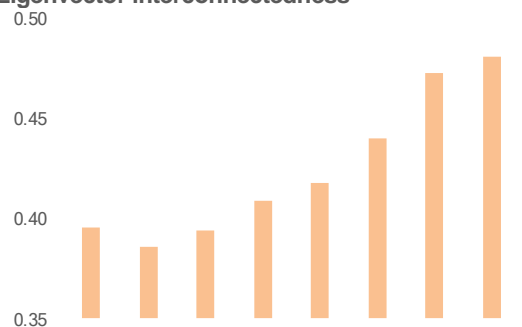
ASRD-S.31

**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).

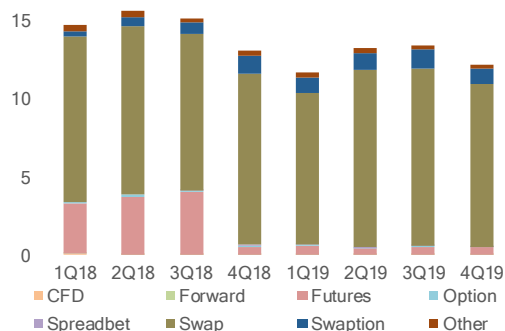
Sources: TRs, ESMA.

## Credit derivatives market

ASRD-S.33

### Total notional amount by contract type

20

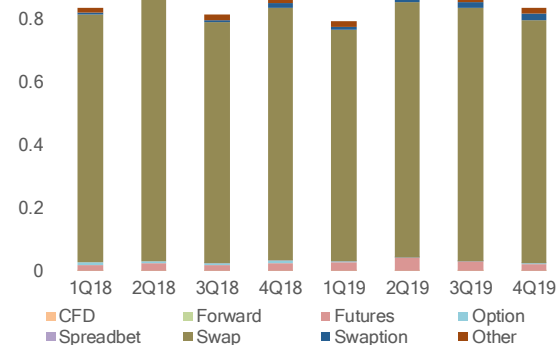


Note: Total notional amount outstanding by contract type, in EUR trillions.  
Sources: TRs, ESMA.

ASRD-S.34

### Number of transactions by contract type

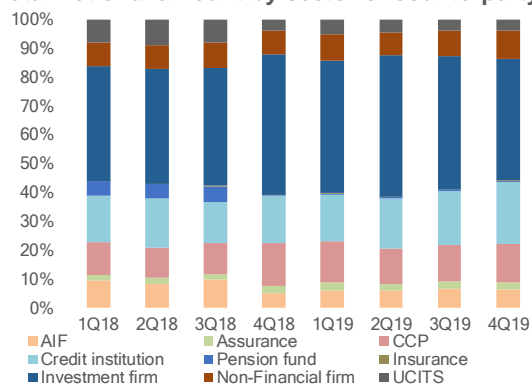
1



Note: Number of transactions by contract type, in millions.  
Sources: TRs, ESMA.

ASRD-S.35

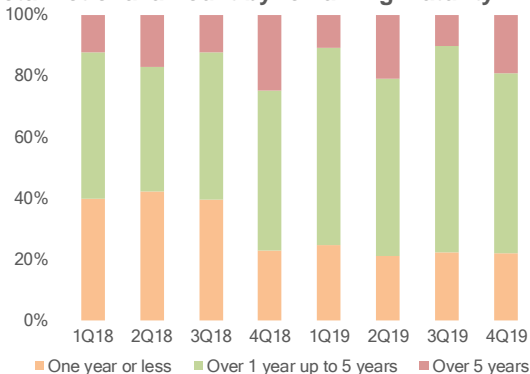
### Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty, in %.

ASRD-S.36

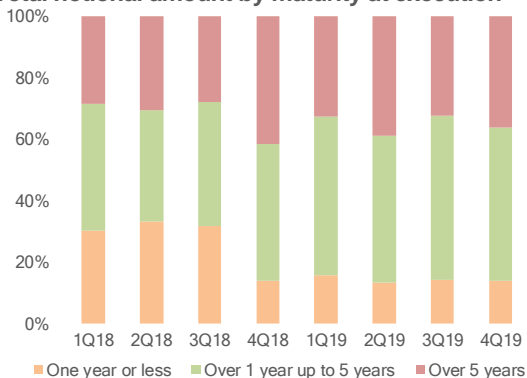
### Total notional amount by remaining maturity



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

ASRD-S.37

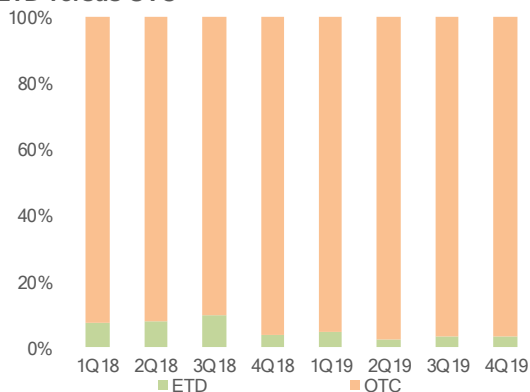
### Total notional amount by maturity at execution



