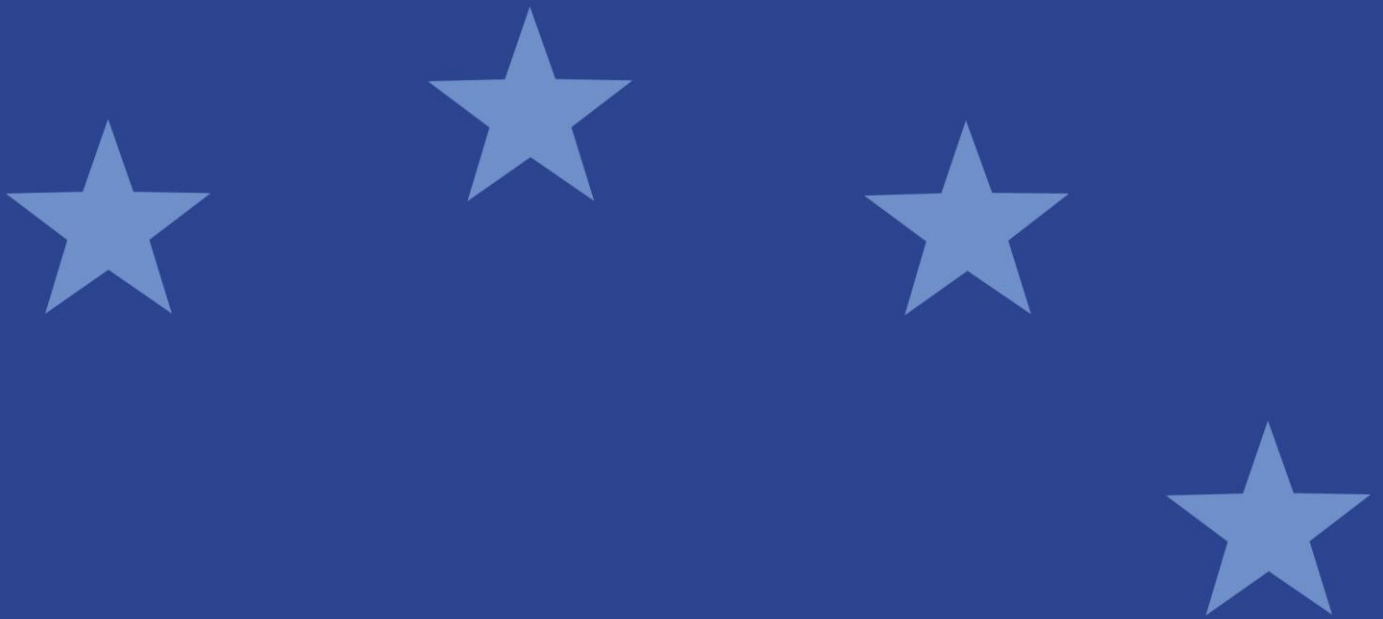




European Securities and
Markets Authority

Final Report

Emission allowances and associated derivatives





European Securities and
Markets Authority

28 March 2022
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1 Executive Summary

Reasons for publication

The European Emission Trading System (ETS) is a key tool of the EU policy against climate change. It puts a price on the CO₂ that entities subject to compliance obligations can release to the atmosphere, with the overall objective of reducing net greenhouse gas emissions. In its Communication on Energy Prices “Tackling rising energy prices: a toolbox for action and support”, published on 13 October 2021, the European Commission highlights that questions have emerged around the functioning of the European carbon market. In order to examine more closely patterns of trading behaviours and the potential need for targeted actions, the Commission asked ESMA for a first preliminary assessment of European carbon markets by 15 November and tasked it to analyse, by early 2022, the trading of emission allowances. Following the publication of its Preliminary Report on Emission Allowances and derivatives thereof¹, ESMA is publishing in this report its analysis of the trading of emission allowances.

Content

Following the introduction (Section 2) where ESMA provides a high-level overview of the functioning of primary and secondary emission allowance markets, including the process from the creation of emission allowances until they are surrendered every year by entities subject to compliance obligations under the EU ETS, the report is structured as follows:

Section 3 describes the different mechanisms foreseen in the Market Abuse Regulation (MAR) which aim at identifying and preventing abusive market behaviours. A description of the follow-up carried out by National Competent Authorities (NCAs) upon identification of alerts for potential market abuse or upon reception of a STOR is also provided.

Section 4 presents ESMA’s analysis of the data regarding emission allowances gathered from different sources, including EMIR reporting, MiFIR transaction reporting, MiFID II daily and weekly position reports, auction data and data obtained from the EU Registry. The analysis focuses in particular on the evolution of carbon prices and its volatility. The data analysis performed by ESMA evidences the specificities and unique characteristics of the EU carbon market, as well as the challenges of having a comprehensive view of this market and an in-depth understanding of its developments. Overall, ESMA considers that the data analysis has not unearthed any major abnormality or fundamental issue in the functioning of the EU carbon market from a financial supervisory perspective.

The observed evolution of carbon prices and volatility seem to have followed market fundamentals. In this context, the emergence of new participants (and instruments) with buy-and-hold strategies warrants future monitoring to the extent that they may lead to a reduction in the supply of physical emission allowances available for trading, even though the available evidence suggests that their impact is only limited so far.

When looking at trading on emission allowances and counterparties in this market, the various segments of the EU carbon market appear to broadly function as expected. Although

ESMA observes some concentration in primary markets, the largest participants are also active in secondary markets and ensure that auctioned emission allowances are disseminated to other secondary market participants. Trading in the secondary market between June 2021 and December 2021 averaged EUR 57 billion per month. Most of the trading in the secondary market takes place through derivative contracts, as many compliance entities seem to take long futures positions with investment firms to acquire emission allowances instead of purchasing them on the spot market. Large holdings of emission allowances in the Trading Accounts of investment firms at the EU Registry appear highly correlated with short positions these firms take in emission allowance derivative markets.

Derivative markets are dominated by compliance entities and other non-financials that are holding long positions for hedging purposes and trading with investment firms holding short positions to make a market. Most of the trading volumes concentrate in the next (front-year) December expiry futures contract, although there are also significant positions in the March expiry of the current year linked to the lifecycle of emission allowances which have to be surrendered by 30 April every year. Investment firms, credit institutions and compliance entities tend to trade futures across the maturity spectrum, while investment funds and other non-financial sector firms appear to favour trading in futures with a residual maturity of less than one year. Investment funds and other non-financial sector firms also trade options to a larger extent. An increase in the relative share of options in total notional volumes traded in late 2021 is a development that warrants monitoring – as do trends in the less transparent OTC market segment.

ESMA has also observed activity from high-frequency trading firms and market makers engaging in algorithmic trading, often from the UK and US, that are however only holding small net positions.

ESMA has faced significant challenges when trying to identify the origins of market participants which makes it complex to obtain a clear picture of who trades and from where. ESMA considers that these challenges need to be addressed in order to improve future monitoring of EU carbon markets. As already indicated in the Preliminary Report and highlighted above, there are also challenges when it comes to the assessment of the available data. In this respect, future research will be essential to deepen ESMA's understanding of the emission allowance market structure and activities of third-country firms.

ESMA is acutely aware that the war in the Ukraine has a major impact apparently also on the carbon market. While EUA prices were declining by 30% in just a few days in late February and early March, natural gas prices reached all-time highs in Europe. There are a number of macro-economic and also technical factors which may explain these latest developments specifically in the carbon market which ESMA is referring to in this report. There are indications that the decline in the carbon price may be associated with concerns around possible gas supply disruptions or import bans leading to a reduced need for

emission allowances, combined with general assumptions concerning an economic downswing and EU countries exiting fossil fuels at an earlier point in time but additional analysis may be required in the future. As far as price developments are concerned this report incorporates data up to 4 March 2022.

Based on the data analysis carried out in Section 4 and the conclusions presented therein, the following section (Section 5) presents a series of policy recommendations together with some issues for consideration that ESMA believes should contribute to improving the transparency and the monitoring of the EU carbon market. ESMA believes that the measures proposed would provide more information to market participants and the public at large about the carbon market and they would help in maintaining orderly markets going forward thereby contributing to the continued adequate functioning of the EU carbon market which plays an important role for the Union's green transition.

Policy recommendations

ESMA puts forward the following policy recommendations:

1. Extending position management controls to trading venues trading derivatives on emission allowances.
2. Adapting position reporting in emission allowances.
3. Amending the account structure at the Union Registry to allow for the identification of individual EUA account holders so that the Union Registry can be used as a data source for market monitoring and transparency for market participants.
4. Publishing weekly position reports on open positions in futures on emission allowances only in addition to the current combined reports on open positions in futures on emission allowances and options on futures on emission allowances.
5. Providing further clarity to market participants regarding counterparty classifications in weekly position reports.
6. As part of the RTS 2 review underway, ESMA will consider the potential need for recalibration of transparency thresholds for emission allowances and emission allowance derivatives.
7. Providing further guidance to ensure that only "EU" ISINs are used for the purpose of reporting spot emission allowances.
8. Providing further clarity on the distinction between spot emission allowances and derivatives on emission allowances.
9. Increasing the level of transparency in OTC derivatives.

-
10. Introducing a new identifier in the case of grouping of orders that would be generated and reported by only one entity per market execution and would be unique for the market-side reports and the client-side reports pertaining to the same execution.
 11. Amending the EU Auction Regulation to ensure that ESMA also receives the information on primary markets transactions.
 12. Increasing data harmonisation in line with the standards and structures used in regulatory reports under MiFID/EMIR and inviting the Commission to consider defining assets protection rules when accounts in the Registry are used as omnibus accounts. In addition, ESMA encourages the timely implementation of the requirement for the identification of account holders with LEIs.

Issues for consideration

Furthermore, ESMA has also considered the arguments in favour and against the two following measures:

1. The application of position limits on the open position a person may hold in emission allowance derivatives and economically equivalent OTC contracts.
2. A centralised market monitoring of the carbon market.

Overall, ESMA has taken the approach in this report to provide factual background information, based on data and securities supervisors experience, to allow EU policy makers to make informed decisions in respect of the carbon market. ESMA stands ready to help implementing any measures which the Commission, Council and Parliament may decide on in the future.

2 Introduction

1. On 13 October 2021, the European Commission adopted a “Communication on Energy Prices”, to help tackle the exceptional rise in global energy prices and help Europe's people and businesses. The Communication included a “toolbox” for the EU and its Member States to address the impact of price increases. The toolbox also identified actions for strengthening resilience against future shocks.
2. One of the measures put forward by the European Commission in that Communication was to step up market surveillance of energy markets, including of the European carbon market. In this respect, the European Commission asked ESMA to further enhance the monitoring of developments in the European carbon market as follows: “To examine more closely patterns of trading behaviours and the potential need for targeted actions, the Commission will ask ESMA, for a first preliminary assessment by 15 November and task it to analyse, by early 2022, the trading of emission allowances. The Commission will consequently assess whether certain trading behaviours would require further regulatory actions.”
3. Following the mandate received from the Commission, ESMA published its Preliminary Report on Carbon Market² mid-November 2021. The Preliminary Report provided a factual description of the market based on the data immediately available to ESMA but did not draw any conclusions on the functioning of EUA markets or provide potential policy recommendations. ESMA explained that it would complete its preliminary analysis based on a more comprehensive data analysis and a more in-depth look into recent developments. This Report is the result of that further work.

Functioning of the EUA market

4. This section of the Report focuses on the auction process and on the negotiation of emission allowances (EUAs) in secondary markets and provides a high-level overview of these processes³. Whenever useful, cross-references are made to other sections of the Report including further information about specific topics.
5. After their creation by the European Commission in the Union Registry⁴, EUAs might be allocated for free to some operators in the EU or auctioned through a process regulated by the Auction Regulation⁵ (primary market) and potentially exchanged in a trading venue or OTC afterwards (secondary markets). Figure 13 in [Section 4.2.5](#) of the report shows supply and demand of EUAs since 2017, including EUAs banked from Phase 2 (2008-2012), freely allocated allowances and those auctioned.

² https://www.esma.europa.eu/sites/default/files/library/esma70-445-7_preliminary_report_on_emission_allowances.pdf

³ Processes presented here have been simplified, i.e. graphs do not present detailed chains of intermediation and all possible trading scenarios, i.e. brokers and clearing members are not specified, for a simplified representation of EUAs flows in primary and secondary markets.

⁴ The Union Registry serves to guarantee accurate accounting for all allowances issued under the EU emissions trading system (EU ETS). The registry keeps track of the ownership of allowances held in electronic accounts and it is used for the delivery of the EUAs. Please refer to section 4.3.8.1 for a more detailed description of the Union Registry.

⁵ Commission Regulation (EU) No 1031/2010 of 12 November 2010 on the timing, administration and other aspects of auctioning of greenhouse gas emission allowances.

6. According to this data, since 2018, freely allocated EUAs account for more than 52% of the annual supply, while auctioned EUAs represent the remaining more than 47%.

Primary markets

7. The primary market for EUAs consists of auctions to which, in addition to compliance entities⁶, most categories of market participants are able to participate in (e.g. credit institutions, investment firms, commodity trading firms without compliance requirements). EUAs are issued by 25 Member States (and the EEA EFTA States since 2019⁷) through an auctioning process which is hosted by the German trading venue EEX. The other two Member States (Germany and Poland) issue emission allowances through a similar auctioning process also on EEX.
8. Entities willing to participate in auctions have to comply with some regulatory eligibility criteria⁸ which guarantee the integrity of the auction process and a fair and open access for all auction participants. According to the Auctioning Regulation, the following persons are eligible to apply for admission to bid directly in the auctions: operators with compliance obligations (including other subsidiaries of the same group of undertakings as the operator with compliance obligations), investment firms authorised under Directive 2014/65/EU, credit institutions authorised under Directive 2013/36/EU, business groupings of compliance operators bidding on their own account and acting as agent on behalf of their members, public bodies that control any compliance operator, and persons covered by the “ancillary activity exemption” of MiFID II⁹ when the Member State where they are established has enacted legislation enabling the “relevant competent national authority” in that Member State to authorise them to bid on their own account or on behalf of clients of their main business.¹⁰
9. Furthermore, the Auctioning Regulation foresees a series of requirements for eligible persons to be admitted to bid in auctions. Among others, these admission requirements notably require all the entities that are not compliance buyers to be established in the EU. In addition, all entities participating in the auctions must open an account in the Union registry, appoint at least one bidder’s representative and comply with the admission requirements of the auction platform. Investment firms, credit institutions and persons covered by the “ancillary activity exemption”, when submitting bids on behalf of their clients, must comply with additional conditions. These additional conditions aim at ensuring that their clients are eligible persons and that the necessary contractual agreements are in place (especially with regards to the process of bids from their clients, the prevention of disclosure of confidential information and to ensure that their clients

⁶ Companies and aircraft operators who are obliged to participate in the EU ETS.

⁷ https://ec.europa.eu/clima/news-your-voice/news/emissions-trading-revised-2019-auction-calendars-including-eea-efta-volumes-published-2019-05-16_en

⁸ Articles 18 and 19 of Regulation 1031/2010 on the timing, administration and other aspects of auctioning of greenhouse gas emission allowances (the Auctioning Regulation)

⁹ Article 2(1)(j) of Directive 2014/65/EU

¹⁰ Article 18(2) of the Auctioning Regulation states the following: *Without prejudice to the exemption in Article 2(1)(i) of Directive 2004/39/EC, persons covered by this exemption and authorised pursuant to Article 59 of this Regulation shall be eligible to apply for admission to bid directly in the auctions either on their own account or on behalf of clients of their main business provided that a Member State where they are established has enacted legislation enabling the relevant competent national authority in that Member State to authorise them to bid on their own account or on behalf of clients of their main business.*

when acting themselves on behalf of other clients apply the requirements relevant to eligible persons). EEX further requires potential bidders to provide evidence of personal reliability and professional qualification, to be recognised as a trading participant by the CCP ECC and to conclude an agreement with a clearing member of this CCP.

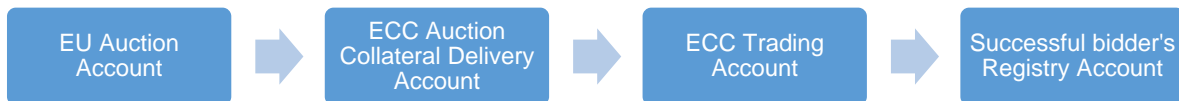
10. Once an entity has been admitted by EEX (and ECC), it can participate in the auctions and submit bids. As further described in [Section 4.3.3](#), the number of unique participants in EUA auctions held between January 2021 and December 2021 was 48 (of which 34 were non-financials and 14 financials).
11. EEX auctions two types of allowances: EU general allowances (EUA) and EU aviation allowances (EUAA)¹¹. The auctions take place on a daily basis according to a fixed calendar¹². One allowance permits the emission of one tonne of carbon dioxide equivalent (CO₂). As further described in section 4.3.3, the total quantity of EUAs auctioned from June 2020 until December 2021 (period for which ESMA has received data under the Auctioning Regulation) was just under one billion for a total market value of EUR 41.8 billion (around EUR 120 million per day), including EUR 31 bn in 2021 only. In comparison, the total quantity of EUAs auctioned during the same period amounted to just 7 million, or 0.7% of the total.
12. The success of a bid will depend on the price and the amount of allowances auctioned¹³. Article 7 of the Auctioning Regulation details how the auction clearing price is to be determined by following the process below:
 - Bids are sorted in descending order of the price bid;
 - Bid volumes are added, starting with the highest bid; the price at which the sum of volumes bid matches or exceeds the volume of allowances auctioned shall be the auction clearing price;
 - Tied bids will be sorted through random selection according to an algorithm determined by the auction platform before the auction;
 - All bids with a price higher than the auction clearing price are successful. Execution of bids made at the auction clearing price depends on their ranking in the random selection (i.e. all bids at the same price are not executed following an order based on their timestamp, but according to the order given by the platform's algorithm). All successful bids pay the same auction clearing price even if they bid higher.
 - Partial execution of orders may be possible for the last successful bid matching the auction clearing price, depending on the remaining quantity of allowances.

¹¹ Specifically foreseen for the aviation sector. Nevertheless, as of 2021, both types of allowances are fungible and aviation allowances can be used to fulfil compliance obligations by stationary installations and vice versa.

¹² Monday, Tuesday and Thursday for auctions on behalf of the Member States and the EEA EFTA States participating in the common auction platform, Wednesday on behalf of Poland and Friday on behalf of Germany.

¹³ The amount of auctioned EUAs is fixed in advance and can be adjusted only a few times during the year.

13. Entities who submit successful bids during the auction process can get allowances delivered in their accounts at the EU Registry¹⁴. From an operational perspective, two parallel processes are to be distinguished. Firstly, at the level of the EU Registry, EUAs will be transferred from the EU Auction Account in the EU Registry (which together with the Free Allocation Account are the Registry accounts managed by the European Commission, cf. [Section 4.3.8.2](#)) to the successful bidder's account in the Registry, going through the CCP accounts. Secondly, at the level of the CCP ECC, internal accounts of the auctioneers and of the buyers are credited and debited.
14. At the level of the EU Registry, as illustrated in the graph below, auctioned EUAs are transferred from the EU Auction Account to the CCP Auction Collateral Delivery Account. Once the payment has been made to the auctioneers, ECC is allowed to transfer the EUAs from its Auction Collateral Delivery Account to its trading account at the Union Registry. ECC delivers the emission allowances to the buyer's registry accounts on their request.



EUA flow at the EU Registry.

15. At the level of the CCP, as illustrated in the graph below, deliveries of EU emission allowances are effected by booking within ECC's internal accounts. ECC transfers the holdings from the internal accounts of the auctioneers to the internal accounts of the buyers on the delivery day, after payment on T+1. This involves the transfer of the allowances in exchange of the received cash, where the cash payments are processed via the clearing members. Once the allowances are within the buyer's account at the CCP, the buyer can keep them in the account, sell them or request delivery to another registry account. Indeed, the accounts at the EU Registry can act as omnibus accounts and as such ECC's account can hold the allowance of a successful bidder without transferring them to the successful bidder's own registry account. This implies that there might be mismatches between the information displayed through the holdings of EU Registry accounts and the accounts at the CCP level (cf. [Section 5.2](#) on recommendations on clarification of position reporting of EUAs and [Section 5.8](#) on the functioning of the EU Registry).



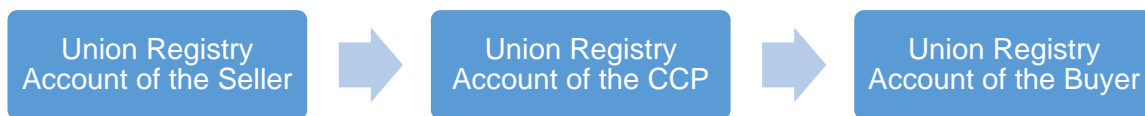
EUA flow at the CCP.

¹⁴ ECC delivers the allowances in the Union Registry account of the successful bidder at the request of the bidder. If the successful bidder wishes, the allowances can be delivered to another account for instance when the allowances are used to fulfil a delivery obligation for derivatives contracts.