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

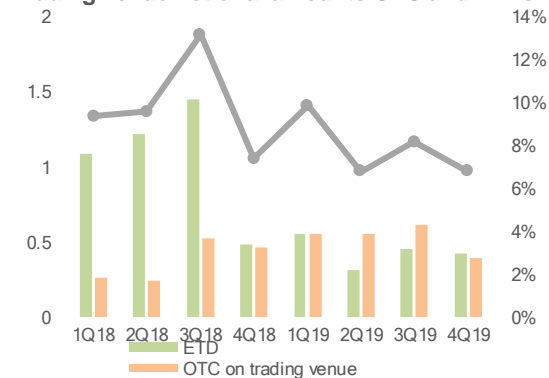
ASRD-S.38

### ETD versus OTC



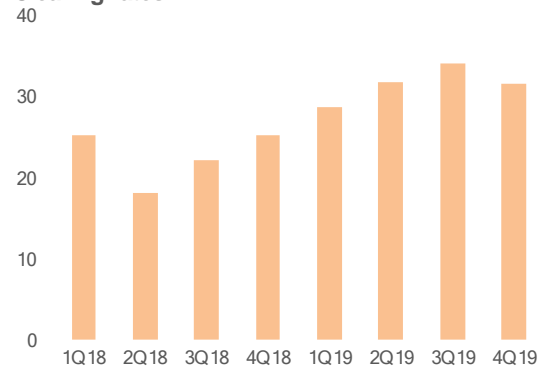
Note: Shares of gross notional amount outstanding, in %.  
Sources: TRs, ESMA.

ASRD-S.39

**Trading venue notional amounts OTC and ETDs**

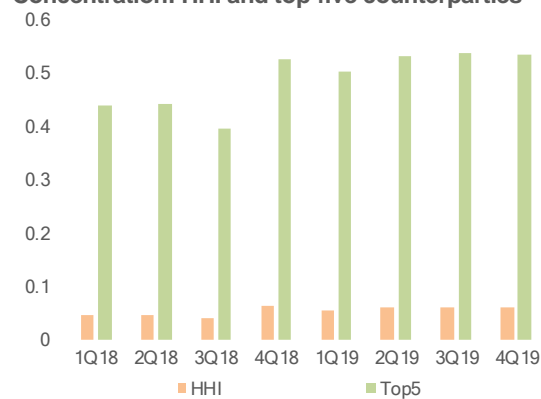
Note: Notional outstanding ETD and OTC on trading venue in EUR trillions, and trading venue notional as proportion of total outstanding notional in % (r.h. axis).  
Sources: TRs, ISO, ESMA.

ASRD-S.40

**Clearing rates**

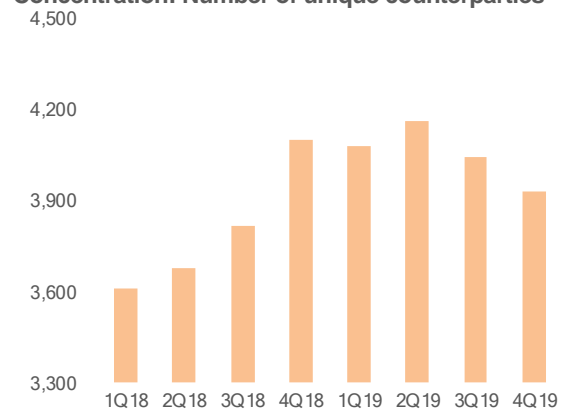
Note: Central clearing rate of total notional amount outstanding, in %.  
Sources: TRs, ESMA.

ASRD-S.41

**Concentration: HHI and top-five counterparties**

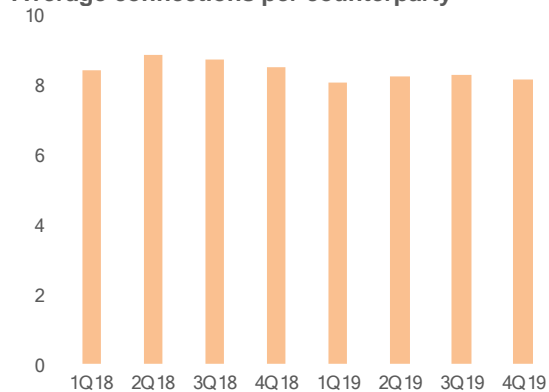
Note: HHI and total notional amount of top-five counterparties as a proportion of the total notional amount. HHI normalised between 0 and 1.  
Sources: TRs, ESMA.

ASRD-S.42

**Concentration: Number of unique counterparties**

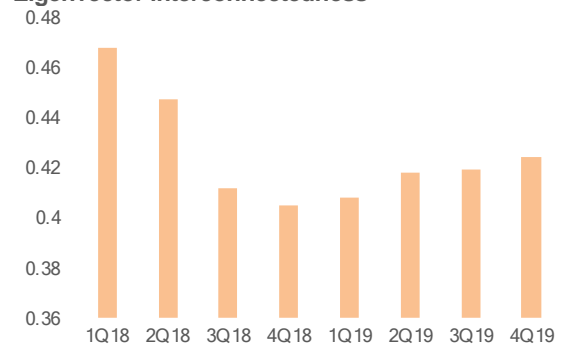
Note: Number of unique counterparties.  
Sources: TRs, ESMA.