Secondary markets¹⁵

16. Three European trading venues offer trading in different contracts on EUAs: EEX in Germany, ICE Endex in the Netherlands and Nasdaq Oslo in Norway. The contracts offered for trading are the following (1) contracts with a daily expiry, called “daily futures” or “spot”¹⁶, (2) futures with various maturities; and (3) options on futures. All derivatives have a standardised contract size of 1,000 allowances (i.e. 1,000 tonnes of CO₂). Derivatives on emission allowances traded in these trading venues are cleared respectively by ECC AG in Germany, ICE Clear Europe Ltd. in the UK¹⁷, and Nasdaq Clearing in Sweden. It is to be noted that after the transfer of the trading of derivatives on EUAs in ICE from its UK trading venue to ICE Endex in the Netherlands, ICE contracts remain cleared by ICE Clear Europe in the UK. These CCPs also offer clearing for OTC transactions. A more in-depth analysis of the post-trade activity in EUAs is presented in [section 4.3.4.6](#).
17. A comparison of open positions on the three trading venues EEX, Nasdaq Oslo and ICE Endex shows a significant dominance of ICE Endex (around 85% of the total gross positions, see the full analysis in [Section 4.3.7](#) and in particular Figure 66) while EEX holds the remaining 15% and the market share of Nasdaq Oslo remains marginal. Open interest is concentrated in the future contracts expiring in December of the current year.
18. Generally speaking (although there might also be negotiated transactions being submitted to a trading venue), a market participant can place a buy or sell order for a derivative on EUAs in the order book of a trading venue. If the order matches an opposite order and both the buyer and the seller keep their positions open until maturity, they will follow the process established by the relevant CCP to ensure that EUAs are delivered from the account of the seller to the account of the buyer in the Union Registry and that the seller gets the corresponding amount of cash from the buyer. The settlement of the two separate legs of the transaction (EUA and cash) takes place in different places:

EUA flow



¹⁵ Article 3(11) of Regulation 1031/2010 defines “Secondary markets” as follows: “(...) the market in which persons buy or sell allowances either before or after they are allocated either free of charge or through auctioning”.

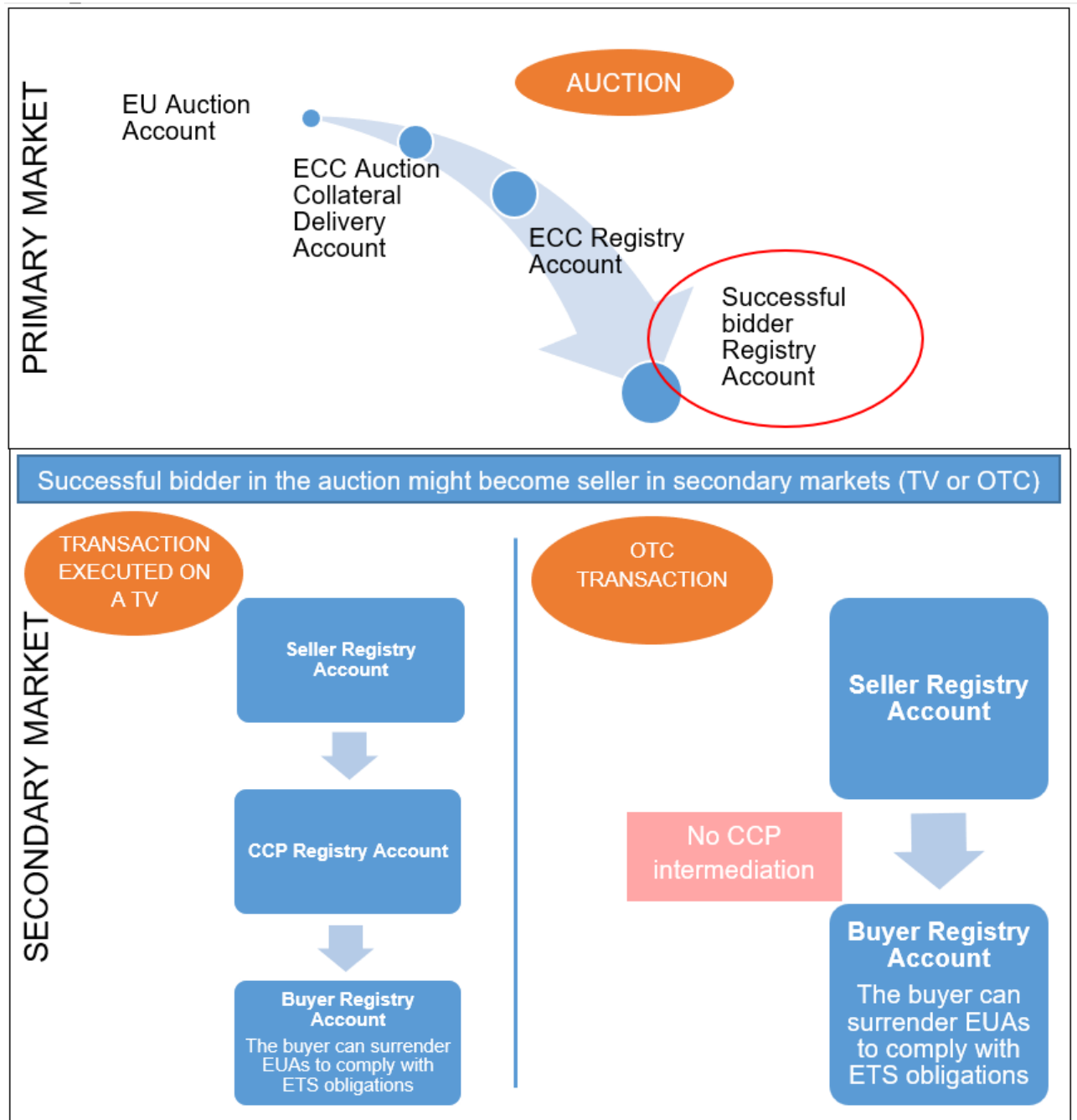
¹⁶ EEX references to “spot” and ICE references to “daily futures” both cover contracts with a daily expiry.

¹⁷ ESMA’s Assessment Report under Article 25(2c), p. 74: “Other products cleared within the F&O segment are not considered to be of substantial systemic importance. Market shares vary depending on the product (Energy, Equities, Soft Commodities), and though the exact exposures of EU clearing members are not available, EU activity appears to be spread over many different types of products.”

Cash flow



19. Once the buyer (e.g. an operator with compliance obligations) has received the EUAs in its account at the Registry, it can surrender the allowances to comply with its obligations under the ETS Directive. The operators' deadline for surrendering EUAs is 30 April of each year for the year Y-1. The seller in the secondary market could also be an entity with compliance obligations who has allowances in excess of its final verified emissions of CO₂, independently of whether the excess allowances have been acquired through primary or secondary markets or even allocated for free.
20. In addition to the negotiation on trading venues, EUAs and derivatives thereof can also be exchanged bilaterally between two entities outside a regulated trading platform, i.e. over-the-counter (OTC). OTC transactions may involve trading participants with or without compliance obligations. While counterparties to an OTC transaction have contractual freedom to decide on the terms and conditions of the transaction, the delivery of the allowance will always take place through the Union Registry, where the seller will have to proceed with a transfer from its account to the account of the buyer. The financial flow for purely OTC transactions are separated from the transfer in the registry.
21. Taking into consideration the above descriptions of the primary and secondary markets, and assuming that the successful bidder in the auction would not hold the emission allowances to comply with ETS obligations or to hold them as it can be seen in some specific trading strategies (cf. buy-and-hold strategies described in [Section 4.2.6](#)) but rather to provide liquidity in secondary markets, an emission allowance can follow the complete lifecycle represented by the graphs below, from the EU Auction Account in the EU registry until the surrender of the EUA by the compliance entity. Considering the findings in [section 4.3.8.2](#) of this report, such an approach would make sense in particular in the case of financial entities providing liquidity in EUAs, as data shows that most financials are buying physical EUAs with the plan to sell them again in the future.



ETS markets outside the EU

22. In 2020, the EU ETS accounted for almost 90% of the global carbon market value¹⁸.
23. Besides the EU ETS, national or sub-national systems are being operated or are under development in Canada, China, Japan, New Zealand, South Korea, Switzerland¹⁹, the

¹⁸ Refinitiv Carbon Market Review 2020.

¹⁹ Following the signature of the Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emission trading systems in December 2017, the Swiss ETS linked with the EU ETS officially in January 2020

United Kingdom²⁰, the United States and other countries worldwide. The level of development of ETS markets in those countries varies significantly depending on a number of different factors (e.g. political ambitions related to the reduction of greenhouse gas emissions, organisation of the system, experience, polluting entities covered, etc.). Section 4.2.1. of this report provides more information on prices developments in those other ETS markets.

24. ESMA has not undertaken an exhaustive analysis of the functioning of these different ETS markets but has noted several recent interesting developments. First of all, after several years of preparation, China's ETS market officially started operating on 16 July 2021²¹. This market covers 2,225 energy companies throughout China. At this initial stage of functioning, only the covered energy companies are admitted to trade in the national ETS market and only spot allowances are traded. However, the Chinese national ETS market is expected to continue evolving, in particular by covering other types of polluting activities, allowing financial entities to participate in the market and introducing new products such as futures and options²². Secondly, the South Korean ETS market²³, which has been operating since 2015, entered into its third phase in 2021. In this new phase, financial intermediaries are allowed to trade South Korean allowances (although with some limitations²⁴) with the objective of complementing the "market maker system" that was introduced in Phase 2 to support market liquidity. Indeed, in 2019, two South Korean banks were officially appointed as market makers, while a third one joined as well to provide liquidity to the market and to try reducing the bid-ask spread. In both cases, ESMA notes the acknowledgment of the contribution of financial entities to the liquidity of the markets and to price discovery. Finally, in the U.S., during the September 2021 meeting of the CFTC's Energy and Environmental Markets Advisory Committee (EEMAC)²⁵, the CFTC has been recommended to form an EEMAC subcommittee to provide a report to the EEMAC on guiding principles for the design of the derivatives and underlying cash markets for environmental products, such as carbon allowances and offsets, which shows an increasing interest in this type of markets at the federal US level.
25. Following the overview of carbon markets provided in this introduction, the report focuses on: the surveillance of carbon markets, with a particular focus on the different jurisdictions where EUAs are mostly traded (Section 3); the analysis of the carbon markets using a variety of data sources to illustrate the evolution of prices and volatility of EUAs and the evolution of trading and counterparties (Section 4); and a series of policy recommendations that ESMA consider could be implemented in order to improve the functioning of EUAs markets.

²⁰ On 1 January 2021, the UK ETS replaced the UK's participation in the EU ETS.

²¹ [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=55](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=55)

²² <https://www.reuters.com/article/china-carbon-trading-idAFL1N2TE03W>

²³ [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=47](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=47)

²⁴ P. 18 https://icapcarbonaction.com/en/?option=com_attach&task=download&id=723

²⁵ <https://www.cftc.gov/PressRoom/Events/opaeventeemac091521>

3 Carbon markets surveillance

3.1 Carbon markets under MAR

3.1.1 Legal framework

26. The EU market abuse regime under MAR is aimed at promoting the integrity of the markets through the prohibition of insider dealing, unlawful disclosure of inside information and market manipulation, altogether referred to as market abuse. To foster compliance and facilitate enforcement of those prohibitions, MAR provides for a number of ancillary rules to be followed by issuers, intermediaries and trading venues in the attempt to reduce the risks of market abuse being committed, and for significant powers for NCAs in the detection and prosecution of breaches.
27. Whilst the NCAs' powers to enforce and prosecute breaches of MAR are necessarily exercised post facto, the EU market abuse regime provides for an articulated system of market surveillance that is built upon several lines of defence to detect and prevent market abuse.
28. In that sense, the EU market surveillance systems that we are describing in this section are designed around the statutory prohibitions of market manipulation and insider trading under MAR and are not created to detect nor prevent any form of speculation-driven impact on prices that does not represent a violation of the market abuse prohibitions.
29. With particular reference to market manipulation, Article 12 of MAR expressly prohibits:
 - a) placing orders, entering into transactions or any other behaviour that give false or misleading signals as to the supply, demand or price of a financial instrument, or that are likely to secure its price at an abnormal or artificial level.
 - b) placing orders, entering into transactions or any other behaviour which affects or is likely to affect the price of a financial instruments, which employs a fictitious device or any other form of deception or contrivance;
 - c) disseminating information through the media which gives, or is likely to give, false or misleading signals as to the supply of, demand for, or price of, a financial instrument, or is likely to secure its price at an abnormal or artificial level, including the dissemination of rumours, where the person who made the dissemination knew, or ought to have known, that the information was false or misleading.
30. Individual or concerted actions aimed at securing a dominant position over the supply of or demand for a financial instrument is also market manipulation.
31. Additionally, buying or selling emission allowances or related derivatives on the secondary market prior to the auction held pursuant to Regulation 1031/2010 is also considered market manipulation whenever it has the effect of fixing the auction clearing price for the auctioned products at an abnormal or artificial level or where it misleads bidders in the auctions. The auction prices and secondary market prices are interrelated,

as the auction should be cancelled according to Article 7 (6) of Regulation 1031/2010 if the auction clearing price is significantly below the price on the secondary market. This aims at preventing market participants to benefit from arbitrage between the primary and secondary markets.

32. Annex I of MAR provides for a non-exhaustive list of indicators relating to false or misleading signals and to securing prices at an artificial level.
33. The prohibition of market manipulation applies horizontally to all financial instruments admitted to trading on an EU regulated market or traded on an MTF or OTF.
34. Unlike spot commodity contracts that are not financial instruments and therefore are not subject to the full set of rules laid down in MAR²⁶ (with the consequence that only derivatives thereof are fully covered by the MAR provisions), emission allowances are financial instruments and subject, together with any derivative thereof, to the full set of MAR provisions.
35. Any other trading strategy that does not fall in any of the above categories, even where it is exclusively carried out in the pursuit of a bet over the uncertain future price evolution of a financial instrument, cannot be considered manipulative.
36. Beyond market manipulation, MAR prohibits insider dealing and unlawful disclosure of inside information.
37. With reference to emission allowances and auction products based thereon, Article 7(1)(c) of MAR provides for a specific definition of inside information, defined as information which is non-public, precise and that, if made public, would be likely to have a significant effect on the prices of those instruments or related derivatives.
38. Among the ancillary rules to reduce the risks of market abuse being committed, MAR provides for general transparency requirements that also apply to emission allowance market participants, who should timely and publicly disclose the inside information which they hold in respect of their activities. In the case of participants in the emission allowance market with aggregate emissions or rated thermal input at or below the threshold set by the Commission in accordance with Article 17(2) of MAR, inside information about their physical operations is not to be disclosed.
39. All other participants that exceed the threshold must disclose information that could influence the price, for example a planned closure of power generation capacities.
40. Emission allowance market participants may delay the public disclosure of inside information where immediate disclosure is likely to prejudice their legitimate interest, that the delay is not likely to mislead the public, and confidentiality is ensured. When a delay in the disclosure took place, emission allowance market participants should inform the NCA and provide a written explanation of how the relevant conditions were met, immediately after the information is disclosed to the public. Alternatively, Member States

²⁶ Article 2(2) of MAR stipulates that the prohibition of market manipulation applies to spot commodity contracts, which are not wholesale energy products, where the transaction, order or behaviour has or is likely or intended to have an effect on the price or value of a financial instrument in scope of MAR.

may provide that a record of such an explanation is to be provided to the NCA only upon request.

41. Like all issuers, in order to monitor the flow of inside information, emission allowance market participants are to draw up a list of all persons who have access to inside information. That obligation applies to emission allowance market participants in relation to inside information relating to the physical operations of that emission allowance market participant, but also to any auction platform and auctioneer in relation to auctions of emission allowances or other auctioned products based thereon pursuant to Regulation 1031/2010.
42. Moreover, persons discharging managerial responsibilities, as well as persons closely associated with them, should notify the emission allowance market participant and the NCA of every transaction conducted on their own account relating to emission allowances, to auction products based thereon or to derivatives relating thereto. Emission allowance market participants are to draw up a list of all persons discharging managerial responsibilities and persons closely associated with them.
43. In addition to the rules to reduce the risks of market abuse being committed, MAR laid down rules to promote prevention and detection of market abuse. Article 16 of MAR laid down that market operators, investment firms operating a trading venue and any person professionally arranging and executing transactions establish arrangements, systems and procedures to detect and report to NCAs suspicious orders and transactions (STORs).
44. As a result, **the first line of defence** in the fight against market abuse is at firm level, where arrangements, systems and procedure have to be implemented to ensure that potentially abusive trading is detected and reported in the form of an STOR. Their presence represents both an ex-ante deterrence and a way to promote detection post facto.
45. Those arrangements, systems and procedures also cover emission allowances and related instruments and should be appropriate and proportionate in relation to the scale, size and nature of their business activity, to ensure that orders or transactions that raise a reasonable suspicion of insider dealing or market manipulation are identified and reported to NCAs. Reporting entities not only have to report transactions carried out on venue, but also OTC transactions whenever concerning instruments in scope of MAR.
46. In practical terms, the implemented systems and procedures should allow for the analysis, on an individual and comparative basis, of all transactions and orders dealt with, and produce alerts indicating activities requiring further analysis.
47. **The second line of defence**, complementing the one at firm level, lies with market operators and investment firms operating a trading venue.
48. The second line of defence presents an enhanced scope, as market operators and investment firms operating a trading venue, in addition to their obligation to identify suspicious orders and transactions and report them via STORs, are also subject to the obligation to establish and maintain effective systems and procedures to prevent market abuse. This translates in a structured market surveillance carried out at the level of the

trading venue, whose objective is to ensure that not only suspicious orders and transactions are detected and reported on an ex-post basis, but that also orders are identified and stopped before market abuse takes place.

49. Like the mechanisms for the detection and reporting at firm level, preventative measures at trading venue level should be proportionate to the scale, size and nature of the business activity, and include adequate software capable of systematic screening of all orders and transaction, combined with an appropriate level of human analysis where appropriate.
50. Finally, **the third line of defence** is regulatory market surveillance. NCAs with jurisdictions over carbon markets have in place their market surveillance systems to promote the integrity of the markets and combatting market abuse.
51. In that fight, NCAs adopt a multi-step surveillance approach, which integrates all the information available to them under the EU regime and all the publicly available information. Those data are integrated in relation to both emission allowances and the different categories of derivatives thereof, with automated alert systems that can be individually followed up and investigated upon identification.
52. Whenever a transaction or an order is flagged as potentially suspicious, a preliminary analysis is carried out and a preliminary investigation takes place.
53. In all those cases where the preliminary investigations confirm the suspicion of market abuse being committed, NCAs may launch a formal investigation, using all the tools at their disposal under MAR.
54. The tools at the NCAs' disposal when investigating a potential market abuse case range from corresponding with any subject in possession of information that is useful for the investigation, to accessing data and document in any form, carrying out on-site inspections and requiring recordings of existing telephone and electronic communication held by investment firms, credit and financial institutions. Insofar as it is permitted by national law, NCAs may also require existing data traffic records from telecommunication operators.
55. NCAs may also:
 - request the freezing and sequestration of assets;
 - suspend trading of the financial instruments concerned;
 - require the temporary cessation of any practice considered contrary to MAR;
 - impose a temporary prohibition on the exercise of a professional activity;
 - take all the necessary measures to ensure that the public is correctly informed, by correcting false or misleading disclosed information or asking the person who had disseminated it to do so.
56. In the performance of their duties under MAR, NCAs cooperate with each other and with ESMA, exchanging information and rendering assistance as opportune.

3.2 Carbon market surveillance

57. In the pursuit of the overall goal to ensure market integrity and prevent and detect market abuse, as described in the previous section, several lines of defence have been designed by the EU regime. This approach fully applies to the EU carbon markets.
58. The architecture of the EU carbon market surveillance integrates the reporting obligations of persons professionally arranging and executing transactions with the detection and prevention obligations of trading venues and, at the last level, the market surveillance systems of NCAs.
59. NCAs' supervision of firms and trading venues is instrumental to the effectiveness of the first and second line of defence, as it ensures that their systems and procedures are adequate to detect and prevent market abuse.
60. However, investment firms are also subject to organisational requirements under MiFID II, that are also relevant to mitigate the risks of disorderly markets. Those include the requirements for firms to establish and maintain adequate risk management policies and procedures which identify the risks relating to the firm's activities, processes and systems. Where appropriate and proportionate to the nature, scale and complexity of their business and the nature of the investment services provided, the investment firm should also establish an internal audit function which is separate and independent from the other functions to evaluate the adequacy and effectiveness of the investment firm's systems, internal control mechanisms and arrangements.
61. As the risks to orderly markets are more salient in case of algorithmic trading, MiFID II sets out specific and more demanding organisational requirements for investment firms that engage in this activity. Under Article 17 of MiFID II, an investment firm that engages in algorithmic trading must have in place effective systems and risk controls suitable to the business it operates, to ensure that its trading systems are resilient and have sufficient capacity, are subject to appropriate trading thresholds and limits, prevent the sending of erroneous orders or any trading that is contrary to MAR or to the rules of the trading venue.
62. Whenever a transaction or an order is flagged as potentially suspicious and reported to NCAs under MAR, a preliminary supervisory analysis follows and, where needed, a preliminary investigation is carried out. Preliminary investigations may also start as a result of flags and alerts directly originated from NCA's own market surveillance systems.
63. In all those cases where the preliminary investigations confirm the suspicion of market abuse being committed, NCAs may launch a formal investigation, using all the tools at their disposal described in the previous section.
64. The previously described lines of defence play also a role in the general prevention of market abuse, as they bring forward a deterrent effect due to the likelihood of market participants' wilful misconducts being detected.
65. The functioning of the market surveillance at firm level, at the level of trading venues and the regulatory market surveillance systems are described in detail in the following sections, each one for every jurisdiction where carbon markets are located.