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

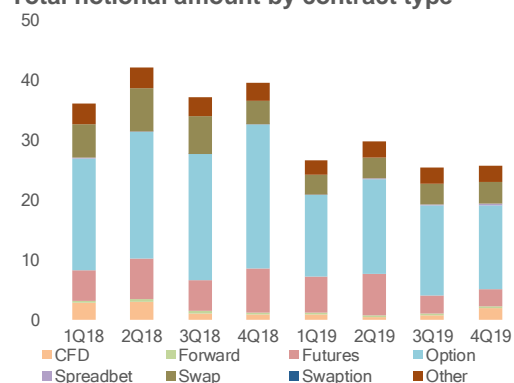
**Eigenvector interconnectedness**

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

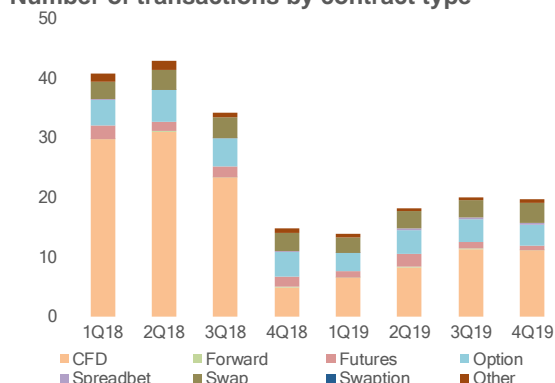
### Total notional amount by contract type



Note: Total notional amount outstanding by contract type, in EUR trillions.  
Sources: TRs, ESMA.

ASRD-S.46

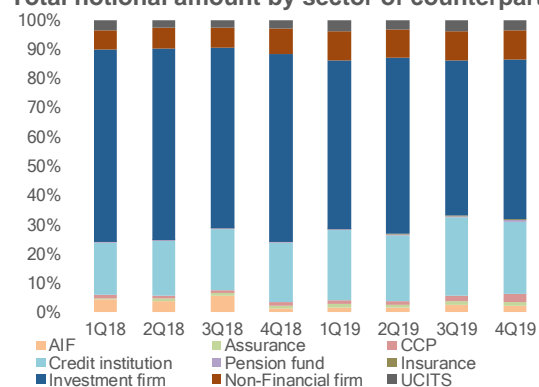
### Number of transactions by contract type



Note: Number of transactions by contract type, in millions.  
Sources: TRs, ESMA.

ASRD-S.47

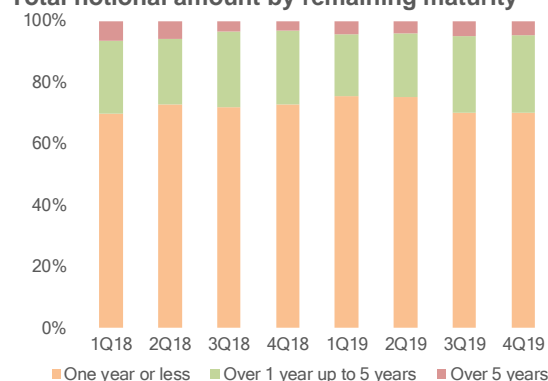
### Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty, in %.  
Sources: TRs, ESMA.

ASRD-S.48

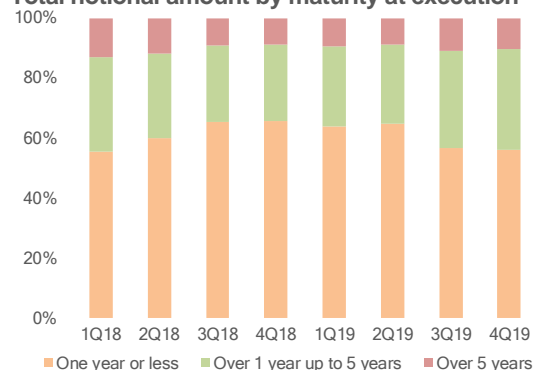
### Total notional amount by remaining maturity



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

ASRD-S.49

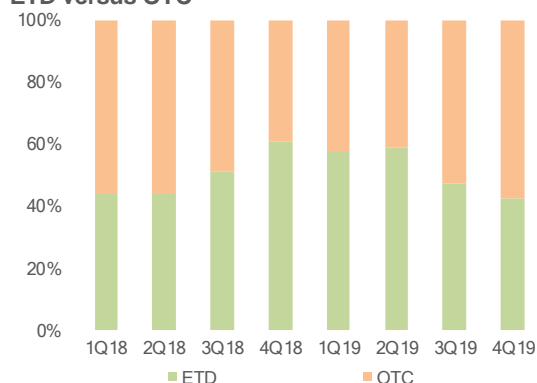
### Total notional amount by maturity at execution