66. A description of the regulatory follow-up carried out by NCAs upon identification of alerts for potential market abuse or upon reception of a STOR is also provided.

3.3 Germany

3.3.1 Systems and procedures at firm level

67. As described in the previous section, the first line of defence in the fight against market abuse is at firm level. Under MAR, firms are obliged to have in place arrangements, systems and procedures to detect and report the clients suspicious trading.
68. BaFin's ongoing supervision of investment firms and credit institutions consists of several elements. Compliance of investment firms with investor protection and organizational rules under MiFID II is examined by public sworn auditors on BaFin's behalf. The German "Regulation on the Examination of Investment Services Enterprises" (Wertpapierdienstleistungs-Prüfungsverordnung, WpDPV) contains several provisions on content of the audit reports and the procedure. The audit also covers the requirements laid down in Article 16 of MAR²⁷. The auditors are explicitly required to comment on their findings on Article 16 of MAR, and even in case of no findings they cannot stay silent but rather affirm the full compliance with the relevant requirements.
69. Those audits are usually carried out on a yearly basis. The responsible BaFin officer receives a notification before the start of the audit process and may, whenever appropriate, demand the appointment of a different auditor or even take over the audit. The responsible BaFin officer can also set specific objectives for the audit to focus on. The auditor has to produce an annual audit report.
70. The responsible BaFin officer evaluates the abstract of the report and decides how to further proceed in light of the findings (e.g. examining more in details the audit report or enacting specific supervisory measures in response to the findings). The results of the audit (together with other information, e.g. that from the additional annual prudential audit) are incorporated in a dedicated database where a risk profile for each firm is assigned. Such indicator is one of the elements considered to support possible risk-based supervisory measures.
71. Risk-based supervisory measures can be information requests (e.g. to further analyse specific facts/situations within the scope of Article 16 of MAR) or audit focuses (for the thorough assessment of specific areas like Article 16 of MAR), as well as on-site-measures like audit accompaniments (to apply own audit procedures and/or monitor the auditors procedures), special audits or other on-site-visits (to further assess specific facts/situations).
72. All in all, in the case of supervision of the requirements stemming from Article 16 of MAR, a desk officer typically receives the necessary information from the annual MiFID audit

²⁷ According to para. 11 Abs. 1 no. 4 WpDPV.

and/or from the colleagues in the market integrity directorate, and then assesses whether and what further measures are necessary.

73. Apart from the occasional findings in the case of individual firms, in the last few years no evidence of systematic deficiencies/failings of German firms was found in relation to the supervision of arrangements, systems and procedures in place at firm level to ensure the completeness of STORs , which was hence not considered a supervisory focus of BaFin. That also given that the public sworn auditors conducted a thorough review of the respective systems and procedures in 2016, when the provisions of Article 16 of MAR started applying.

3.3.2 EEX's own market surveillance

74. At EEX, market oversight is shared between the management board and the market surveillance office of the exchange. While the market surveillance office is by law obliged to collect and analyse all trading, reporting and clearing data on a daily basis, the management board monitors and enforces compliance with the applicable set of rules of the exchange.
75. By law the two bodies are obliged to act only in the public interest. Within its market oversight activities, both the management board and the market surveillance office treat emission allowances and derivatives thereof the same way as any other instrument offered for trading at EEX.
76. Once a suspicious trading behaviour has been identified or reported, or when other irregular circumstances occur, the management board intervenes directly (through e.g. suspension of trading, cancelling miss-trades, etc.), to guarantee orderly trading at all time. This includes e.g. trading halts if a potential breach of Article 12 and 15 of MAR is observed in the order books. Additionally, the management board may suspend trading participants acting against the relevant rules, including e.g. Article 12 and 15 of MAR, to maintain orderly market operation.
77. The market surveillance office is an independent pillar of the public exchange and by law a public authority. According to German national law neither the exchange operator nor the exchange management can exert any direct influence on the type and scope of monitoring carried out by the market surveillance office. Only the exchange supervisory authority of the State of Saxony (SMWA) can give orders or instructions to the market surveillance office. Although the management board may request a special investigation, it cannot request to stop one.
78. The market surveillance office has wide-ranging investigation powers, may send official requests of information and is allowed to enter the premises of its members. The employees of the market surveillance office are subject to a privileged protection against dismissal.
79. The market surveillance office supervises on a continuous basis the exchange trading and its settlement, i.e., price determination, trading activities, market behaviour, suspicious behaviour of exchange participants, according to MAR, REMIT, the Auctioning Regulation, national law and the exchange's rules.

80. The market surveillance office reports to SMWA and the exchange management board. BaFin receives the transaction reports under MiFIR, monthly monitoring reports under the Auctioning Regulation and is informed about violations of MAR.
81. The market surveillance office uses a well-established monitoring tool to perform continuous surveillance of the EUA and EUA derivatives market. It receives its data on orders and trades from a live feed directly from the trading system. The stream is constantly and automatically analysed to detect suspicious activities. In addition, the market surveillance office has access to and analyses margins and P&L data from the CCP ECC and has access to the position reporting data from all members and their customers. It also has access to master data, including algo notifications and Know-Your-Customer documents.
82. EEX provides the Commission's Directorate General for Climate Action (DG CLIMA) with reports and monitors EUA and EUAA auctions at EEX under the Auction Regulation. EEX provides DG CLIMA, appointing Member States and the German competent authority BaFin with a comprehensive report about the primary market auctions on a monthly basis. The purpose of this reporting is twofold, as it is used to fulfil EEX's monitoring obligations under Article 53(2) of the Auctioning Regulation, but also as a basis for Member States' reports under Article 10(4) of the ETS Directive. This reporting includes, inter alia, the bidding behaviour of all bidders in the auctions, bidders per bidder category, cover ratio, level of concentration, comparison to secondary market, price evolution and analysis and raw data. That report is presented and discussed in a monthly call with DG CLIMA. The relevant parts of the reports are published on a quarterly basis on the webpages of DG CLIMA.²⁸
83. Since the introduction of MAR, EEX has - within its market oversight activities - observed no initial suspicion of any order-book based misconduct. On the one hand, the primary market auctions are conducted in an auction according to Art. 5 of Regulation 1031/2010 (Auction Regulation) whereby bidders shall submit their bids during one given bidding window without visibility over the bids submitted by other bidders and where each successful bidder shall pay the same auction clearing price for each allowance regardless of the price of his bid. On the other hand, the emissions derivative markets are highly liquid and therefore also very robust to withstand market manipulation. The impact of one single trader on the prices is also rather small.

3.3.3 Supervisory market surveillance

84. SMWA is responsible for the legal oversight of the exchange, including the market operator and the bodies of the exchange such as management board and market surveillance office. SMWA has the authority to give binding instructions to all the mentioned entities and bodies, ensuring that the organizational requirements for operating an exchange stipulated by national and international law (e.g. Article 16 of MAR) are respected at all times.

²⁸ Auction reports under https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/auctioning_en

85. EEX-entities and related bodies report to SWMA on a regular basis as well as on an ad-hoc basis whenever necessary. The reporting includes any indication of irregular trading behaviour as well as any issue related to EEX's IT-systems (e.g. trading system, market surveillance systems etc.). SMWA does not run its own market surveillance IT-systems since all the relevant data is captured and evaluated by the market surveillance office and, where required, transferred to BaFin.
86. BaFin is the competent authority within the meaning of Article 22 of MAR. In order to fulfil this obligation, BaFin follows up on the STORs received under Article 16 of MAR and other external input connected to potential market abuse. Furthermore, proprietary algorithmic data analysis of the transaction data received under Article 26 MiFIR is performed.
87. BaFin and SMWA exchange information (including those related to MAR) and mutually support each other whenever helpful for the fulfilment of each other's tasks and duties. Such exchange does not follow a fixed protocol but is rather on a case-by-case basis.
88. Collectively and simplified, the system of supervision of exchange trading in Germany could be described as follows. The exchange as a public institution and its bodies ensure orderly trading at all times. The mandate of the exchange supervisory authority is focused but not limited to the organizational set-up of the exchange's operation as required by national and international legislation, such as MiFID II, MiFIR and the related delegated regulations. Furthermore, BaFin is the competent authority to enforce breaches of MAR.
89. Reporting obligations established by law ensure the exchange of information (including those related to MAR) between EEX, SMWA and BaFin. BaFin and SMWA furthermore are obliged to mutually support each other whenever helpful for the fulfilment of each other's tasks and duties.

3.3.3.1 Suspicious Transaction and Order Reports (STORs) received and other external input

90. STORs from market participants are received by BaFin via an electronic portal that allows the upload of the reports. STORs from other NCAs are transferred via specific electronic platforms. Inputs from other parties are received via mail, email or a specific portal for (anonymous) whistle-blowers.
91. All incoming STORs and other inputs will undergo a two-tier process. In a first step all STORs and other inputs are sifted and validated with regard to their relevance. Those cases with high significance are further investigated in a second step.
92. Any such information received (in the form of STORs or other observations) which gives reason to suspicion of market abuse will lead to an in-depth analysis. In order to assess the case in its entirety, further sources of intelligence are explored. For EUA and derivatives thereof, news and information relevant to the case are gathered and assessed with regard to their relevance to the carbon market and their potential price and market impact.
93. Price and volume data of the concerned carbon market products in the relevant period are analysed with respect to unusual movements or peculiarities. Furthermore,

transaction data is examined in different directions. Transactions of market participants with unusually high market shares in the relevant period will be scrutinised. Trading patterns of active market participants will be examined.

94. Often it is necessary to supplement transaction data by order data in order to evaluate the orders and trading behaviour in detail. Such data is requested from the EEX on an ad hoc basis and included into the analysis. Carbon market position data available to BaFin is another piece of information used when evaluating the positioning of certain market participants over time.
95. Should such investigations lead to the assumption that market abuse has taken place the case will be brought to the attention of the public prosecutor's office.

3.3.3.2 Proprietary Algorithmic Data Analysis of transaction data

96. In order to monitor the EUA markets, in addition to procedures described above BaFin takes a predominantly data driven approach. It monitors the auction and spot trading in emission allowances and derivatives thereof for which BaFin is the relevant competent authority and thus gains a comprehensive understanding of the emission allowances trading in BaFin's jurisdiction.
97. At its core, the approach is a semi-automated surveillance system that is based on the transaction reports received under Article 26 of MiFIR for both on and off-venue trading as well as transaction reports regarding auctions as per Article 36 of the Auctioning Regulation. The transaction data is supplemented with additional data about market participants. In addition, BaFin might integrate additional data sources in the future.
98. BaFin's surveillance system relies on two complementary parts: a general market monitoring to gather overall market observations at a macro level as well as an algorithm-based surveillance system to detect suspicious behaviour at market participant level.
99. The general market monitoring aims at capturing overall trends and developments on an aggregated level. Therefore, BaFin analyses the distribution of trading volumes, long and short positions and the number of active market participants considering both the auction and the secondary market for EUAs as well as derivatives thereof.
100. The algorithm-based surveillance system uses a set of algorithms designed by BaFin to identify possible market abuse. It combines pre-defined scenarios with outlier detection methods in order to detect unusual trading behaviour.
101. For example, the system uses a pre-defined top-down approach that links macro-level observations with micro-level transaction data analysis. In particular, if the system detects a significant price movement without any reasonable explanation, an algorithm assesses whether that price movement may have been caused by unusual trading activities. Therefore, it identifies market participants with significant market shares and checks whether their trading behaviour deviated from their usual one by conducting a longitudinal analysis taking into account their activities in and outside the observation period.

102. This top-down approach is supplemented by further micro-level searching routines. For example, the system calculates activity indices in order to detect market participants with elevated trading activity. In addition, the system conducts a performance analysis at transaction level to rank market participants according to their theoretical trading profits and losses in certain time intervals. Based on those rankings, the algorithm detects market participants that repeatedly outperform the average market participant.
103. Although significant market shares, increased activities or high profits alone do not per se indicate any unlawful behaviour, they can be the basis for further analysis. Thus, the outcomes of those surveillance algorithms described above are reviewed and – if necessary – further analysed by BaFin’s market surveillance analysts on a case-by-case basis.
104. Taking into account new developments and findings, BaFin’s market surveillance methodology and the calibration of its various algorithms is under continuous refinement and revaluation.

3.3.3.3 Analysis of position data

105. BaFin receives on a daily basis position reports on EUAs and derivatives thereof in accordance with Article 58 (1) (b), (2) of MiFID, implemented into national law by § 57 WpHG (Wertpapierhandelsgesetz – Securities Trading Act). EEX reports positions in exchange-traded instruments whereas investment firms provide reports in economically equivalent OTC emission allowances and derivatives thereof. EUAs and derivatives thereof are considered economically equivalent to instruments traded on a trading venue where they have identical contractual specifications, terms and conditions.
106. In contrast to other reports, position reports do reveal the end client of a position, rendering them unique in the reporting regime. Initially designed to enable competent authorities to supervise compliance with position limits, position reports today also represent a useful tool to identify beneficial owners. Besides BaFin, market surveillance at EEX also makes use of position reports.

3.3.4 Outcome of carbon market surveillance: STORs received and preliminary investigations

107. So far, the preliminary analysis carried out did not show any potential market abuse and thus, based on the outcome of the surveillance system, no formal investigation has been launched.
108. One STOR brought to BaFin’s attention was concerned with the suspicion of possible insider trading in connection with non-public information regarding drafted EU proposals of the broader EU Green Deal policy goals and the Fit for 55 Package. Investigations into the case led to the conclusion that the relevant information was already disclosed to the public on the day ahead of the alleged insider trading activity. Hence, the information in question did not qualify as inside information under MAR. Moreover, the information would not have been suitable to explain an expected negative price impact on the EUA futures as alleged in the STOR. Furthermore, transaction data on EUA instruments

traded on EEX in the relevant period did not show any signs of abnormal price movements or positions taken by market participants. Therefore, the case did not warrant further investigation.

109. A hint regarding possible market manipulation in the EU carbon market was given to BaFin by a market participant. The informant claimed that due to missing position limits and the access of a wide variety of participants (specifically non-compliance entities) market manipulation was easily feasible. Analysis about the allegations revealed no evidence of the indicated price movements and neither did further examinations of the reported transactions during the relevant time period substantiated the allegations.

3.4 The Netherlands

110. Also in the Netherlands market surveillance of secondary market trading of EUA-derivatives is organized along three lines of defence.
111. The first line consists of brokers and investment firms that execute trades on behalf of clients. Under Article 16 of MAR, every person that professionally arranges or executes transactions in financial instruments must establish and maintain effective rules, systems and procedures to actively monitor, detect and report suspicious orders and transactions. If such a person has a reasonable suspicion that an order and/or transaction in a financial instrument, whether placed or executed on or outside a trading platform, could constitute insider dealing, market manipulation or attempted insider dealing or market manipulation, they are under the legal obligation to notify the AFM without delay.
112. The second line of defence consists of ICE-Endex surveillance system to prevent, detect and report suspicious trading behaviour.
113. As a third line of defence, the AFM conducts market abuse supervision through its own surveillance mechanism, based on data-driven detection, resulting in various alerts which are used, in combination with the STORs submitted by market participants, for further analysis and possible follow-up investigations.

3.4.1 Systems and procedures at firm level

114. Investment firms and brokers have a responsibility under MAR with regard to the detection of market abuse and are subject to the obligation to report STORs to the AFM.
115. As pointed out in the recent Market Watch²⁹, the obligation to submit STORs is a supervisory priority for the AFM in the area of market abuse supervision.
116. As a result, in order to ensure the proper and effective functioning of the first line of defence, the AFM closely supervises the investment firms' systems and procedures to detect and report market abuse. In particular, the AFM is requesting periodic audit reports regarding systems and controls and following up whenever needed to increase the level of surveillance, quality and quantity of STORs.

²⁹ See AFM Market Watch #4 @ AFM Market Watch | Topics AFM | AFM Professionals

3.4.2 ICE Endex's own market surveillance

117. Both EUA-futures and options are traded on ICE Endex. The ratio between EUA futures and EUA options traded at ICE Endex has been stable at circa 2.5, with futures being the leading product ICE Endex is offering. EUA options are mostly traded in block trades, whereas for EUA futures, more than 80% is traded on screen. Most activity in the futures market is in term futures instead of daily futures.
118. The general objective of the ICE Endex market surveillance activities is to support the fair and orderly operation of its markets by closely monitoring them, thereby allowing it to detect irregularities and suspicious behaviour that may indicate any form of market abuse. In order to achieve this, ICE Endex applies both real time market monitoring and t+x analysis using a proprietary system that provides algorithmically generated alerts. In addition, ICE Endex assesses unusual market and position developments, even in situations where no alerts have been triggered.
119. Furthermore, ICE Endex analyses alerts generated by its surveillance systems. In case an alert constitutes potential market abuse, it is discussed by dedicated staff to determine whether there is a suspicion of market manipulation to be reported as a market observation or STOR to the AFM. A market observation has a lighter degree of suspicion compared to a STOR.
120. Next to the integrity of markets, robustness and proper functioning of the market infrastructure is key. Licensing, the rule book and changes thereof by ICE Endex have to be approved by AFM to ensure continuity and robustness of the market infrastructure operation. Board members are assessed for suitability. Transparency waiver applications have to be assessed and approved. An important additional control for ensuring fair and orderly markets is ICE Endex's member onboarding process. Only verified professional parties with proven knowledge and adequate capabilities are allowed to trade on ICE Endex's wholesale markets.
121. Moreover, ICE Endex shares with the AFM information about the context behind activated trading halts and incidents that affect the smooth functioning of the market. ICE Endex also conducts an annual internal audit to assess whether effective market surveillance controls have been designed and implemented. The findings from the audit are shared with the AFM.

3.4.3 Supervisory market surveillance

122. The AFM uses several supervisory methods to perform market surveillance on the EUA derivatives market, which is based in the Netherlands since June 2021. First of all, the AFM performs data-driven multi-asset class market surveillance through an algorithm-based surveillance system. AFM is finalizing the implementation of the EUA module within this system, that is based on algorithms designed by the AFM and on transaction data that will be sent directly from ICE Endex to AFM.
123. For the moment, the AFM only receives MiFIR transaction reporting data on a structural basis as input for its surveillance system, while also order data constitute important

information for effective surveillance. Currently, the AFM can only obtain order data via ad-hoc requests to be sent to ICE Endex.

124. A dedicated team conducts day-to-day supervision of the EUA-markets, including detection of possible market abuse and analyses if any alerts is to be further investigated. EMIR and Commodity Position Reporting System data is used to keep a general overview of the market and its trends.
125. In addition to the data-driven approach, the AFM uses STORs as an important source of information for its market abuse supervision.
126. Whenever AFM receives a STOR, experts assess it. The AFM assessment can result in either dismissing the STOR, issuing an informal warning, or enriching the STOR with data and information from relevant market participants. In case such further analysis confirms suspicious trading behaviour, the AFM may decide that the case qualifies for a formal investigation. Investigations generally require a substantial amount of time and can result in sanctions and supervisory measures.
127. As described in the previous section, a key role is also played by trading venues. ICE Endex should have effective procedures in place under its legal obligation to maintain a fair and orderly market. As a result, the trading venue carries out real-time and T+1 monitoring and is expected to submit STORs whenever they notice suspicious trading behaviour on their platform. The AFM organizes quarterly supervisory meetings with ICE Endex where the alerts generated by the automated surveillance system of ICE Endex are thoroughly discussed. Upon request, ICE Endex shares EUA derivatives order data with the AFM to support thematic market surveillance investigations.
128. The AFM Market Watch contains the first market observations based on the received transaction data. AFM observed that 50 market participants (out of a few hundreds) are responsible for roughly 90% of the carbon market volume. As a reference for volume, in December 2021, ICE Endex published one-sided traded volumes of around 1.819.500 lots in EUA Futures, EUA Futures on options and daily Futures combined³⁰. Market participants are diverse as regards nationality and trade category (such as investment firms/banks/utility trading firms/prop trading firms). As part of its supervision of the EUA derivatives markets, the AFM also started supervision of the compliance levels of those market participants.

3.4.4 Outcome of carbon market surveillance: STORs received and preliminary investigations

129. In 2021 the AFM has received four EUA-based STORs and one market observation. The STORs are related to potential market manipulation based on layering and spoofing, which is trading scheme based on submitting multiple or large orders to trade often away from the touch on one side of the order book in order to execute a trade on the other side of the order book and, only once the trade has taken place, the other orders with no

³⁰ <https://www.theice.com/marketdata/reports/238>

intention to be executed are deleted. On the other hand, the market observation is linked with disclosure of potential inside information.

130. With respect to two out of the four STORs received and the market observation, the AFM's preliminary investigations did not provide evidence of market abuse. Please note that the other two STORs are still under investigation by the AFM, hence it is not possible to elaborate on the further steps that are currently being considered.

3.5 Norway

3.5.1 Systems and procedures at firm level

131. According to Article 16 of MAR, persons professionally arranging or executing transactions, including investment firms, should establish arrangements, systems and procedures to monitor, detect and report STORs to NCAs. Those arrangements, systems and procedures should be appropriate and proportionate in relation to the scale, size and nature of their business activity.
132. Reporting entities not only have to report transactions carried out on a trading venue, but also OTC transactions concerning instruments in scope of MAR.
133. The arrangements and procedures are to ensure an appropriate level of human analysis in the monitoring, the detection and the identification of transactions and orders that could constitute insider dealing or market manipulation. Investment firms are to organise and provide effective and comprehensive training to their staff involved in those activities. Such training should take place on a regular basis and should be appropriate and proportionate in relation to the scale, size and nature of the business.
134. The arrangements, systems and procedures, which should be clearly documented in writing, are to be assessed regularly, at least through an annually conducted audit and internal review.
135. Investment firms are licensed and supervised by Finanstilsynet. The supervision encompasses both the investment firms' operations and compliance with organisational requirements, *inter alia* the legal requirements related to its arrangements, systems and procedures.
136. To this end, Finanstilsynet may carry out inspections (full-scale inspections or thematic inspections addressing specific issues). As part of its supervisory activities, Finanstilsynet regularly provide investment firms with guidance and clarifications in areas where specifications are needed.

3.5.2 Nasdaq Oslo's own market surveillance

137. Nasdaq Oslo offers a secondary trading market for daily, quarterly and yearly futures on EUAs. Traded volumes of such futures are however limited. In the period from 1 July 2021 to 31 December 2021 only 250 transactions were executed. Nasdaq Oslo does not trade options on EUAs.

138. Nasdaq Oslo has established an independent surveillance department to ensure a continuous real-time monitoring of all its listed products, including EUA derivatives. Adequate resources are assigned to the surveillance department for it to perform effective surveillance in relation to potential market abuse or breaches of other rules and regulations.
139. Nasdaq Oslo uses the surveillance technology Nasdaq Market Surveillance (formerly named SMARTS) to monitor all trading in real time, triggering alerts in the event of unusual activity and/or price movements. The surveillance department also subscribes to relevant news and analyses to assess the price development of its listed products and to detect possible misconducts. Further, the surveillance department subscribes to price data traded on other trading venues to cross check that with the development on its own trading platform. That is especially useful for the monitoring of its EU carbon derivatives since a big majority of the activity is conducted on other trading venues.
140. Nasdaq Oslo's arrangements, systems and procedures are established to detect possible insider trading or market manipulation. Suspicious activities are further investigated by the surveillance department that notifies the competent authority (through STORs) where it has a reasonable suspicion that an order or transaction could constitute insider trading, market manipulation or attempted insider trading or market manipulation.
141. Additionally, in presence of detected suspicious trading ahead of execution, Nasdaq Oslo's arrangements, systems and procedures allow for the prevention and detection of potential market abuse from taking place as requested under Article 16(1) of MAR. A vital part of preventing market abuse is Market Surveillance's communications with market participants related to observed trading activity. Market participants are, upon written request by the exchange, under an obligation to provide as soon as possible all information the exchange considers relevant in respect of its role for the surveillance of the Market Conduct Rules and other applicable laws and regulations.
142. Through those communications, Market Surveillance could express their view on the activity, point towards relevant regulations and/or give feedback on potential improvements to ensure that market participants do not (unintentionally or intentionally) carry out suspicious trading activity in the future.
143. Nasdaq Oslo has also implemented effective systems to fulfill Article 48 of MIFID 2 provisions regarding circuit breakers and rejection of orders that exceed pre-determined volume and price thresholds.
144. Nasdaq Oslo is subject to supervision by Finanstilsynet, which aims to ensure that the institution acts in an appropriate and proper manner in accordance with the applicable legislation, including MAR. To this end, Finanstilsynet may carry out inspections to review the trading venue's internal systems. Furthermore, meetings between Finanstilsynet and Nasdaq Oslo are regularly held to discuss market surveillance topics, including possible alerts generated by Nasdaq Oslo's surveillance systems.

3.5.3 Supervisory market surveillance

145. Finanstilsynet has applied multiple market surveillance software solutions. For position reporting monitoring and analysis, Finanstilsynet uses an internal developed solution called "Position Miner". This IT solution uses the daily reports of the position reporting to graphically illustrate all the consolidated positions of all entities. A dedicated staff is assigned to monitor and operate this position surveillance system.
146. The primary data source for the surveillance systems is the transaction reporting under Article 26 of MiFIR, received from the investment firms and trading venues. This information includes details about all transactions on trading venues but also OTC. Information in these reports include e.g. LEI-codes (identifier codes) of buyers and sellers, executing investment form, time and date, price, volume, instrument type and identification code (ISIN).
147. Finanstilsynet receives STORs and other notifications regarding potential market abuse from trading venues, investment firms and foreign supervisory authorities. All STORs received are analysed by Finanstilsynet.
148. Should an STOR or the alerts produced by Finanstilsynet' surveillance system evidence a potential market abuse, Finanstilsynet may open an investigation. Where an investigation leads to the conclusion that market abuse has taken place, Finanstilsynet may adopt sanctions (e.g. financial penalties) or bring the case to the attention of the public prosecutor for possible criminal proceedings.
149. In case of potential market abuse carried out on the territory of another EEA State, Finanstilsynet will request the relevant NCA's assistance during the investigations.

3.5.4 Outcome of carbon market surveillance: STORs received and preliminary investigations

150. Finanstilsynet has received no STORs related to emission allowance derivatives. This is likely due to the fact that the number of trades of such derivatives at Nasdaq Oslo is very limited. Finanstilsynet has not adopted sanctions for violation of market abuse rules related to EUAs derivatives.

MAR entered into force in Norwegian law on 1 March 2021. Finanstilsynet has to date not sanctioned any infringements of MAR by emission allowance market participants.

4 Carbon market analysis

151. This section focuses on analytical aspects concerning EU carbon markets and trading of EU emission allowances. It includes a short survey of the economic literature immediately relevant to this report (Section 4.1), followed by an overview of key carbon market developments in recent years, including prices and supply/demand dynamics (Section 4.2). The third part presents the results of the various analyses undertaken by ESMA for the purpose of preparing this report on EUA-related information reported under

various EU regulatory frameworks (Section 4.3). The last part summarises these findings and concludes the market analysis part (Section 4.4).

4.1 Literature review

152. The relevant literature on price formation in the EU ETS focuses on the impact of public policy, the demand-side drivers, and the role of financials in this market. A first takeaway is that carbon prices appear to react to public sector announcements. Conrad et al. (2012) find that releasing announcements on EUAs by the European Commission have an impact on EUA prices³¹. More recently, Friedrich et al. (2020) provide empirical evidence of the impact of the Market Stability Reserve (MSR) on participants beliefs, likely leading to an overreaction that destabilised the market³².
153. A second thread among the analyses carried out on EUA prices is the relationship between carbon prices on the one hand, and coal, gas and oil prices on the other hand. Alberola et al. (2008)³³ show that EUA spot prices react to energy prices with forecast errors and to unanticipated temperature changes. Indeed, input prices are supposed to influence EUA prices in an efficient market (Koch et al., 2014)³⁴. Other studies, such as Aatola et al. (2013)³⁵, document a steady and positive relationship in the first five years of the EU ETS between daily EUA forward prices and German electricity and UK gas price, and a negative relationship with coal prices. Carnero et al. (2018) document that the forward prices of EUA, coal, gas and Brent oil are jointly determined in equilibrium, with spot prices mainly driven by supply and demand in energy markets³⁶. In contrast, Koch et al. (2014) find no clear evidence of a relationship between fuel and carbon prices during the EU ETS price drop in mid-2008, highlighting instead the impact of economic activity³⁷. Taken together, these findings suggest that the drivers of EUA price changes and the direction of the relationship with other commodity prices seem to vary over time. It should be noted however that most of these studies were conducted prior to the introduction of the MSR, which had a major impact on the EU carbon market.
154. A third stream of the literature on carbon markets lies in the study of trading in EUAs. Cludius and Betz (2020) documented that the majority of EUA trading takes place in the futures market³⁸. Pirrong (2009) argued that since compliance entities buy EUAs in the auction market and hold them to satisfy regulatory requirements, the actual number of allowances available for trade may be far lower than the total amount outstanding, thus

³¹ "Modelling and explaining the dynamics of European Union allowance prices at high-frequency" (2012), *Energy Economics*, 34(1): 316-326

³² "Rules vs. discretion in cap-and-trade programs: Evidence from the EU emissions trading system" (2020), Working Paper 8637, CESifo

³³ "Price drivers and structural breaks in European carbon prices 2005-2007" (2008), *Energy Policy*, 36(2): 787-797

³⁴ "Causes of the EU ETS price drop: Recession, CDM, renewable policies or a bit of everything? New evidence", *Energy Policy*, 73:676-685

³⁵ "Price determination in the EU ETS market: Theory and econometric analysis with market fundamentals", *Energy Economics*, 36: 380-395

³⁶ "Modelling the dynamics of fuel and EU allowance prices during Phase 3 of the EU ETS" (2018), *Energies*, 11(11):1-23

³⁷ "Causes of the EU ETS price drop: Recession, CDM, renewable policies or a bit of everything? – New evidence", *Energy Policy*, 73: 676-685

³⁸ "The roles of Banks in EU emissions trading", *Energy Journal*, 41(2), 275-99

creating opportunities for potential market manipulation by use of derivative strategies³⁹. While the market has evolved over the years, the point that the number of allowances available for trading is substantially lower than the number of allowances in circulation holds true. Quemin and Pahle (2022)⁴⁰ further look into this question and investigate EUA futures trading activity. While futures positions are mostly held for the purpose of hedging and market-making, they highlight the growing number of speculative positions both from financial and commercial traders. The authors further show that market speculation has increased since 2018 while they underscore that the current limitations regarding the quality, harmonisation and availability of publicly accessible data impede further analysis of the impact that speculation levels have on prices.

4.2 Evolution of carbon prices and volatility

155. This section relies on data obtained from various commercial data sources, focusing on major events and price-related developments in the most liquid EUA spot and futures markets until the beginning of March 2022.

4.2.1 Spot prices⁴¹

156. After trading for many years below 10 EUR per tonne of CO₂, EUA prices experienced a first major increase from 8 EUR in January 2018 to 30 EUR in July 2019. After fluctuating between 20 and 30 EUR for nearly two years, in December 2020, EUAs decisively broke the 30 EUR mark and quickly rose up to 63 EUR in October 2021. After a brief pause, the rally resumed, leading to a record high of 96 EUR in February 2022, followed by a sharp sell-off at the beginning of March pushing prices below 70 EUR.

157. Comparing daily settlement prices from EEX and ICE Endex, where most of the trading takes place (see Section 4.3), no major differences can be observed with an average absolute difference of 0.015 EUR – suggesting the absence of clear arbitrage opportunities between the two main venues.

³⁹ “Market oversight for cap-and-trade: Efficiently regulating the carbon derivatives market” (2009), Policy Brief 09-04, The Brookings Institution, Energy Security Initiative

⁴⁰ “Financial threaten to undermine the functioning of emissions markets” (2022)

⁴¹ In this section ‘spot’ refers to both spot contracts traded on EEX and daily futures traded on ICE ENDEX (see Section 2).



Figure 1: Spot prices in continuous trading at EEX and ICE Exend, in EUR/tCO₂. Source: Refinitiv, ESMA.

158. Since the launch of the EU ETS in 2005, several other jurisdictions have introduced cap and trade systems with the objective to reduce regional greenhouse gas emissions, although these systems differ from the EU ETS in terms of scope and design. Five years ago, all existing ETS were pricing carbon between 5 and 15 EUR/tCO₂ and prices were until 2020 approximately following the same steady upward trend. EU carbon prices even lagged behind those of other regions, until the EU ETS' revision in 2018 led EUAs to rise above prices in other jurisdictions (see section 4.2.5 for additional details on supply and demand factors).⁴²
159. When the COVID-19 pandemic reached Europe and triggered a broad market sell-off, carbon prices were affected as well, reflecting the sharp slowdown in economic activity and the expected decline in global energy demand. EUAs plummeted from 23 to 15 EUR in just a few days. However, prices recovered quickly and further increased from December 2020 following the announcement of more stringent climate policy objectives in the EU, leading to expectations of a tighter supply.
160. As the economic recovery in the EU took hold in 2021, another factor set in. Heightened utility demand and rising gas and power prices⁴³ gradually increased the relative attractiveness of coal as a substitute for gas-fired energy production. However, with a higher carbon dioxide emissions factor than gas, coal also requires the purchase of additional EUAs, raising demand and further driving carbon prices up.

⁴² Charlotte Roig-Ramos: [Booming Prices on the European Emission Trading System: From Market Oversupply to Carbon Bubble?](#), IFRI, 8 October 2018.

⁴³ Camilla Hodgson: [European gas crunch pushes up carbon price](#), Financial Times, 4 October 2021 & Stephen Stapczynski: [Europe's Energy Crisis Is Coming for the Rest of the World, Too](#), Bloomberg, 27 September 2021.

161. The market turmoil in March 2022 related to the war between Russia and Ukraine disrupted this dynamic, with EUA prices declining by 30% in just a few days while natural gas prices reached all-time highs in Europe. As far as the impact of the war on the carbon price is concerned, further analysis will be necessary in the future to determine the precise transmission channels. There are indications that the decline in the carbon price may be associated with concerns around possible gas supply disruptions or import bans leading to a reduced need for EUAs, combined with general assumptions concerning an economic downswing and EU countries exiting fossil fuels at an earlier point in time. A more immediate reason for the decline may have also been market participants closing positions in EUAs to meet elevated margin calls, for instance, for gas contracts⁴⁴.

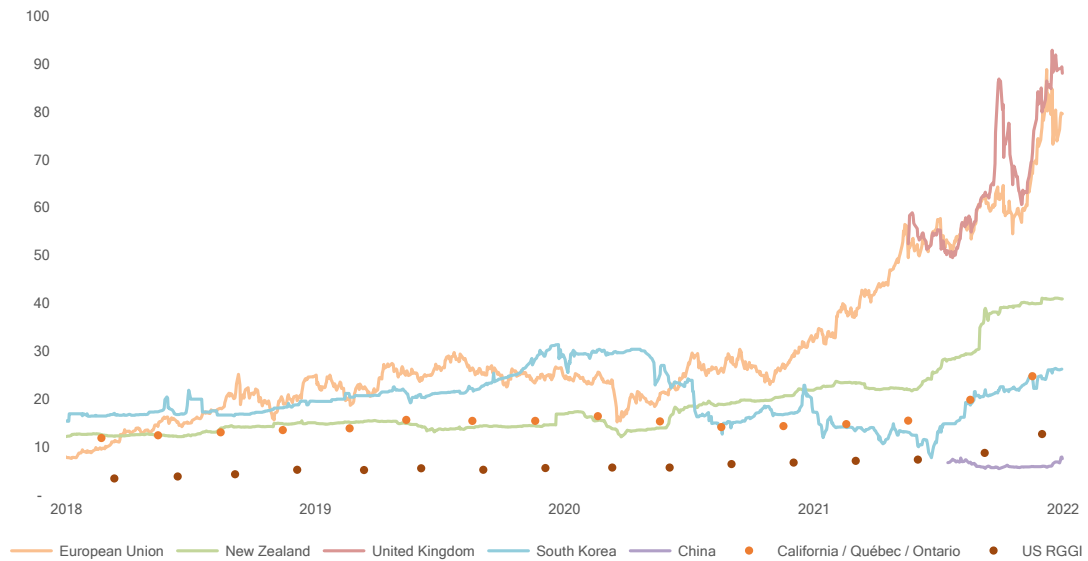


Figure 2: Monthly spot prices of emission allowances across different ETS, in EUR/tCO₂, data through December 2021. Source: International Carbon Action Partnership (ICAP), Refinitiv, ESMA. Note: US RGGI stands for the “US Regional Greenhouse Gas Initiative” comprising Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia. US RGGI & California / Québec / Ontario both display quarterly auction prices (as opposed to continuous trading). The Chinese ETS started trading in July 2021 and the UK ETS started trading in May 2021.

162. The recent price surge was only topped by the UK’s trading system which, after its launch in May 2021, moved along the EUA price until it spiked by more than 30% in September 2021. Despite converging back to the EU’s level, it subsequently remained slightly above. Possible explanations for this divergence include the UK’s low gas storage capacity and issues related to utilities switching over from the EU to the UK allowance system⁴⁵.

⁴⁴ William Mathis: [Carbon Tumbles Most in Almost a Decade as War Spooks Investors](#), Bloomberg, 1 March 2022.

⁴⁵ Rob Davies: [Surge in UK wholesale gas prices fuels winter energy crisis fears](#), The Guardian, 28 September 2021 & Camilla Hodgson: [European gas crunch pushes up carbon price](#), Financial Times, 4 October 2021.



Figure 3: Spot prices of EU and UK emission allowances traded at ICE Exend and ICE Futures Europe, in EUR/tCO₂. Sources: Refinitiv, ESMA.

4.2.2 Forward curve

163. The difference between EUA spot and futures prices is small and both have historically increased in tandem, reflecting expectations that prices are unlikely to come down significantly in the long term.



Figure 4: Daily prices of EUA futures contracts with December expiry traded on ICE Exend, in EUR/tCO₂. Sources: Refinitiv, ESMA.

164. The spread between the December 2025 and the December 2022 futures has remained positive for several years. This situation is also known as contango, i.e. the forward curve

is upward sloping. The spread remained range-bound between 0 and 5 EUR until early 2022 but reached a maximum of 6.5 EUR in February 2022. Increases in the contango broadly correspond to the upswing phases in spot prices in 2018 and in 2021, and the stability of the spread in relative terms (i.e. in % of spot prices) suggests that the latest increase reflects the fact that EUAs are trading at higher price levels.

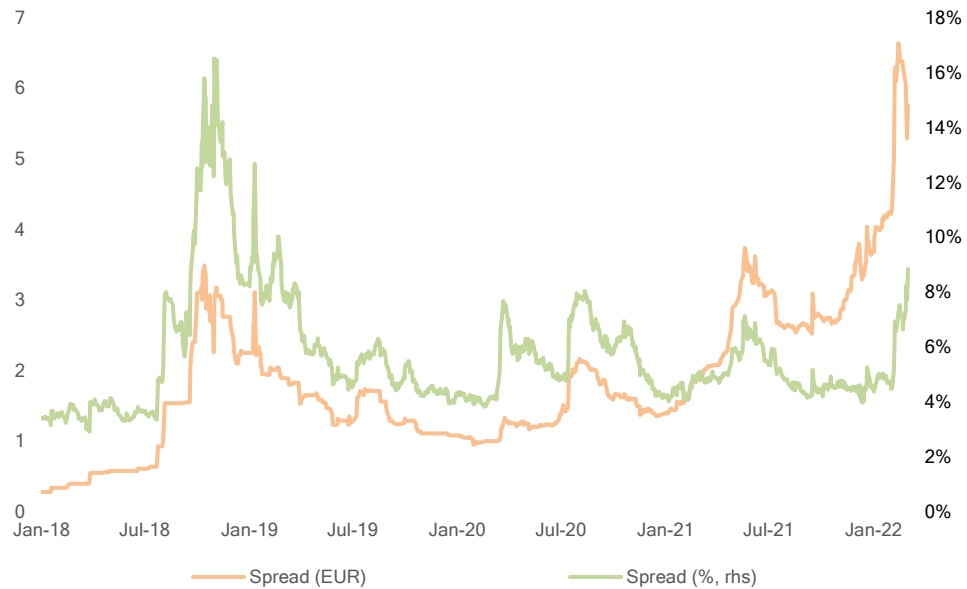


Figure 5: Absolut spread in EUR/tCO₂ (left axis) and % (right axis) between December 2025 and December 2022 EUA futures contracts traded on ICE Endex. Sources: Refinitiv, ESMA.

165. As a result, the shape of the EUA future curve remained broadly flat until early 2022 with increases in spot prices leading to an upward shift in the futures curve without any meaningful steepening. The main reason for this is that surplus allowances can be kept to cover future needs, while the cost of “storing” allowances is small, creating a strong link between spot and futures prices⁴⁶.

⁴⁶ ECB (2021), “EU emissions allowance prices in the context of the ECB’s climate change action plan”, ECB Economic Bulletin 6/2021.