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

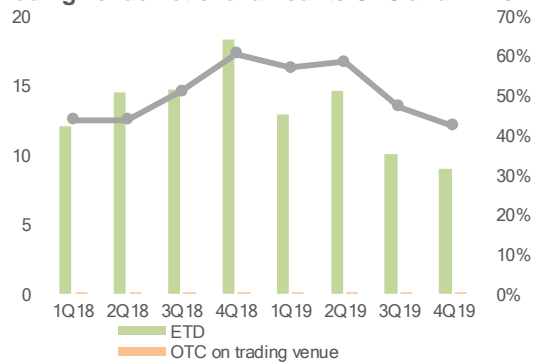
ASRD-S.50

### ETD versus OTC



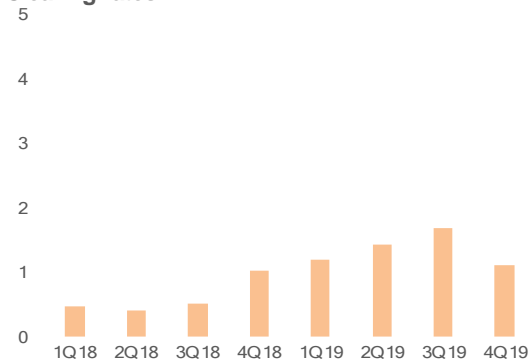
Note: Shares of gross notional amount outstanding, in %.

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).  
Sources: TRs, ISO, ESMA.

ASRD-S.52

**Clearing rates**

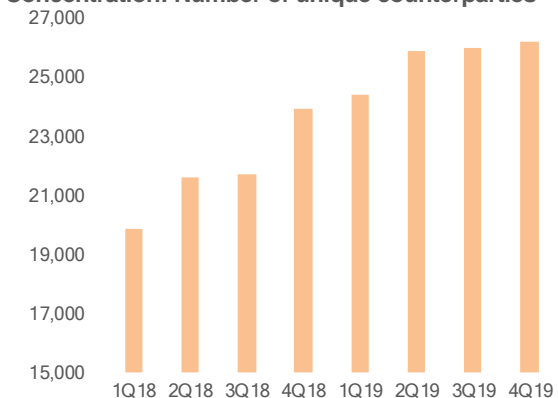
Note: Central clearing rate of total OTC notional centrally gross outstanding notional in %.  
Sources: TRs, ESMA.

ASRD-S.53

**Concentration: HHI and top-five counterparties**

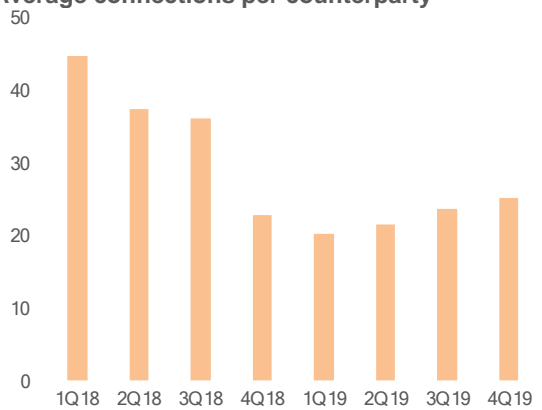
Note: HHI and total notional amount of top-five counterparties as a proportion of the total notional amount. HHI normalised between 0 and 1.  
Sources: TRs, ESMA.

ASRD-S.54

**Concentration: Number of unique counterparties**

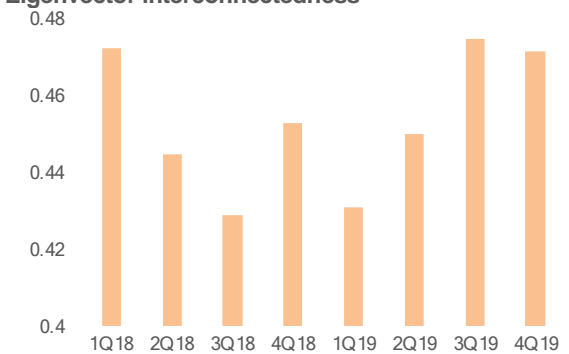
Note: Number of unique counterparties.  
Sources: TRs, ESMA.