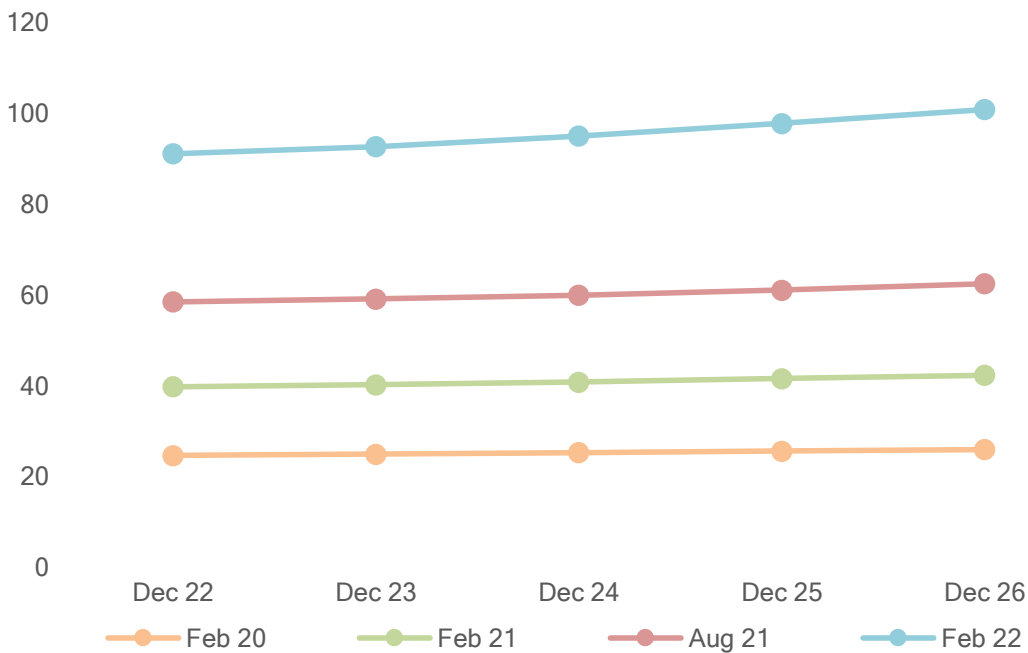


Figure 6: Shifts in the futures curve of EUA contracts with December expiry on ICE Index between February 2020 and February 2022, in EUR/tCO₂. Sources: Refinitiv, ESMA.

4.2.3 Volatility

166. We use three measures of volatility to assess price movements of EUAs from 2018 to 2022 (for additional details on these volatility measures, see Annex 1) using price data for the next December expiry traded on ICE ENDEX⁴⁷. Comparing the average of those measures before and after EUA prices started to surge in March 2020, a small increase can be observed in two out of the three measures⁴⁸.

Measure	Historical volatility	Intraday volatility	RS volatility
Mar 2018 - Feb 2020	0.0223	0.1993	0.0240
Mar 2020 - Feb 2022	0.0245	0.1998	0.0239

Table 1: Average of daily volatility measures. Historical Volatility is the rolling 5-day standard deviation of daily returns. Intraday volatility follows the Parkinson method and RS volatility refers to the Rogers-Satchell method. For a description of those measures, see Annex 1. Sources: Refinitiv, ESMA.

⁴⁷ In the preliminary report the volatility analysis focused on the December 2021 expiry. By switching to a measure that refers to the front-year (December) contract, data availability has improved. This resulted in higher estimates for the March 2018 - February 2020 period and therefore in smaller differences with the March 2020 - February 2022 period.

⁴⁸ The market turmoil related to the Russia-Ukraine conflict at the beginning of March 2022 has not been included to illustrate price volatility under 'regular' market conditions.

167. Figure 7 shows the historical volatility, calculated as rolling 5-day standard deviation of daily price returns. Aside from some extreme values in September 2018, March 2020, December 2021, and March 2022, we cannot identify any structural breaks or a clear upward trend.

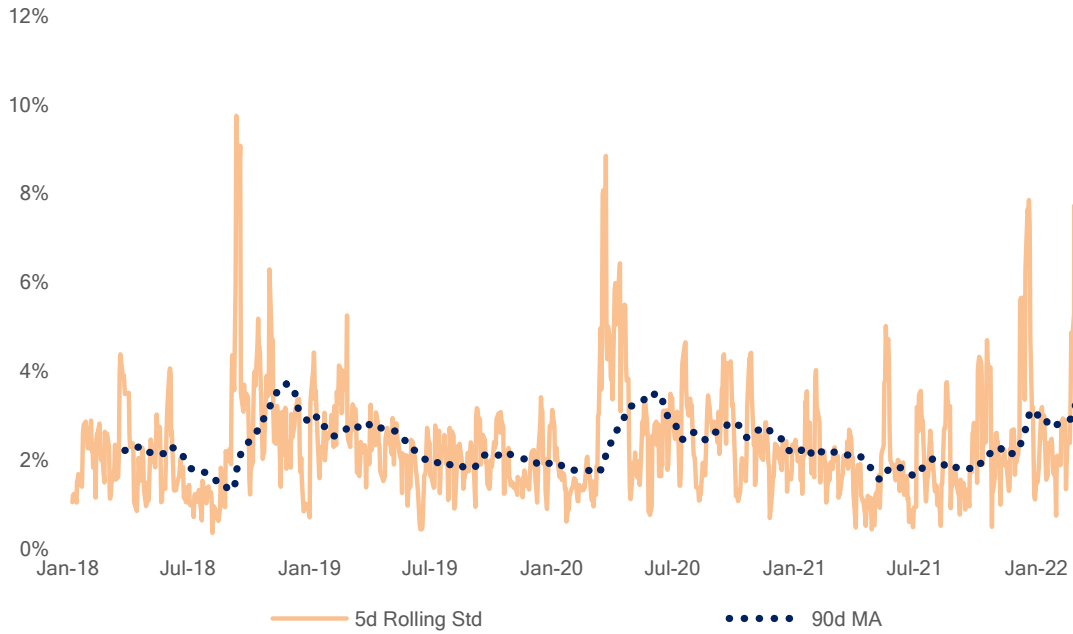


Figure 7: Historical volatility of front year December futures, daily closing prices at ICE Exend, Rolling 5-day standard deviation of daily price returns, in %. Source: Refinitiv, ESMA.

168. To confirm this finding, we calculate an additional measure of intraday volatility⁴⁹ which could be considered more precise than daily return volatility, since it also accounts for within-day information of high and low prices⁵⁰. Based on this measure, no clear structural break can be identified either. The increase in intraday volatility related to the conflict between Russia and Ukraine has been particularly pronounced, highlighting the particularly large price movements over a very short period of time.

⁴⁹ Parkinson, M. (1980), "The Extreme Value Method for Estimating the Variance of the Rate of Return", The Journal of Business, No. 53, pp.61-65.

⁵⁰ Petnehazi, G. and Gall, J. (2019), "Exploring the Predictability of Range-Based Volatility Estimators using RNNs", Intelligent Systems in Accounting, Finance and management, Vol. 26, pp. 109-116.

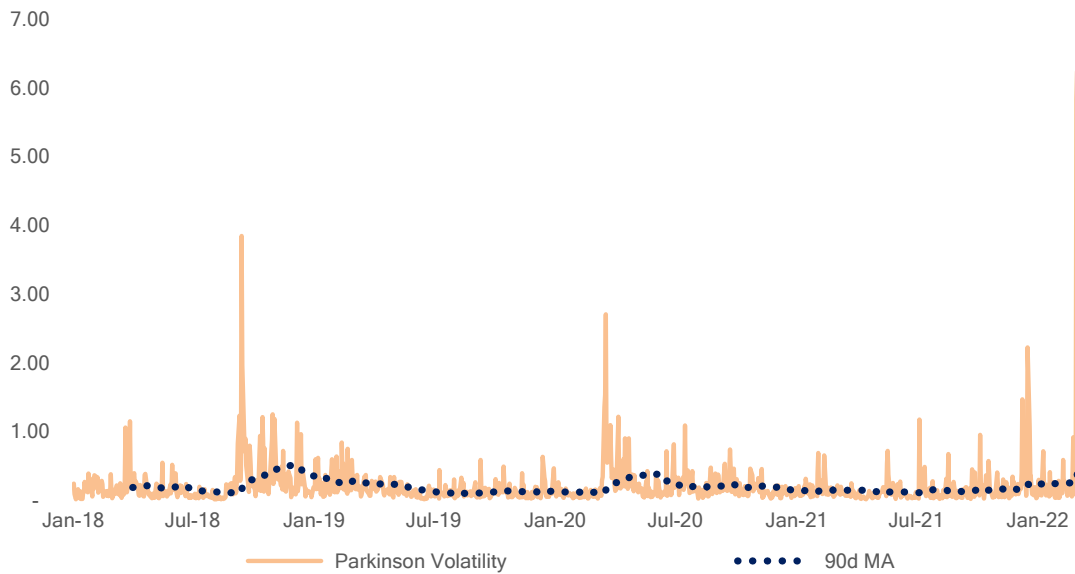


Figure 8: Intraday volatility of front year December futures, daily high and low prices at ICE Endex, Parkinson method. Source: Refinitiv, ESMA.

169. Last, and as a robustness check, we compute another metric of intraday volatility following Rogers and Satchell⁵¹ who propose a method that is robust to a possible non-stationarity of the underlying timeseries. The measure confirms the previous observations.

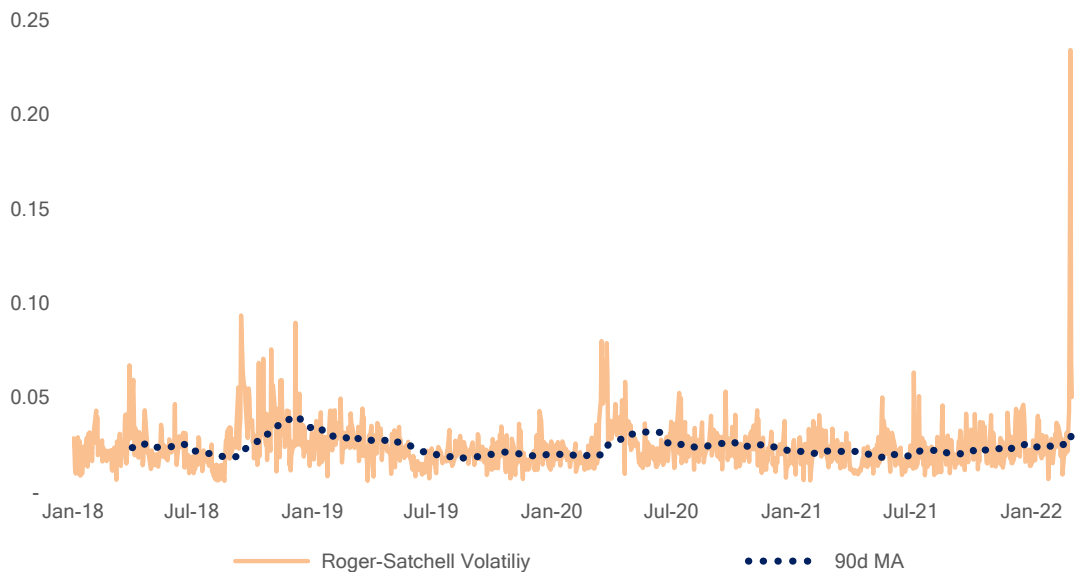


Figure 9: Intraday volatility of front year December futures, daily high, low, opening and closing prices at ICE Endex, Roger-Satchell method. Source: Refinitiv, ESMA.

⁵¹ Rogers, L.G.C., and Satchell, S.E. (1991), "Estimating Variance from High, Low and Closing Prices", The annals of applied probability, Vol. 1, No 4, pp. 504-512.

4.2.4 Comparison with other assets

170. The historical volatility of EUA prices since January 2019 (computed using standard deviation of daily returns) was 2.9%, compared with 1.2% for equities and less than 0.3% for bonds (Table 2). This firmly puts EUAs in the ‘risk assets’ category from a portfolio investment perspective. However, as a financial asset, EUAs have more in common with energy commodities than other traditional asset classes.

EUAs	Equities	Corporate bonds	Government bonds	Crude oil	Natural gas	Coal
2.9%	1.2%	0.2%	0.3%	4.3%	5.1%	2.7%

Table 2: Standard deviation of daily returns in EU emission allowances (EEX-EUA Continuous trading), equities (STOXX Europe 600 index), corporate bonds (ICE BofA Euro Corporate index), sovereign bonds (ICE BofA Euro Sovereign index), crude oil (Brent 1-month price), natural gas (NYMEX Dutch TTF Natural Gas Calendar Month), and coal (ICE Coal Rotterdam Continuous trading), from 1 January 2019 to 31 December 2021. Sources: Refinitiv, ESMA.

171. The price increase that EUAs have experienced from the March 2020 through to the end of 2021 (+423%) is closer to that of crude oil (+207%) or natural gas (+670%) – although the price recovery started later for energy commodities. Similarly, the price decline from peak to trough experienced in March 2020 was steeper for EUAs (-35%) than equities (-26%) or corporate bonds (-8%) but not as severe as crude oil (-50%). Natural gas and coal prices were little affected by the March 2020 lockdown measures. Since the middle of March 2020, daily changes in EU emission allowance prices displayed a positive correlation coefficient of 38% with equities and 23% with coal (the correlation with other assets was below 20%).

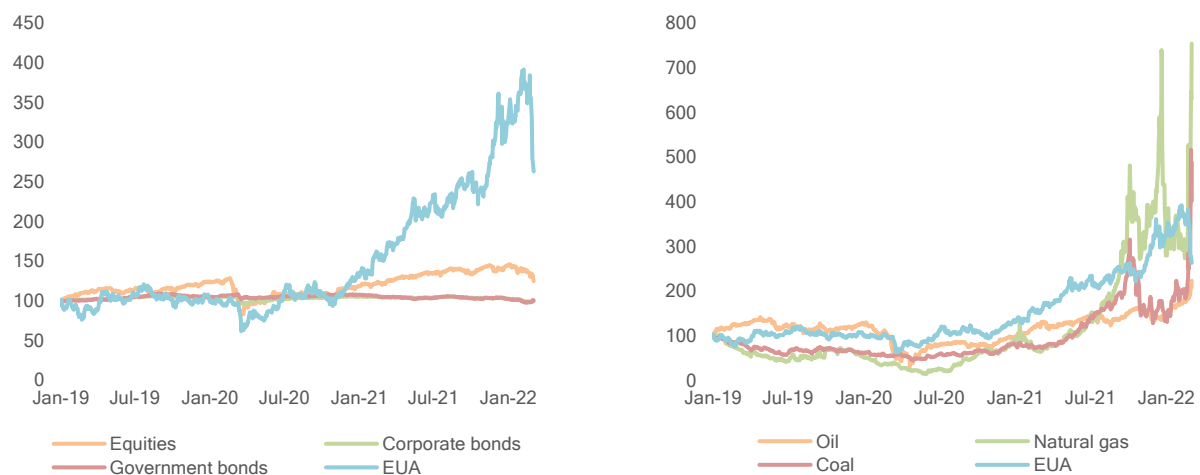


Figure 10: Prices of EU emission allowances (EEX-EUA Continuous trading), equities (STOXX Europe 600 index), corporate bonds (ICE BofA Euro Corporate index), sovereign bonds (ICE BofA Euro Sovereign index), crude oil (Brent 1-month future price), natural gas (NYMEX Dutch TTF Natural Gas Calendar Month), coal (ICE Coal Rotterdam Continuous trading), gold (S&P GSCI Gold Spot), rebased with 1 January 2019=100. USD prices converted to EUR. Source: Refinitiv, ESMA.

172. For many assets, sharp increases in spot prices usually result in backwardation (i.e. an inversion of the future curve corresponding to spot prices being higher than future prices). This reflects expectations that future prices will revert to their long-term mean or simply decrease, with the slope of the curve signalling how quickly this is expected to occur. Backwardation can be observed for energy commodity prices, with for example the inversion of the crude oil future curve in December 2020 and subsequent steepening, in contrast with the EUA future curve where no backwardation can be observed. In other words, an upward sloping EUA futures curve implies no market expectations about EUA prices reverting to their long-term mean.

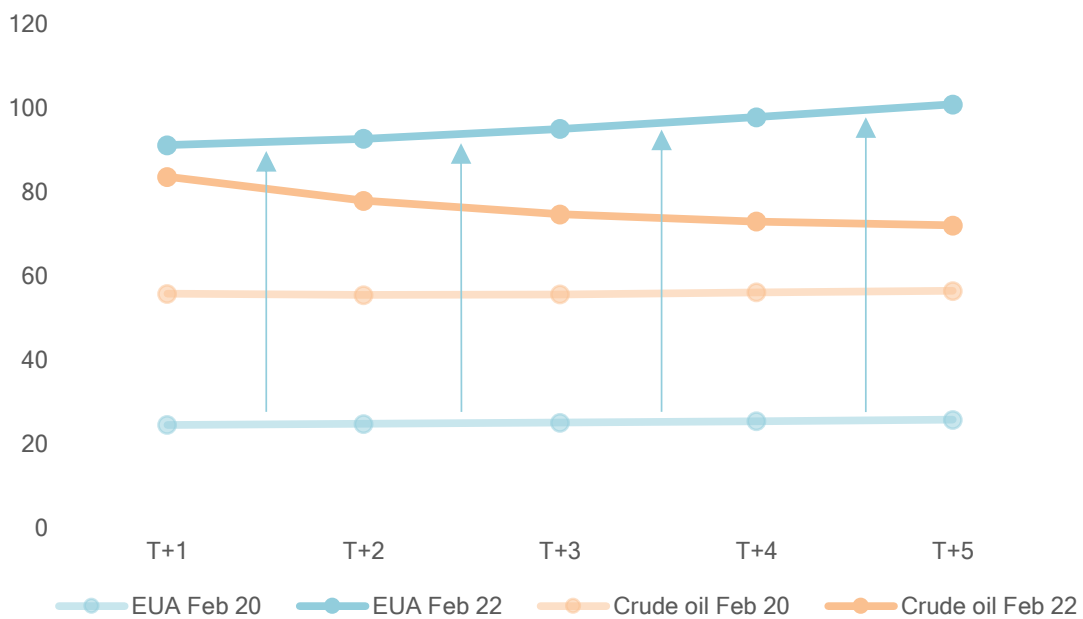


Figure 11: Future curve of December contracts, Brent crude oil (USD/barrel) and EU emission allowances (EUR/tCO₂), in February 2020 and February 2022. Source: Refinitiv, ESMA.

4.2.5 Carbon market supply and demand dynamics

173. One of the fundamental drivers behind carbon price developments has been the change in supply and demand of EUAs over time. As explained in Section 2, new EUAs enter the market every year either in the form of free allocations to firms under EU ETS compliance or through the auction process. Firms under EU ETS compliance obligations must surrender every year a given amount of emission allowances based on the (verified) greenhouse gas emissions they emitted during the preceding year⁵². The excess supply of EUAs for many years relative to the verified emissions of EU ETS compliance firms – resulting in a peak cumulative surplus of 2 billion allowances in 2013 – has been the main reason behind low carbon prices until 2018.

⁵² The details of the information to be reported and the requirements regarding verification by accredited verifiers are set out in EU Monitoring and Reporting Regulation ((EU) 2018/2066) and EU Accreditation and Verification Regulation ((EU) 2018/2067).

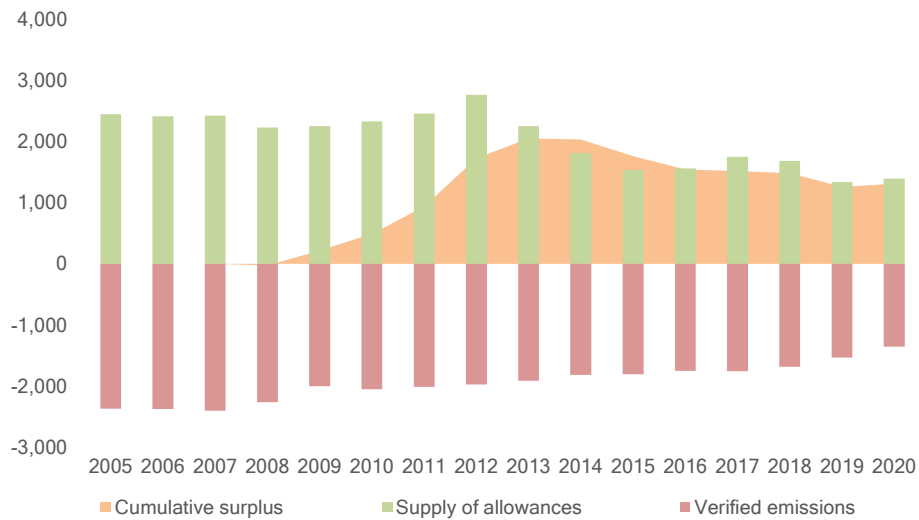


Figure 12: Supply of EU emission allowances (including allowances allocated for free, auctioned or sold plus international credits surrendered or exchanged) and verified greenhouse gas emissions of EU ETS compliance firms, in million tonnes of CO₂-equivalent emissions. Cumulative surplus=cumulative supply of allowances minus cumulative emissions. Source: European Environment Agency.

174. The establishment of the Market Stability Reserve⁵³ (MSR) helped to address the excess supply issue, creating expectations of a tighter market.⁵⁴ The MSR adjusts auction volumes according to predefined thresholds of the total number of allowances in circulation (TNAC). In any given year, when the TNAC is above 833 million, 12% (and up to 24% until 2023) of the surplus is withheld from auctions; when it is below 400 million, 100 million allowances are taken from the MSR and added to auction volumes the following year. These thresholds being priced in by EUA market participants act as a price stabilisation mechanism. Following MSR interventions from 2019, the surplus of allowances decreased from 1.655 billion in 2018 to 1.385 billion allowances in 2019 and limited the increase due to lower demand in 2020 (from reduced economic activity and energy demand), to 1.579 billion. The auction volumes in 2021 further decreased by nearly 40% as a result, i.e. around 320 million.⁵⁵

⁵³ Decision (EU) 2015/1814 of the European Parliament and of the Council of 6 October 2015 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC (OJ L 264, 9.10.2015, p. 1-5).