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**

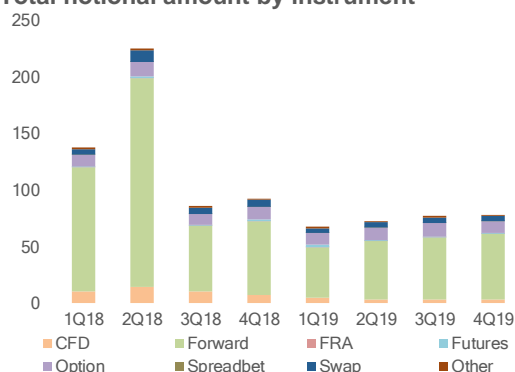
Note: The eigenvector interconnectedness indicator measures a participant's influence based on the number of links it has to other participants within the network. It also takes into account the connections of these participants through the network. It ranges from 0 (lowest) to 1 (highest interconnectedness).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



## Currency derivatives market

ASRD-S.57

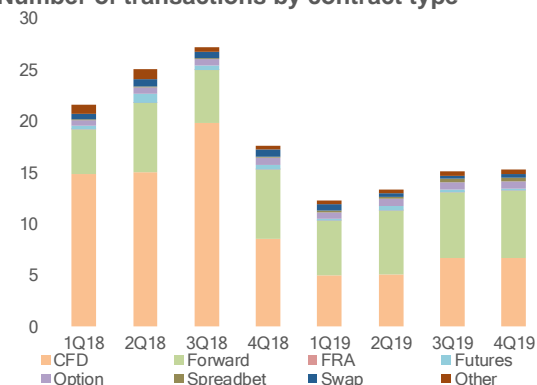
### Total notional amount by instrument



Note: Total notional amount outstanding by contract type, in EUR trillions.  
Sources: TRs, ESMA.

ASRD-S.58

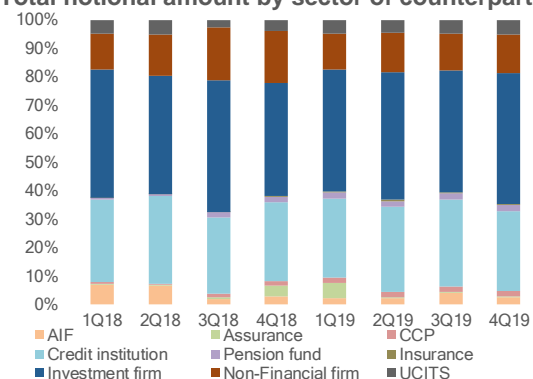
### Number of transactions by contract type



Note: Number of transactions by contract type, in millions.  
Sources: TRs, ESMA.

ASRD-S.59

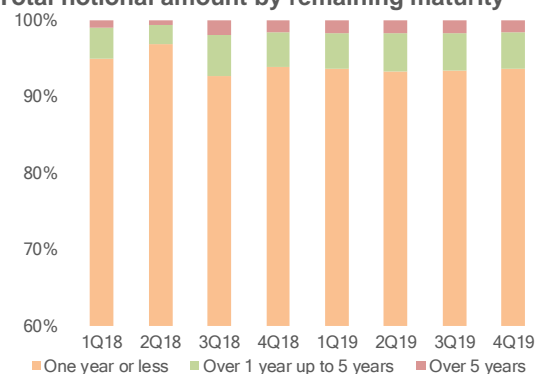
### Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty, in %.

ASRD-S.60

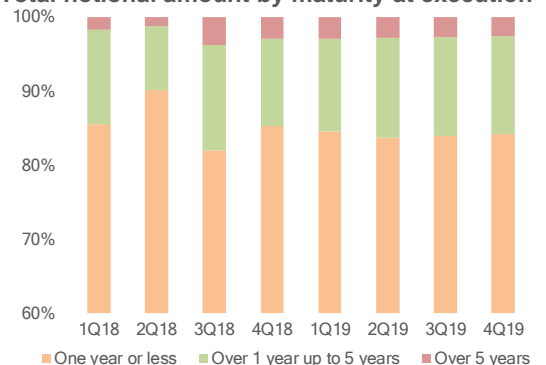
### Total notional amount by remaining maturity



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

ASRD-S.61

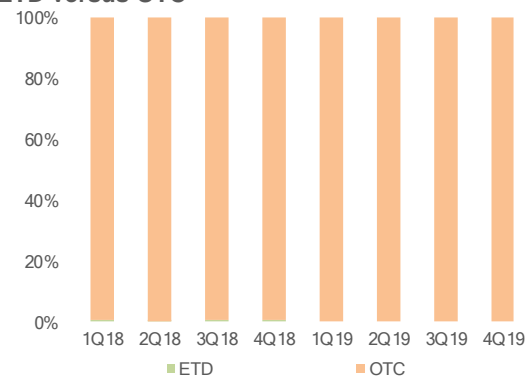
### Total notional amount by maturity at execution



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

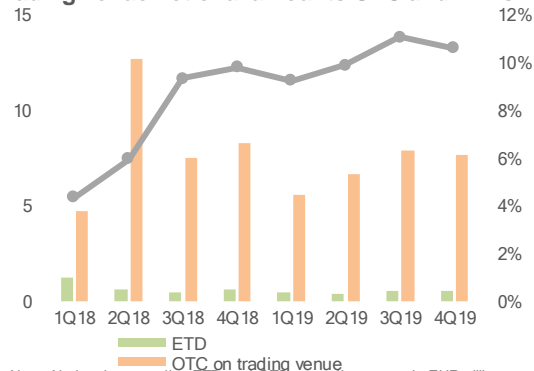
ASRD-S.62

### ETD versus OTC



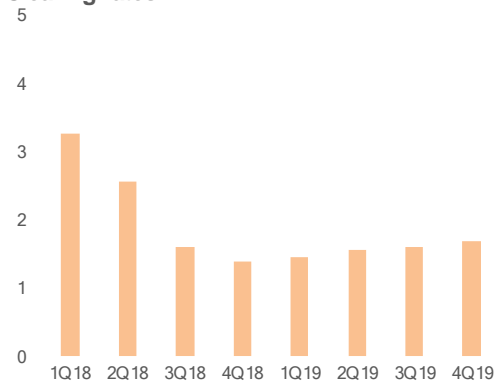
Note: Shares of gross notional amount outstanding, in %.  
Sources: TRs, ESMA.

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).  
Sources: TRs, ISO, ESMA.

ASRD-S.64

**Clearing rates**

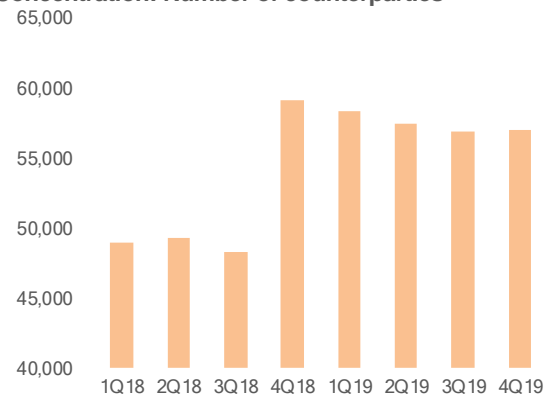
Note: Central clearing rate of total OTC notional centrally gross outstanding notional in %.  
Sources: TRs, ESMA.

ASRD-S.65

**Concentration: HHI and top-five counterparties**

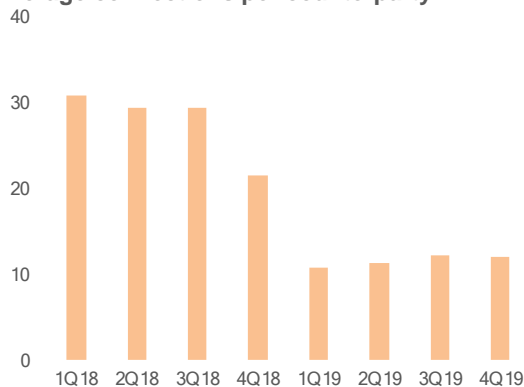
Note: HHI and total notional amount of top-five counterparties as a proportion of the total notional amount. HHI normalised between 0 and 1.  
Sources: TRs, ESMA.

ASRD-S.66

**Concentration: Number of counterparties**

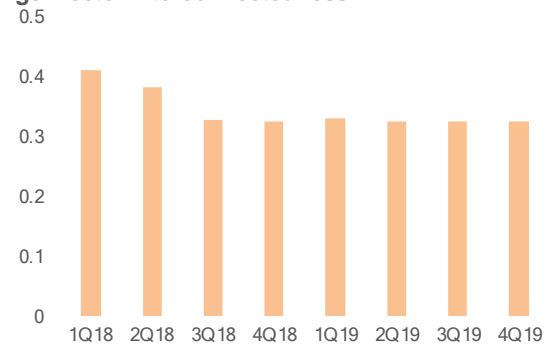
Note: Number of unique counterparties.  
Sources: TRs, ESMA.

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

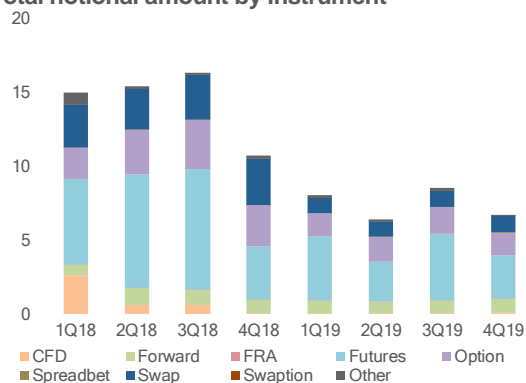
**Eigenvector interconnectedness**

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

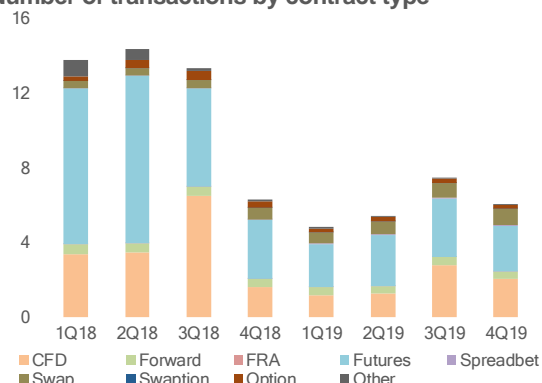
### Total notional amount by instrument



Note: Total notional amount outstanding by contract type, in EUR tn.  
Sources: TRs, ESMA.