⁵⁴ European Federation of energy traders, "EU ETS price developments" (2021)

⁵⁵ European Commission, Report on the functioning of the European carbon market (2021)

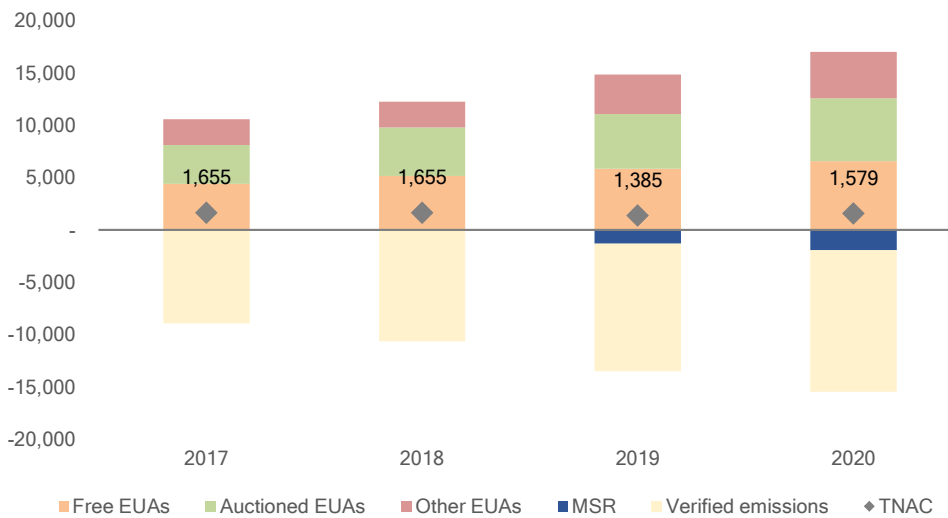


Figure 13: Breakdown of supply and demand of EU emission allowances from 2017 to 2022, cumulative since 2013 (beginning of Phase 3). 'Other EUAs' include allowances banked from Phase 2 (2008-2012) and supply other than from free allowances or auctions. MSR=Market Stability Reserve. TNAC=Total number of allowances in circulation. Source: European Commission.

175. The announcement of more stringent climate policy targets in December 2020 further drove expectations of tighter EUA supply. Indeed, between 2013 and 2020 (i.e. Phase 3 of the EU ETS), the number of new EUAs entering the market decreased every year by a linear factor of 1.74%. This reduction factor increased to 2.2% for the period 2021-2030 (i.e. Phase 4). In the wake of the new EU objectives to reduce net GHG emissions by at least 55% by 2030 compared to 1990 levels, the decrease rate is now foreseen to rise to 4.2% per year⁵⁶.

4.2.6 Buy and hold strategies

176. One of the key developments on the demand side in recent years is the entry of a growing number of financial entities with limited direct connection to the regular functioning of the EU ETS market. As evidenced in the literature (see Section 4.1), these may include market participants with short-term trading strategies, as well as longer-term investors with buy-and-hold strategies, seeking either exposure to carbon markets or ways to hedge their climate transition risk exposure.

177. A noteworthy trend has been the growth of exchange-traded products (ETPs) aiming to replicate or track carbon prices, such as exchange-traded funds (ETFs), exchange-traded commodities (ETCs), and exchange-traded notes (ETNs).⁵⁷ As of the first week of March 2022, there were six ETPs investing in carbon markets, four of which were

⁵⁶ The full proposals were outlined in the Fit-for-55 package proposed by the European Commission in July 2021, see: https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541

⁵⁷ For an explanation between the different types of ETPs, see EFAMA (2020), *Demystifying ETPs: A simple guide for the European investor*. https://www.efama.org/sites/default/files/publications/20%2011%20EFAMA%20ETP%20Investor%20education%20guide_0.p_dj

launched during the second half of 2021. The combined assets of these ETPs reached a peak of 2,433 million in February 2022, up from EUR 500 million six months earlier and EUR 210 million at the end of 2020. Following the market turmoil in February and March 2022, total assets declined by 30%, to EUR 1,693 million.

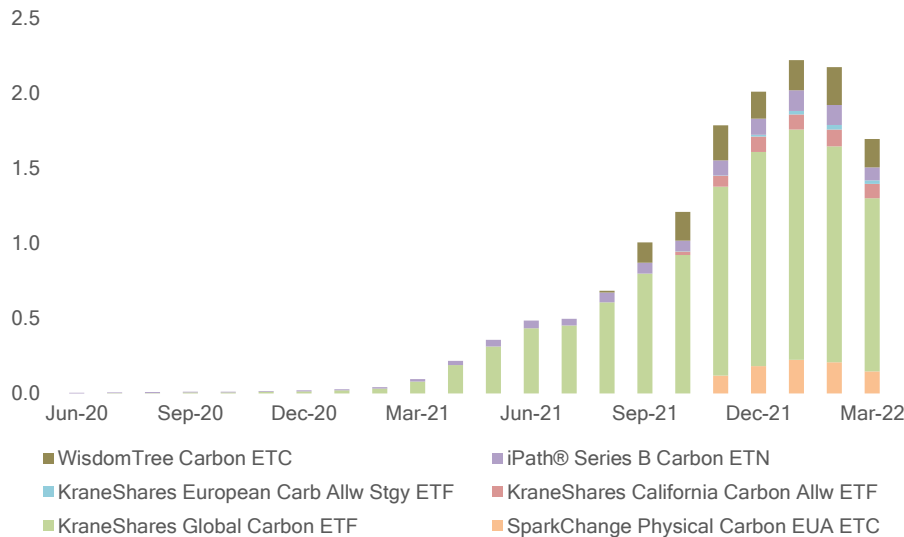


Figure 14: Assets of exchange-traded products focusing on carbon markets, EUR bn. ‘Mar-22’ observation as of 7 March. Source: Morningstar.

178. Out of these six ETPs, five invest in EU emission allowances (the last one invests exclusively in the Californian allowance market) – either because they directly stated this in their investment policy⁵⁸, or for practical reasons such as the size, accessibility and liquidity of the EU carbon market compared to markets in other jurisdictions. Importantly, four out of the five ETPs investing in EUAs rely on synthetic replication, i.e. they aim to replicate carbon prices by investing exclusively in derivatives.
179. The launch of the SparkChange Physical Carbon EUA ETC (‘SparkChange’) on the London Stock Exchange in November 2021 marked the first launch of an exchange-traded product or vehicle investing in physical EUAs. SparkChange is a debt instrument within the scope of Article 4(1)(44)(b) of MiFID II. By issuing a series of secured debt securities that are linked to physical EUAs, HAN ETC Securities plc (the “Manufacturer”) seeks to enable investors to gain exposure to EUAs. The Manufacturer holds a note issued by the Backing Issuer (Spark Change Jersey Issuer Limited, incorporated under the laws of Jersey) and the Backing Issuer holds the EUAs in a Union Registry account. The Manufacturer then issues secured zero coupon debt obligations.
180. According to its KID⁵⁹, SparkChange is relatively risky (risk indicator rated at 6 out of 7) and therefore, it is intended for investors with the ability to bear losses up to the total amount invested. The Prospectus further specifies that only “experienced financial

⁵⁸ For example, the KraneShares website states that “The KraneShares European Carbon Allowance Strategy ETF provides targeted exposure to the European Union Allowances (EUA) cap-and-trade carbon allowance program.”

⁵⁹ See https://sparkchange.io/wp-content/uploads/2021/11/kid_co2_XS2353177293_en_GB.pdf

institutions” may enter an agreement with the Manufacturer, before they can make the ETC available to end investors through exchanges or the OTC market.

181. Despite these warnings, SparkChange offers in practice the possibility for many new investors to invest in physical EUAs, potentially broadening participation to a significantly larger number of investors. Indeed, SparkChange claims on its website⁶⁰ to make “physical carbon easily investable; until now investing in physical carbon has been too operationally challenging to many investors”. Although the volumes exchanged have remained limited so far, daily trading and continuous asset growth since inception show the appeal of this ETC to some investors.



Figure 15: Share price in EUR (left axis) and daily volumes exchanged of SparkChange Physical EUA ETC on LSE (right axis). Source: Refinitiv EIKON.

182. SparkChange claims to have a “direct and positive environmental impact” by taking EUAs away from polluting firms and reducing the available supply, leading prices to increase. While the actual impact of the instrument on EUA prices and on emissions reduction by compliance entities is unclear, the product indeed takes EUAs away from the number of allowances available for trading as its size increases. The overall impact appears to be limited so far: since the ETC was launched on 5 November, the assets of SparkChange have increased from nil to a peak of EUR 245 million as of 23 February 2022, equivalent to around 2.5 million EUAs based on current EUA spot prices (or 0.2% of 2020 TNAC). In the context of the market turmoil in late February and early March 2022, SparkChange assets subsequently declined to EUR 146 million as of 7 March.
183. Moreover, purchases of physical EUAs by SparkChange have been spread over time since they mirror daily in- and out-flows from the instrument. The average single-day increase in SparkChange assets, a proxy for the daily volumes of physical EUAs it buys on the market, amounted to less than EUR 15 million since the instrument was launched. Based on the analysis of MiFID transaction reports (see Section 4.3.5), the average daily trading volumes of contracts with expiry of up to 2 days (including spot transactions)

⁶⁰ See <https://sparkchange.io/etc-institutional-investors/>

amounted to EUR 818 million between June and December 2021, implying that EUA purchases by SparkChange accounted for less than 0.2% of volumes traded on average between early November and mid-February⁶¹.

184. Nonetheless, the potential scope for growth as well as the launch of new investment vehicles or instruments in the future warrants monitoring. This is particularly the case in a context where investors pay increasing attention to climate-related policies and risks, including the role of carbon markets in facilitating the transition to a low-carbon economy.

4.3 Evolution of trading and counterparties in EU carbon markets

4.3.1 Overview of the available datasets

185. For the final report, ESMA has sought to expand the data sources used as a basis for its assessment of the carbon market, in contrast to the preliminary report which exclusively relied on publicly available weekly position reports.
186. The datasets cover granular information both on the primary and secondary markets; both at position and transaction level and the datasets are disaggregated at instrument level and counterparty level (except for the weekly reports).
187. Due to the existing legal framework, each dataset has a specific scope in terms of counterparties and instruments covered, meaning that no dataset can provide the full picture of the carbon market on a standalone basis. In addition, the departure of the UK from the European Union is affecting each dataset in a different way, in some cases leading to an interruption of reporting from 1 January 2021 (e.g. EMIR) and in other cases to the unavailability of data before 1 January 2021 (e.g. transaction reports, daily position reports).
188. The characteristics and challenges of each dataset is provided in Table 3 below.

⁶¹ This estimate excludes trading in derivatives contracts with expiry greater than two days, including trading in the most liquid futures contract (such as the next December expiry) where most of the volumes are concentrated.

#	Dataset name	Legal reference	Primary market (PM) Secondary market (SM) Post-Trade (PT)	Transactions (TS) or Positions (PO) Or Transfer (TF)	Entities in scope	Instruments in scope	Time horizon	Source
1	Auction reports	Article 36(5) Auctioning Regulation	PM	TS	Any entity participating in the auction	EUA	Jun/20 to Dec/21	BaFin
2	EMIR trade repositories reports	Article 9 EMIR	SM	TS	Only EU entities are subject to EMIR reporting obligation	EUA derivatives traded on exchange and OTC	Jan/20 to Dec/21	ESMA access to EMIR trade repositories
3	Transaction reports	Article 26 MiFIR	SM	TS		EUAs and EUA derivatives traded on exchange	Jun/2062 to Dec/21	BaFin Fin-NO AFM
4	Weekly position reports	Article 58(1)(a) MiFID II	SM	PO	Entities holding a position on EUA derivatives	EUA derivatives	Jan/18 to Dec/21	Public
5	Daily position reports	Article 58(1)(b) MiFID II	SM	PO	Entities holding a position on EUA derivatives	EUA derivatives	Jun/2063 to Dec/21	BaFin Fin-NO AFM
6	Union registry data		PT	TF and PO	Entities holding a position on EUA	EUA		European Commission

Table 3: Data sources used for the final report

⁶² Jun/20 to Dec/21 for EEX and Nasdaq NO. For ICE Endex, transaction reports are available from the date on which the trading of derivatives on EUAs migrated from the UK to the NL platform, i.e. from Jun/21.

⁶³ Jun/20 to Dec/21 for EEX and Nasdaq NO. For ICE Endex, transaction reports are available from the date on which the trading of derivatives on EUAs migrated from the UK to the NL platform, i.e. from Jun/21.

4.3.2 Classification of counterparties used in this report

4.3.2.1 Common classification of counterparties

189. While preparing the preliminary report, ESMA had been made aware of possible difficulties and inconsistencies in the classification of counterparties in the weekly position reports and intended to follow-up on this issue in the final report.
190. For this purpose, ESMA has compiled in a single list the counterparties present in any of the 6 different datasets introduced in the previous section and checked whether the counterparties were classified in the same way in different data sources.
191. The data sources used to build the common classification are:
- the classification of counterparties used by trading venues (EEX and ICE Endex) to produce the weekly position reports;
 - the classification of counterparties reported in EMIR TR data⁶⁴;
 - the public registers of financial counterparties (ESMA register⁶⁵, EBA register, FCA register⁶⁶);
 - the public list of operators in the EU ETS published by the European Commission⁶⁷
 - External sources of data (GLEIF and commercial databases).
192. The purpose of this exercise was (1) to identify cases of inconsistent classifications between different sources and where possible the reasons for those inconsistencies, and to propose remedial actions; (2) to establish a common classification of counterparties to ensure that the analyses presented in this report are performed on the basis of a common classification.
193. The common classification uses the same five categories as the ones of the weekly position reports i.e. (1) investment firms or credit institutions; (2) investment funds; (3) other financial institutions; (4) operators with compliance obligations under the ETS Directive (thereafter “compliance entities”); and (5) commercial undertakings, i.e. non-financial counterparties other than those with compliance obligations under the ETS Directive (thereafter “other non-financials”).
194. Crossing the various sources of information produced cases where all classifications were consistent (thereafter “consistent classifications”), cases where some classifications were inconsistent (“inconsistent classifications”), and cases of legal

⁶⁴ Field 6 “Corporate sector of the reporting counterparty” and Field 7 “Nature of the reporting counterparty”

⁶⁵ ESMA register of financial entities available at:

https://registers.esma.europa.eu/publication/searchRegister?core=esma_registers_upreq

⁶⁶ List of UK investment firms available at:

<https://register.fca.org.uk/s/resources#Downloads>

⁶⁷ Available under Miscellaneous section at:

https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/union-registry_fr

entities which were only classified in one dataset (“single classification”). In addition, some legal entities could not be classified (“unclassified”) because they were identified only in datasets which do not include any classification (i.e. transactions reports).

195. In the case of inconsistent classifications, counterparties were cross-checked individually against other public sources of information to identify the most appropriate classification. For financial counterparties, ESMA relied to the extent possible on the classifications provided in the public registers.
196. As regards the classification of third-country entities in the weekly position reports, and in particular third-country funds (see more details in Section 198), ESMA has sought to identify entities which could reasonably be classified as investment funds on the basis of a matching terminology derived from the names of legal entities consistently classified under EU law as investment funds.
197. The public list of operators published by the European Commission has also been used as a classification source as follows: this list is a subset of Union Registry accounts which only includes so called “operator holding accounts”. Those types of accounts are tied to installations with compliance obligation under the EU ETS Directive. While the same account holder may hold both an “operator holding account” and a “trading account” (linked to its financial activities in the EU ETS market), the vast majority of legal entities identified in the list of operators are compliance entities⁶⁸.
198. As a result, legal entities which were classified as “Other non-financials” for the purpose of the weekly position reports, and which are present in the list of operators, have been reclassified as compliance entities in the common classification. In addition, legal entities which are present in the list of operators and absent from any other classification source have been classified as compliance entities in the common classification.

Issues with the classification in the MiFID II weekly position reports

199. When comparing the common classification with the classification in the weekly reports, ESMA identified two main issues, one related to investment funds and one related to non-financial counterparties. First, several funds appear to be classified in the weekly position reports under the category “other non-financials” or “investment firms and credit institution” (or to a lesser extent, under the category “other financials”). This issue is more prominent in the case of third-country entities. If those entities were classified as funds, the number of funds in the weekly position reports would be roughly 10% higher⁶⁹.
200. Second, several entities appear to be classified in the weekly position reports under the category “other non-financials” when they instead should be classified as “compliance entities”. This issue does not seem to be linked to the UK departure from the EU as almost all compliance entities presumably misclassified as non-financial entities are EU

⁶⁸ A few financial entities hold an operating holder account but most of their EUA trading activity lies in the trading account. Those counterparties have not been reclassified as compliance entities.

⁶⁹ I.e. if the number of funds in the weekly reports was 100, the number of funds after reclassification would be around 110. The number of position holders in each category after reclassification can be viewed in the analysis based on daily position reports (Section 4.3.7).

ones, excluding the UK. The number of compliance entities in the weekly position reports could be underestimated by a factor of 3 to 4.

201. Proposals to improve the counterparty classification in the MiFID II weekly position reports are presented in Section 5.3.

4.3.3 Analysis based on Auction data

202. Issues related to the classification of counterparties were discussed in Section 4.3.2 above. In light of the difficulty to accurately assign counterparties under the categories “compliance entities” and “other non-financials”, both categories have been merged in the analysis below, under the unique label “Non-financials”.

203. The data received by ESMA under the Auctioning Regulation extends from June 2020 until December 2021. The total quantity of EUAs auctioned over this timeframe was just under one billion for a total market value of EUR 41.8 billion (around EUR 120 million per day), including EUR 31 bn in 2021 only. In comparison, the total quantity of EU aviation allowances (EUAAAs) auctioned amounted to just 7 million, or 0.7% of the total.

204. The number of unique participants in EUA auctions held between January 2021 and December 2021 was 48. The daily number of participants was smaller, with 18 auction participants on average. This number declined slightly over the course of 2021 but was broadly on par with the second half of 2020.

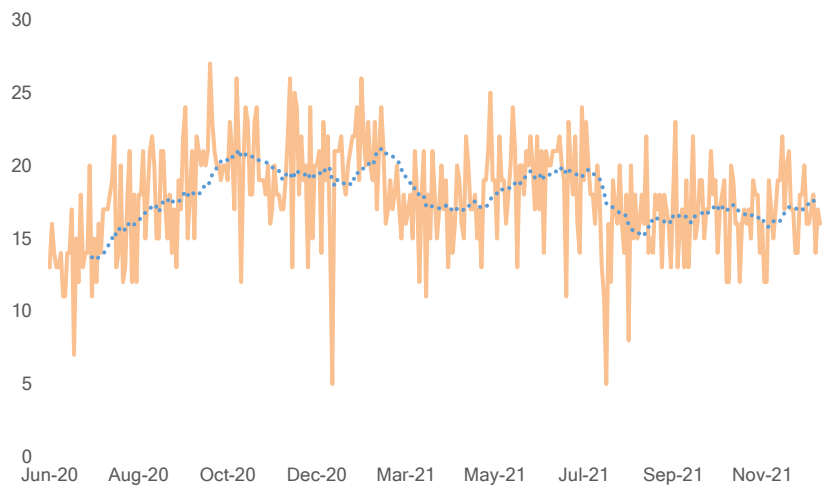


Figure 16: Daily number of participants in EUA auctions held at EEX, and 20-day moving average. Sources: BaFin, ESMA.

205. The small number of entities participating to EUA auctions, relative to the number of participants in secondary markets (between 400 and 700 active participants monthly in 2H21, see section 4.3.4.3 and 4.3.5.3) suggests possible barriers to entry. These may stem, for example, from the costs of participating in auctions as opposed to relying exclusively on services provided by investment firms in secondary markets (see Section 2 for an overall explanation).

206. Participants in 2021 EUA auctions included 34 non-financials (including 3 UK entities and 3 Swiss entities) and 14 financials (including 3 UK entities and two from other third countries). Altogether, third-country entities bought 15% of the EUA volumes auctioned in 2021. More than two thirds of auctioned EUAs were bought by non-financial entities (69% in 2021), with this proportion holding relatively steady over time.

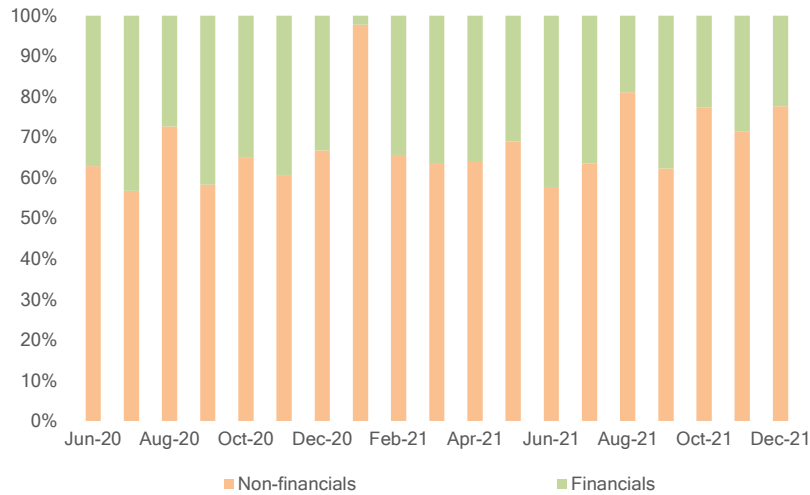


Figure 17: Monthly share of EUA volumes auctioned by EEX by sector.⁷⁰ Sources: BaFin, ESMA.