ASRD-S.70

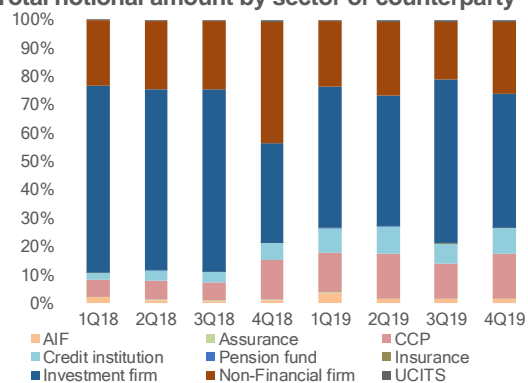
### Number of transactions by contract type



Note: Number of derivatives by contract type, in million.  
Sources: TRs, ESMA.

ASRD-S.71

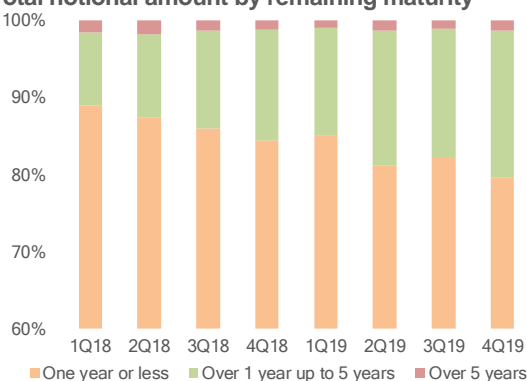
### Total notional amount by sector of counterparty



Note: Proportions of total notional amount outstanding (not reconciled) by counterparty, in %.

ASRD-S.72

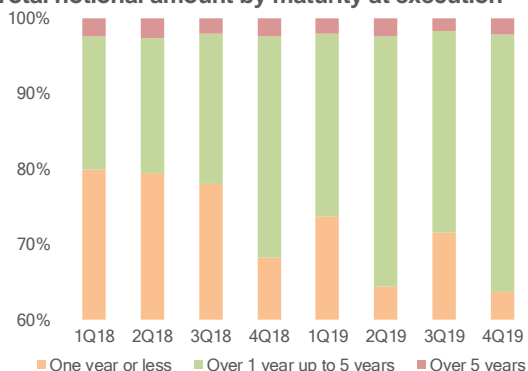
### Total notional amount by remaining maturity



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

ASRD-S.73

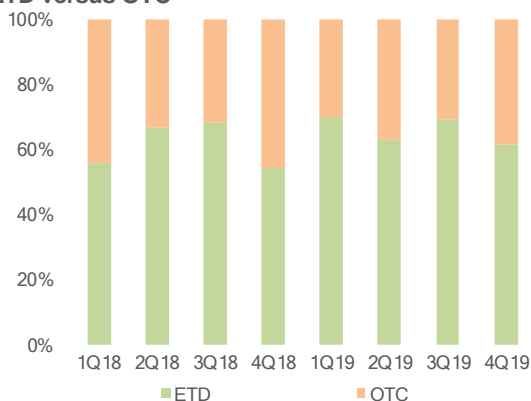
### Total notional amount by maturity at execution



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

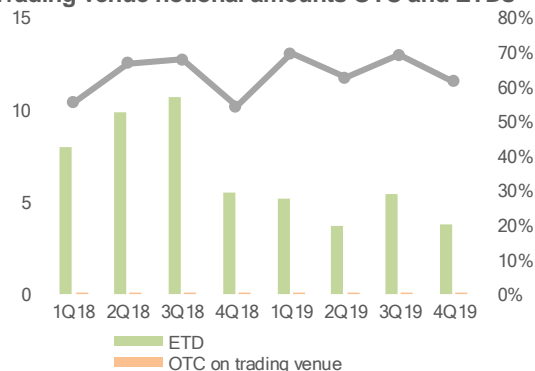
ASRD-S.74

### ETD versus OTC



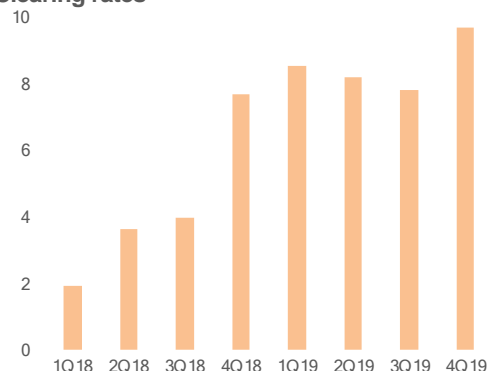
Note: Shares of gross notional amount outstanding, in %.  
Sources: TRs, ESMA.

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).

ASRD-S.76

**Clearing rates**

Note: Central clearing rate of total OTC notional centrally gross outstanding notional in %.

Sources: TRs, ESMA.