207. The market appears to be fairly concentrated in the hands of a few entities. The top 10 auction participants accounted for 90% of the volumes auctioned in 2021, with the remaining 38 participants accounting for just 10%. The top three auction participants were non-financials and bought a combined 49% of 2021 EUA volumes. In contrast, the top four financials in 2021 auction volumes bought 28%.

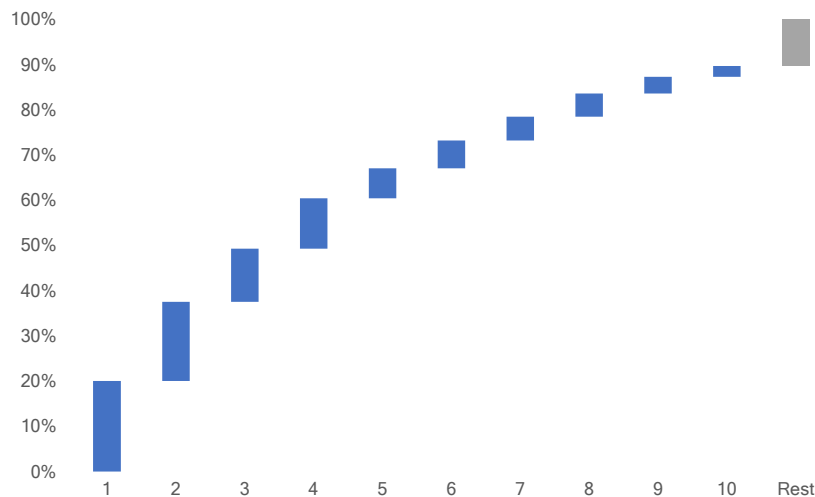


Figure 18: Share of EUA volumes auctioned in 2021, top 10 participants vs. rest. Sources: BaFin, ESMA.

⁷⁰ The January 2021 numbers presented in the graph only include one day of auction trading (29 January 2021) corresponding to low monthly volumes and a limited number of participants. EEX did not hold auctions for most of January 2021.

208. Daily concentration measures provide a mixed picture of developments over time. The bid-to-cover ratio (or “coverage ratio”, calculated as the aggregate value of all bids received in a given auction over the total value sold) has remained stable between June 2020 and December 2021 at around 1.7⁷¹. On the other hand, the Herfindahl-Hirschman index (calculated by summing the squares of the individual market shares by participant based on daily quantities) shows concentration increasing, from 0.17 in Q4 2020 to 0.23 in Q4 2021.

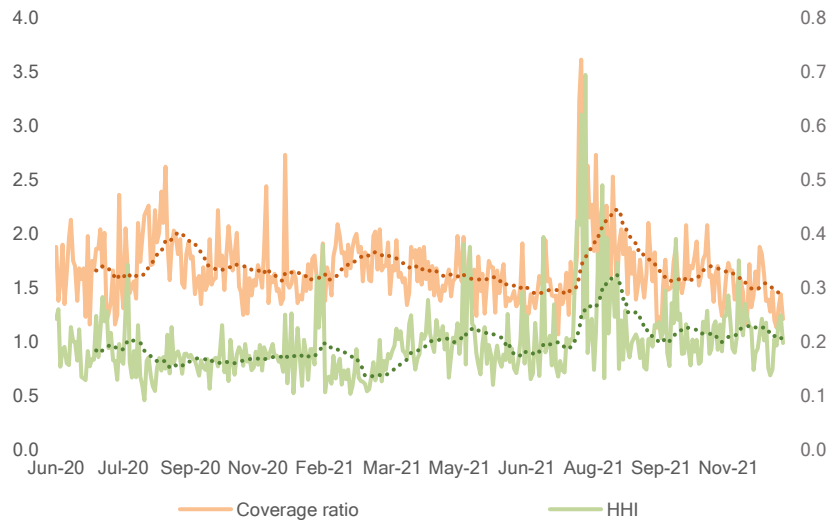


Figure 19: Coverage ratio and Herfindahl-Hirschman index based on daily volumes of EUAs auctioned at EEX. The dotted lines show 20-day moving averages. Sources: BaFin, ESMA.

209. Cross-checking this information with data on daily derivative positions (Section 4.3.7), the top 10 auction participants also appear to be significant players in secondary markets. The top 3 EUA derivatives position holders (based on aggregate position size) are indeed amongst the top 10 auction participants, and these top 10 auction participants together accounted for 26% of all EUA derivatives positions reported during the second half of 2021. Data from the EU Transaction Log (Section 4.3.8) confirm that these auction participants are large net suppliers of physical EUAs, especially to compliance entities (allowing these to fulfil their obligations), but also to non-compliance ones (contributing to secondary market liquidity). These findings show that despite some concentration in primary auctions, the main auction participants help disseminate EUAs to other secondary market participants.

4.3.4 Analysis based on EMIR data

4.3.4.1 Overview on EMIR data and processing

210. For the following subsections, ESMA exploited data reported under Article 9 of EMIR which essentially requires all EEA counterparties conducting derivative transactions to report their transactions to Trade Repositories (TRs)⁷². This obligation not only includes

⁷¹ The coverage ratio is naturally greater than one, as undersubscribed auctions would be cancelled automatically.

⁷² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0648>

conclusions of both OTC and ETD transactions but also post trade activity such as clearing or compression as well as intragroup transactions⁷³. This unique combination of different views on this highly sophisticated and very heterogenous derivatives market makes EMIR data a unique source of information for this report.

211. EMIR data is provided through several aggregated reports to authorities, the main ones being trade activity, trade state and position reports. While trade state reports (TSR) offer a detailed view on all derivatives outstanding at a certain date, trade activity reports (TAR) entail a higher granularity by providing the lifecycle events such as, for example, opening, valuation and cancelling of derivatives. In this report as the main goal of the analysis is to investigate the recent developments of the emission allowances derivatives segment, naturally the presented results will be mainly based on TAR data.
212. The final data sample included in the analysis comprises the period between January 2020 and December 2021, with 569 observed trading days. Since January 1st, 2021, counterparties located in the UK do not have the obligation to report under EMIR anymore, which is visible in some of the figures below. However, to keep the analysis as complete as possible the reports from these counterparties are included throughout 2020. Further, the data has been filtered to contain EUA derivatives by using the commodity fields in EMIR. For the cross-commodity analysis the sample has been extended to other related derivatives (i.e. with oil, gas and coal) using the same identification method.
213. Data cleaning was conducted using similar methods outlined in the ESMA Annual Statistical Report on EU Derivatives Markets⁷⁴. The following explanations give a quick overview of the steps that had been taken. Firstly, reports were identified that have been reported multiple times. Of these reports only one report was kept for the rest of the analysis. This step does not entail adjustments for double reporting, which are outlined below. Secondly, outliers were identified using a median and standard deviation approach. As with the common approach being taken on outliers with EMIR data these are removed as the information of other fields needs to be put into question. Thirdly, data that exhibited a wrong execution timestamp, either wrongly reported or implausible, were removed. These are records that have an execution timestamp that is in the future or in the past, i.e. timestamps that are implausible given the reference date of the report⁷⁵. Records with the missing values in the field maturity date were included in the sample.
214. Since the post trade activity such as clearing or compression is included in the TAR reports, further adjustments need to be applied in order to aggregate only the end-client activity. With regards to clearing, reports relating purely to the post-trade activity have been removed. In the case of OTC derivatives, this has been achieved by considering only the bilateral derivatives between the original counterparties and excluding the subsequent reports with clearing members and between clearing members and CCPs. In the case of ETDs a more complex procedure was applied due to the fact that original

⁷³ To the extent they are not subject to the exemption from reporting of intragroup derivatives pursuant to the Article 9(1) of EMIR

⁷⁴ <https://www.esma.europa.eu/press-news/esma-news/esma-reports-derivatives-and-securities-markets-in-2020>

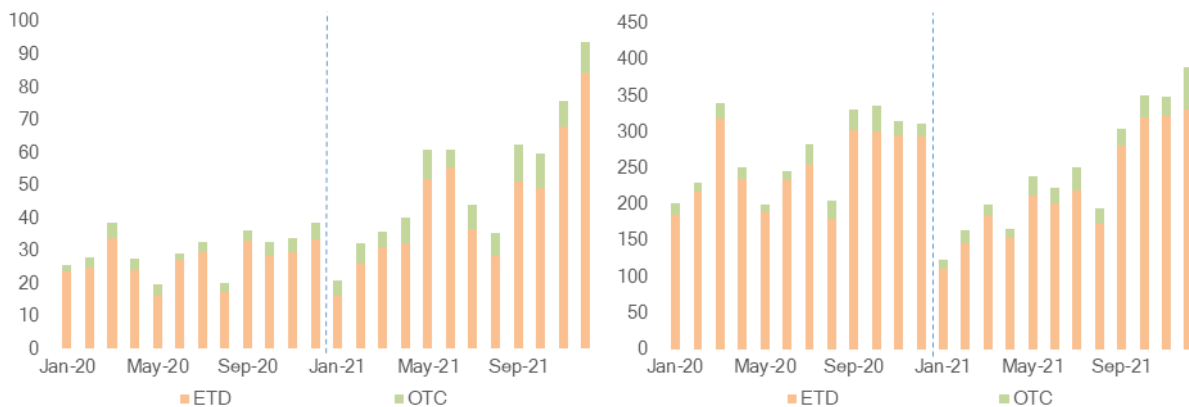
⁷⁵ Date as of which the report is produced

execution on venue is not reported under EMIR⁷⁶. Notably, all the trades between clearing members and CCPs have been removed⁷⁷ to avoid counting multiple times what is essentially the same trade. After this step, the data analysed might still contain the same trade reported twice: if both the client and the clearing member are located in the EEA30, both of them have the obligation to report to EMIR. ESMA considered also the trades reported only by the clearing member (where the clearing member is based in the EEA30 and the final client outside of the EEA30). After dechaining this double reporting, we arrive at the final ‘client reports’ mentioned in the following paragraphs and figures. These include, whenever possible, the highest quality report of the client-clearing member trade, and - for OTC derivatives - the original uncleared report. However, in all cases it is the final client, rather than a clearing member, considered for the purpose of presenting the market structure. Finally, when the final clients on both the buying and selling sides of an execution are observed, the corresponding amounts are aggregated.

- 215. EMIR contains two levels of the sector classification of counterparties: an initial classification between financial and non-financial counterparties and a second level with a more granular breakdown of the corporate sectors. These two fields have been cross-checked and expanded with the other datasets included in this report as explained before. Inconsistencies across data sources have been resolved whenever possible and new classifications such as ‘Compliance entities’ are included in the analysis.

4.3.4.2 Market structure: execution venues and contract types

- 216. On average more than 85% of the notional amounts of EUA derivatives are traded ETD, which corresponds to 90% of the trades (Figure 20). Based on the client reports, notional amounts traded per month have increased from EUR 25 billion in January 2020 to almost EUR 94 billion in December 2021, and from 200,000 trades to almost 400,000 trades.



⁷⁶ In the case of derivatives concluded on a trading venue and cleared by a CCP on the same day, only the cleared form of a derivative is reported.

⁷⁷ Clearing member’s own trading is included, although estimated to be relatively small.

Figure 20: Notional amounts (EUR billion, left chart) and number of trades (thousands, right chart) by ETD/OTC split. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

217. The share of notional amounts of EUA derivatives traded in futures has decreased from approximately 70% in January 2020 to 53% in December 2021 (see Figure 21). Options, on the other hand, have increased from 17% to 27% of the amounts traded, followed by forwards. Futures, however, correspond to roughly 90% of the number of trades across the entire sample.

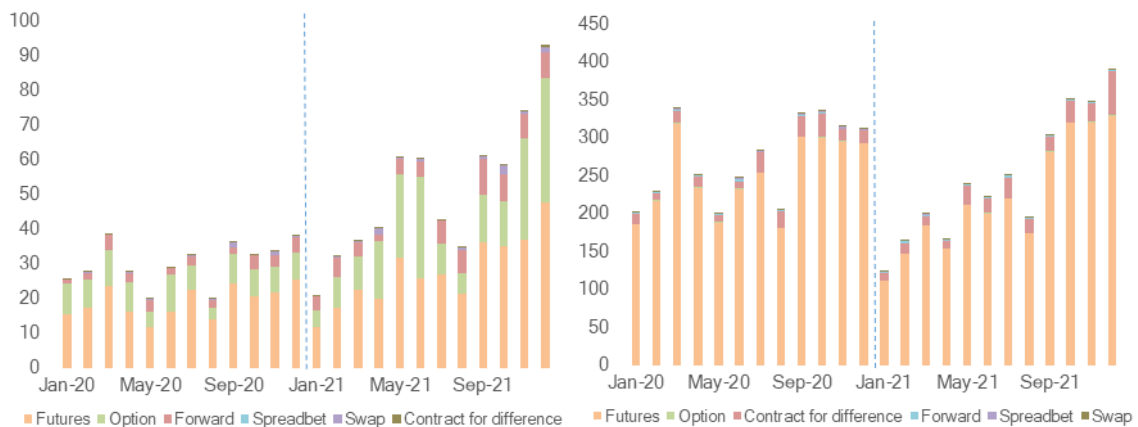


Figure 21: Notional amounts (EUR billion, left chart) and number of trades (thousands, right chart) by contract type. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

218. Most of the notional amounts traded are based on contracts with maturities of less than one year, and more specifically targeting the end of the calendar year. As seen in Figure 22, in January 2020 contracts with maturities in December 2020 corresponded to more than 85% of the amounts traded. In January 2021, trades with expiration date in December 2021 accounted for 75% of the amounts traded. At the end of the period analysed, in December 2021, trades with maturity in December 2022 represent 25% of the notional amounts traded.

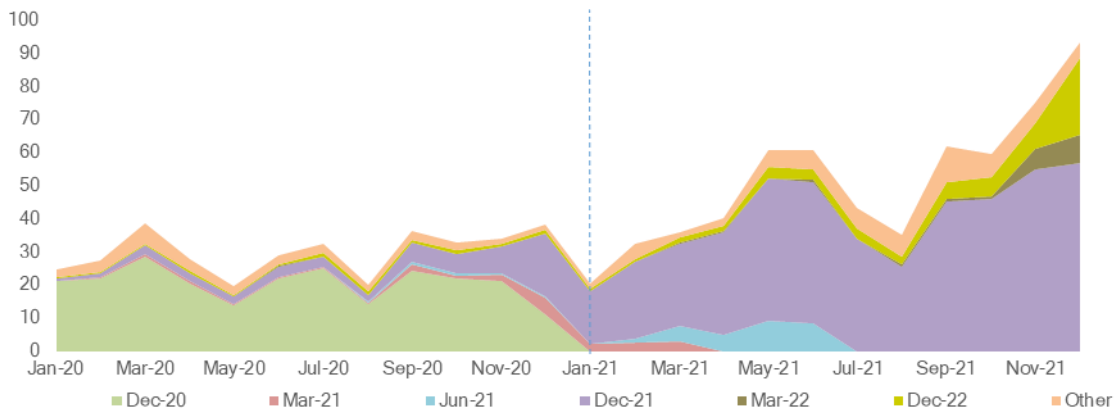


Figure 22: Outstanding monthly notional amounts (EUR billions) for the top six maturities by contract maturity date. Trades with no maturity date included in category 'Other'. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

219. In Figure 23, the notional amounts traded daily have been adjusted by the spot price. On average, futures display larger amounts than options. However, there is a significant drop in the amounts observed of futures trading after the withdrawal of the UK, following January 1st, 2021. For each year and contract type the adjusted amounts have remained relatively stable, with an increase of the volume of options at the end of the sample period.

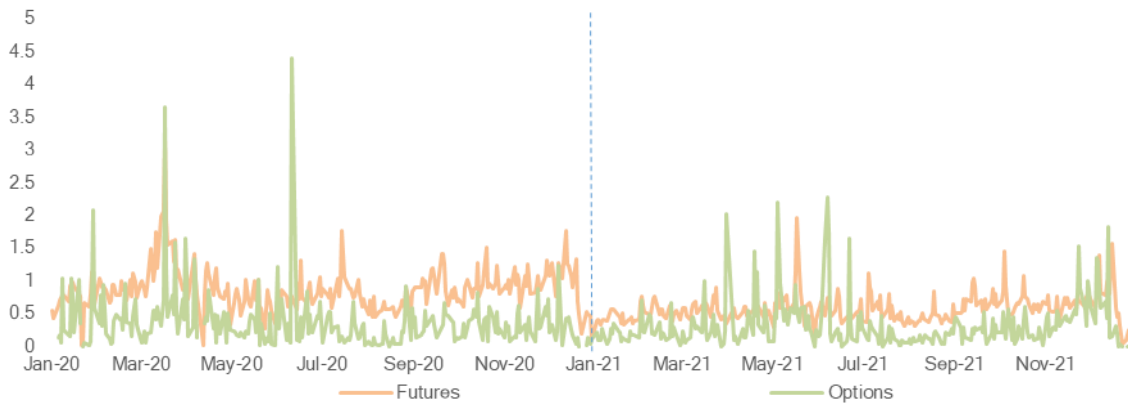


Figure 23: Index of notional amounts traded, adjusted by spot price per contract type. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

220. Figure 24 displays, for each month analysed, the Herfindahl-Hirschman index of concentration based on the notional amounts traded per client⁷⁸. This measure displays higher concentration in the options market than in the futures or overall market. All the measures rise after the withdrawal of the UK, with the overall index shifting from an average of 0.03 in 2020 to 0.06 in 2021.

⁷⁸ See Annex for a description of the HHI.

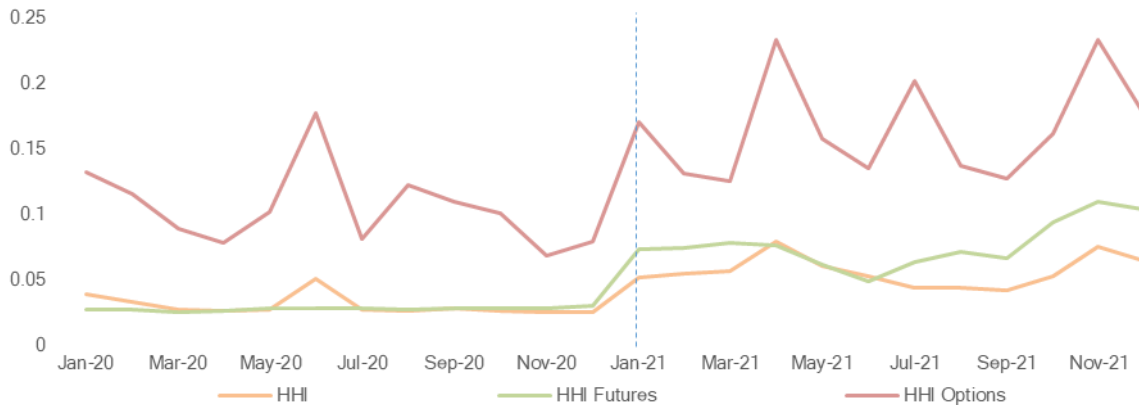


Figure 24: Herfindahl-Hirschman index of concentration per client by month and contract type. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

4.3.4.3 Market participants: sector activity and number of counterparties

221. The number of market participants has increased by 31% since January 2021 (post Brexit). The withdrawal of the UK corresponds to a drop of approximately 38% of the counterparties reporting their trades in EUA derivatives between December 2020 and January 2021 (Figure 25). However, the share of entities by sector has remained relatively stable, with compliance entities amounting to approximately 40% of the total number of counterparties, followed by other non-financial companies, funds and investment firms or credit institutions.

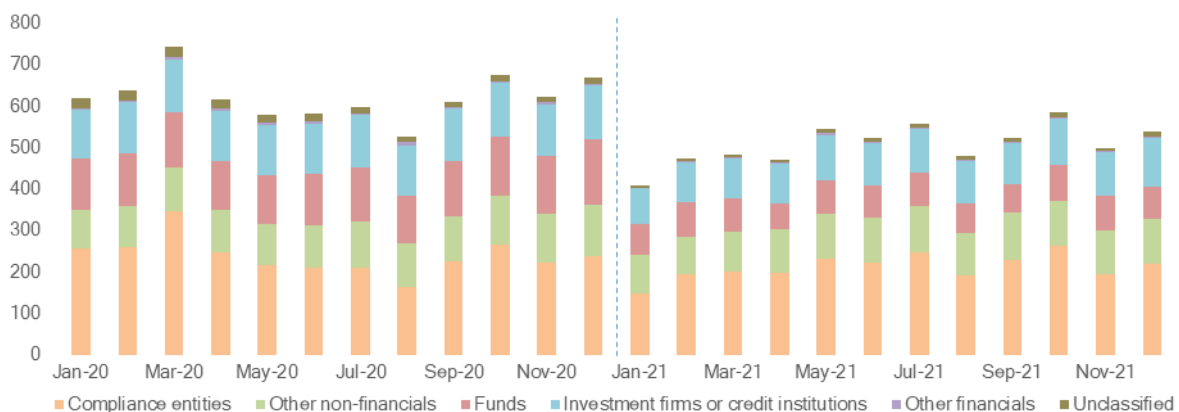


Figure 25: Number of active counterparties trading by month and sector. Counterparties reported as client codes instead of LEIs are excluded. All reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

222. On average, non-financial corporations account for 63% of the notional amounts and 54% of the trades (Figure 26). While their share of notional amounts has remained relatively stable, their share of the total number of trades has decreased from around

55% in January 2020 to roughly 36% in December 2021. This is mainly due to the relative increase of the share of investment firms or credit institutions during the second half of the sample.