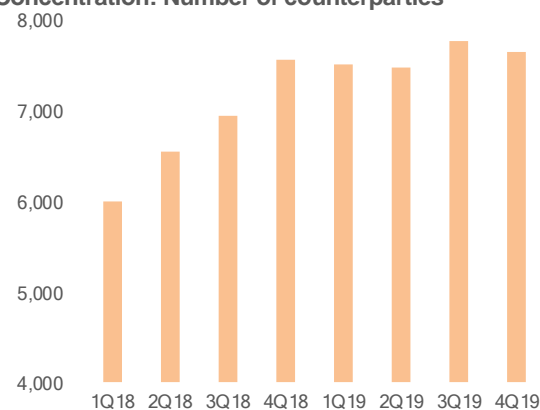
ASRD-S.77

**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.

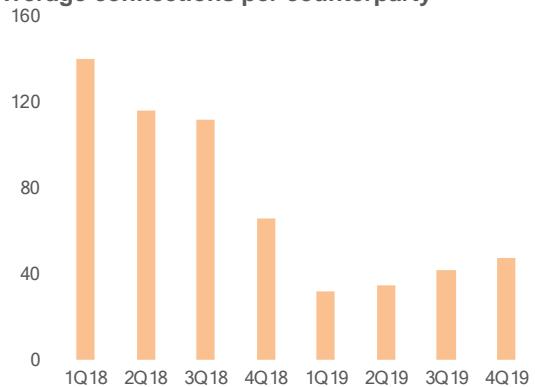
ASRD-S.78

**Concentration: Number of counterparties**

Note: Number of unique counterparties.

Sources: TRs, ESMA.

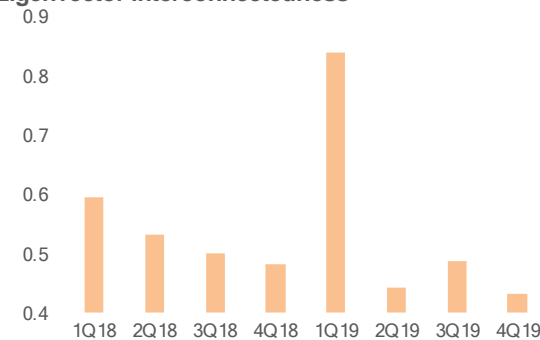
ASRD-S.79

**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 2018

To facilitate comparison over time, we reproduce the essential statistics from the previous reporting year.

	Derivatives asset class					
	All	Commodities	Credit	Currency	Equity	Interest rate
<b>Size</b>						
Total notional amount (EUR tn)	715	11	13	93	40	557
Proportion (% of notional amount)	100	2	2	13	6	78
Change 1Q18 to 4Q18 (%)	2	-11	-29	-33	10	16
Contracts (number in mn)	48	6	1	15	20	8
Proportion (% of total)	100	12	2	31	40	15
Change 1Q18 to 4Q18 (%)	-47	-54	4	-18	-64	-15
<b>Underlying instruments</b>						
Instrument with largest notional	swap	futures	swap	forward	option	swap
Proportion (% of notional amount)	58	33	84	70	61	70
Instrument with most transactions	CFD	futures	swap	CFD	CFD	swap
Proportion (% of transactions)	32	49	93	48	32	69
<b>Counterparty exposures</b>						
By type (% of notional amount)						
Investment firms	32	36	50	42	64	28
CCPs	33	15	12	1	1	41
Credit institutions	22	6	16	27	20	22
Non-financial firms	7	41	9	19	10	4
By domicile (% of notional amount)						
Intra-EEA	43	45	33	32	56	44
Intra-EEA excluding UK	7	7	5	10	16	6
UK to rest of EEA	19	15	17	12	31	20
Intra-UK	18	24	11	11	9	19
EEA with a third country	56	55	64	67	43	55
<b>Intragroup exposures</b>						
Intragroup total notional amount	70	3	1	12	12	42
Proportion (% of notional amount)	10	28	10	13	30	7
Intragroup transactions (number in mn)	4.8	0.8	0.1	1.9	1.6	0.5
Proportion (% of all transactions)	10	12	9	12	8	7
<b>Execution venue and clearing</b>						
ETD proportion (% of notional)	10	54	4	0.6	61	8
OTC proportion (% of notional)	90	46	96	99	39	92
On-trading venue	6	0.003	4	9	0.02	6
Off-trading venue	83	46	93	90	39	85
Clearing rate (% of OTC notional)	n/a	8	25	1	1	63
<b>Concentration</b>						
Top five (% of notional amount)						
Excluding CCPs	n/a	42	47	38	39	24
Including CCPs	n/a	52	52	38	39	61

Note: All values as of 4Q18 (14 December 2018). 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.

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:

$$\text{Cleared notional (\%)} = \frac{\frac{CN_{EEA}}{2} + CN_{Non-EEA}}{UN + (\frac{CN_{EEA}}{2} + CN_{Non-EEA})}$$

where:

- $CN_{EEA}$  is the notional amount of contracts with one EEA CCP as a counterparty;
- $CN_{non-EEA}$  is the notional amount cleared by a non-EEA CCP;
- $UN$  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.

**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.<sup>47</sup> The underlying formula is:

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

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.

<sup>47</sup> 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