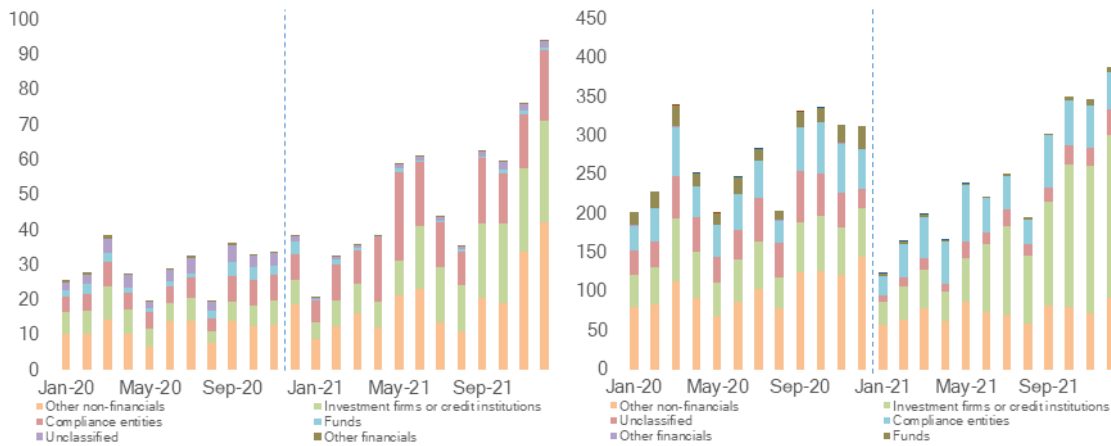


Figure 26: Notional amounts (EUR billion, left chart) and number of trades (thousands, right chart) by sector of the end-client. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

223. Figure 27 displays the Herfindahl-Hirschman index of concentration computed based on clients for two of the main sectors, compliance entities and investment firms and credit institutions. While concentration on compliance entities has remained relatively stable around 0.4, for investment firms and credit institutions it increased post-Brexit, after January 1st, 2021, from an average of 0.15 in 2020 to 0.27 in 2021.

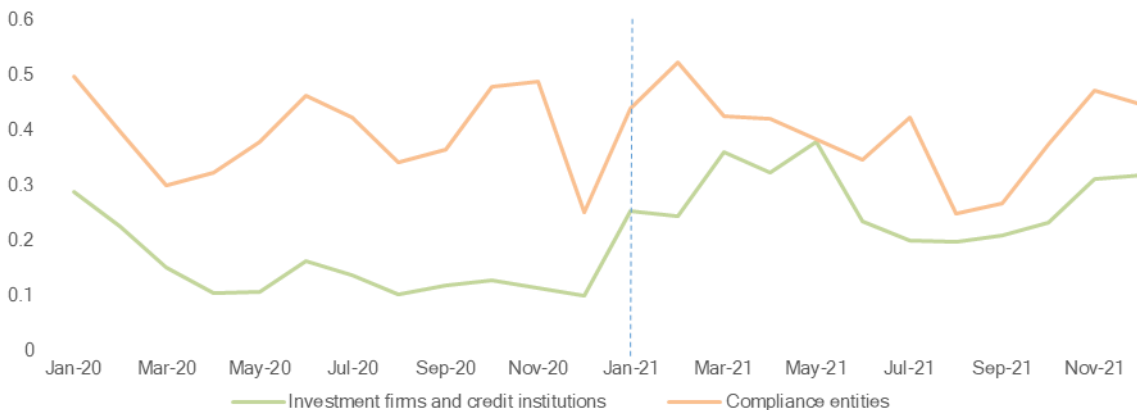


Figure 27: Herfindahl-Hirschman index of concentration by notional amount traded per client by month and selected sector. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

224. In the sample of two years most counterparties have traded between 0 and 10 days (Figure 28). In the case of non-financial corporations, 85% of them have traded less than 50 days during these two years, while financial corporations have on average traded more frequently. A small sample of entities, roughly 3% of the total, has traded more than 300 days.

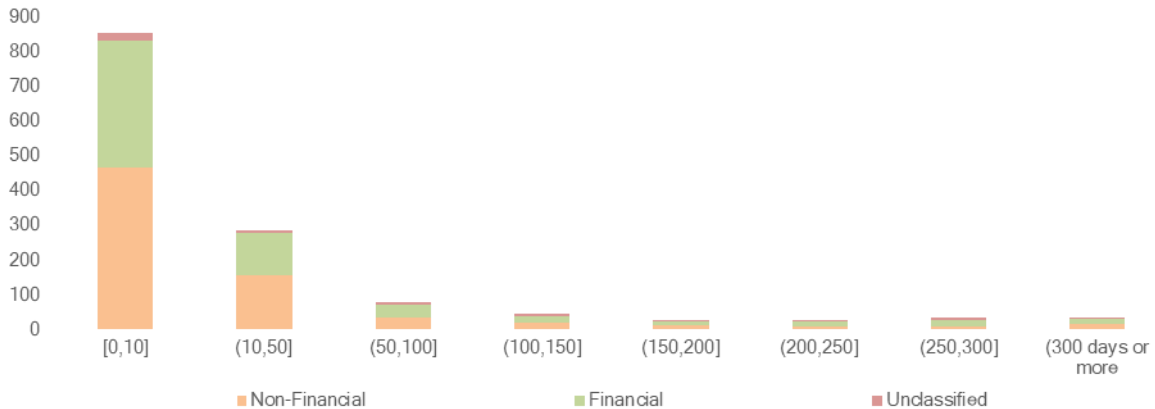


Figure 28: Count of counterparties (vertical axis) by sector and number of days where they traded in the two-year sample (horizontal axis). Only client reports included. Sources: TRs, ESMA.

225. Figure 29 displays the same calculation as Figure 28 but with a more granular sector breakdown. In this case, non-financial corporations are classified into ‘Compliance entities’ and ‘Other non-financials’. 68% of compliance entities have traded 10 days or less, while only 37% of the funds have traded at that frequency.

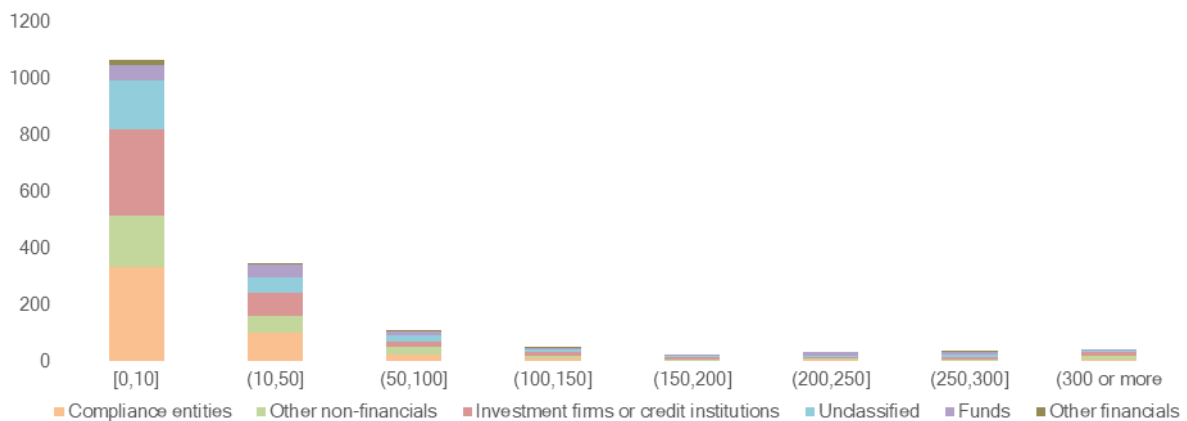


Figure 29: Count of counterparties (vertical axis) by sector and number of days where they traded in the two-year sample (horizontal axis). Only client reports included. Sources: TRs, ESMA.

226. Non-financial counterparties need to report the field ‘Directly linked to commercial activity’. Based on this field it is possible to analyse whether the trading is executed for hedging purposes or not. Slightly more than half of the notional amounts reported by

non-financial counterparties (which include compliance entities and other non-financials) are traded for hedging purposes (Figure 30)⁷⁹. On average, hedging corresponds to 53% of the amounts and 51% of the trades. In addition, the share of hedging trades has increased from 48% of the amounts in January 2020 to roughly 60% in December 2021.

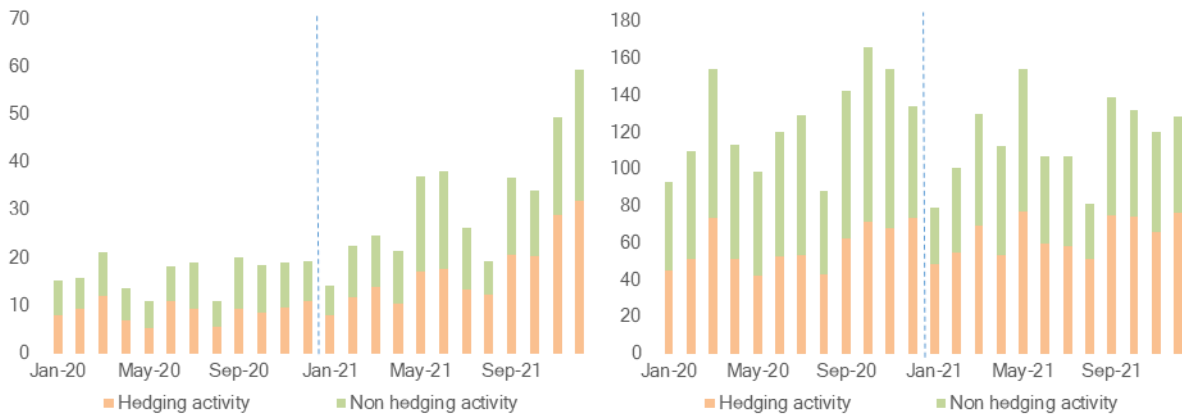


Figure 30: Notional amounts (EUR billion, left chart) and number of trades (thousands, right chart) of non-financial corporations by hedging strategy. Only reports from NFCs included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

227. Under EMIR, counterparties must report whether a derivative is an intragroup trade for all trades except for those executed on the regulated markets (or third-country venues equivalent to the regulated markets). Notional amounts of intragroup trades are, on average, above EUR 2 billion per month in the period studied (Figure 31). After the withdrawal of the UK, this corresponds to an average of more than 3,000 trades per month. What we can further observe is a material number of intragroup exposures between EEA and non-EEA entities. Given that the reporting obligation under EMIR does not apply to third-country entities, we cannot further investigate who is the end-client of these transactions as we only observe that these notional amounts are transferred overseas. Whether these derivatives are staying within this group or are resold to other clients remains unclear.

⁷⁹ ESMA experience with the analysis of data reported under EMIR shows that the population of the field which allows to indicate whether a transaction is concluded with the objective of hedging risks emerging from the commercial activity or the treasury needs of an entity is not always correctly populated. This possibly gives an underestimation of real hedging activity.

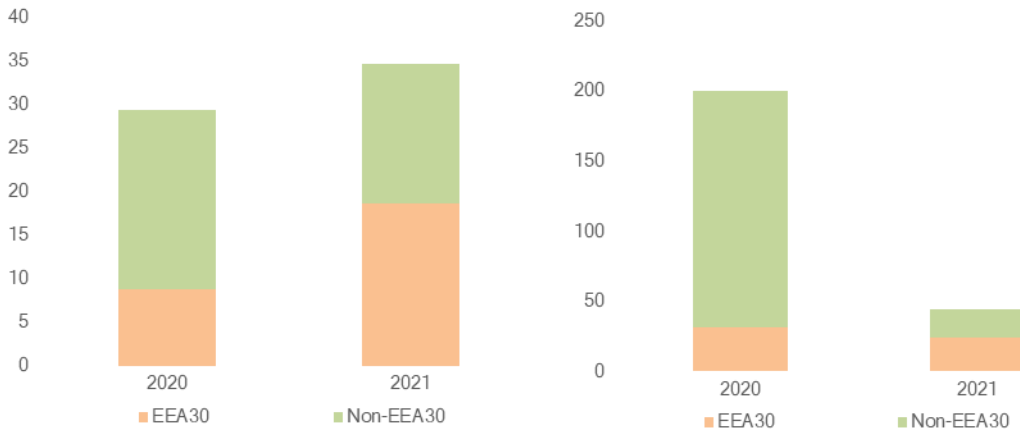


Figure 31: Intragroup notional amounts (EUR billions) and number of trades (thousands)

4.3.4.4 Geographical distribution: EEA30 vs non-EEA30 countries

228. On average, notional amounts traded by clients located in DE account for more than 40% of the total amounts (Figure 32) traded by EEA30 clients. The corresponding share of the amounts traded by clients located in NL has grown in recent months from 13% in July 2021 to around 30% in December 2021. A similar trend can be observed in the total number of trades, where clients located in DE account on average for 40% but the trades of NL-based clients amount to 36% of the total in December 2021.

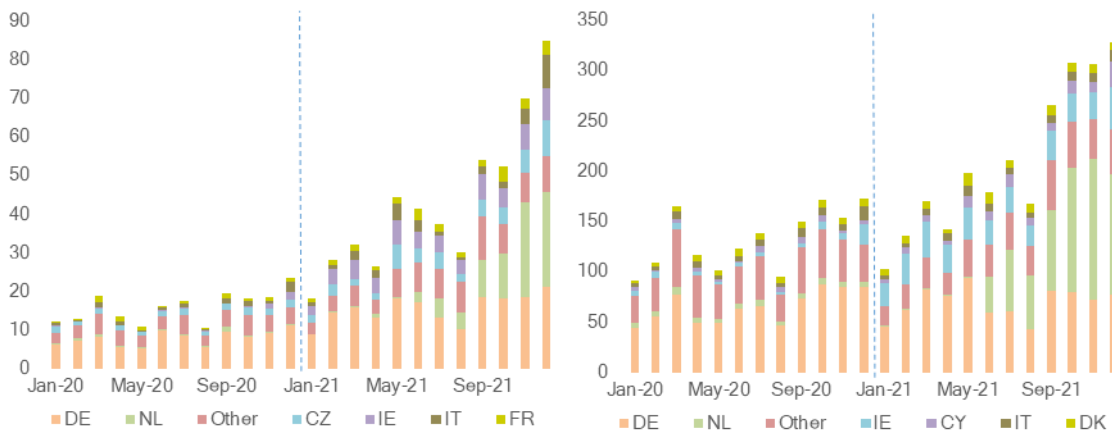


Figure 32: Notional amounts (EUR billion, left chart) and number of trades (thousands, right chart) by country of the end-client for the top EEA30 countries (ordered by notional amount). Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

229. Non-EEA30 clients trade less than EEA30 ones, but their relative share in total trading declined substantially due to Brexit. After the withdrawal of the UK from the EU, clients located in GB and CH accounted, on average, for 75% of the notional amounts traded by non-EEA30 clients (Figure 33). This corresponds to roughly 60% of the trades in the

same time span. From December 2020 to January 2021, following the withdrawal of the UK from the EU, notional amounts reported by third-country entities declined by 80% between December 2020 and January 2021, and the number of trades by 85%.

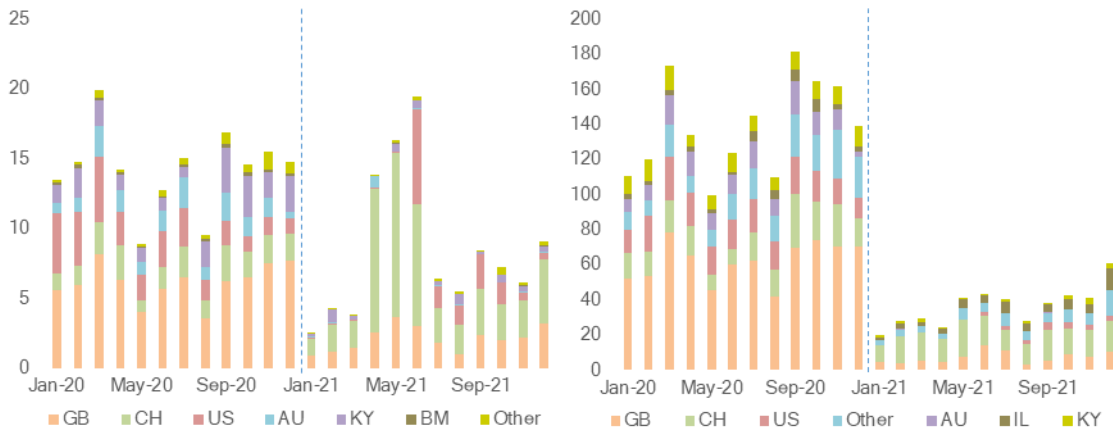


Figure 33: Notional amounts (EUR billions, left chart) and number of trades (thousands, right chart) by country of the end-client for the top non-EEA30 countries (ordered by notional amount). Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.⁸⁰

4.3.4.5 Options: trading volumes and counterparties per strike-prices

230. This subsection focuses on the options segment of the EUA derivatives market as it represents a significant amount of trading activity in the observation period. Options possess different characteristics, for example the strike price or the type of right it gives to the buyer (i.e. selling or buying the underlying at a strike-price). To investigate distinct option patterns, we use ancillary information reported in EMIR. Essentially this means no further (reference) data source was necessary to compute the information that is depicted in the following explorative analysis. As we use additional EMIR fields specific data cleaning and aggregation procedures where necessary to enable this analysis. To exclude implausible values and to make the visualisation meaningful and straightforward all strike prices above 120 EUR were excluded. After this preliminary cleaning the data is further aggregated by the notional amount traded in each strike price. Finally, the results are binned into strike price buckets of 10 EUR (e.g. [0 EUR:10 EUR), [10 EUR:20 EUR)).

231. The next two figures focus on the relative monthly notional amount (in percentage) that is assigned to each strike price bucket and visualized onto the two heatmaps shown below. Using relative monthly notional amounts avoids any bias of the chart towards the end of 2021 where notional amounts increase. It should be noted that each month adds up to 100% and not the whole visualization itself. Focusing on the put options and their

⁸⁰ Country codes displayed represent countries as follows. GB: United Kingdom of Great Britain and Northern Ireland. CH: Switzerland. US: United States of America. AU: Australia. KY: Cayman Islands. BM: Bermuda. IL: Israel

trading patterns we can see a clear evolution along with the spot price (not shown in the figure). This is nothing unusual and was expected as options with a strike price close to the underlying price are usually more frequently traded and liquid. Furthermore, we can observe that as the spot price rises the volumes become more distributed around the strike price (vertical axis) indicating a slight shift in the usage of the options.

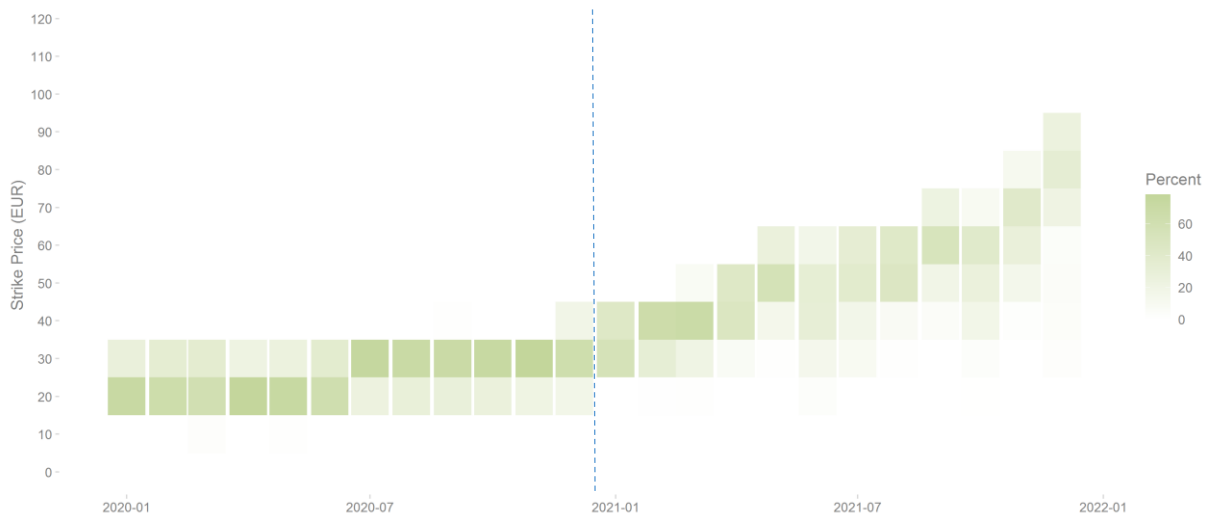


Figure 34: Relative notional amounts traded (%) in put options by strike price and month. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

232. The next figure extends the analysis to call options. As in the previous chart, we witness a clear evolution along with the price that has increased during the observation period. Further, we can observe that the distribution of relative volumes around the spot price is higher than for put options, and a large amount of trading activity on out of the money options. Out of the money options have no intrinsic value and their price strongly reacts (among other parameters) to the underlying price and its volatility. In such a form these options provide a certain leverage to the buyers of a call option, that comes with the risk that these options expire worthless if the underlying price does move over the strike price.

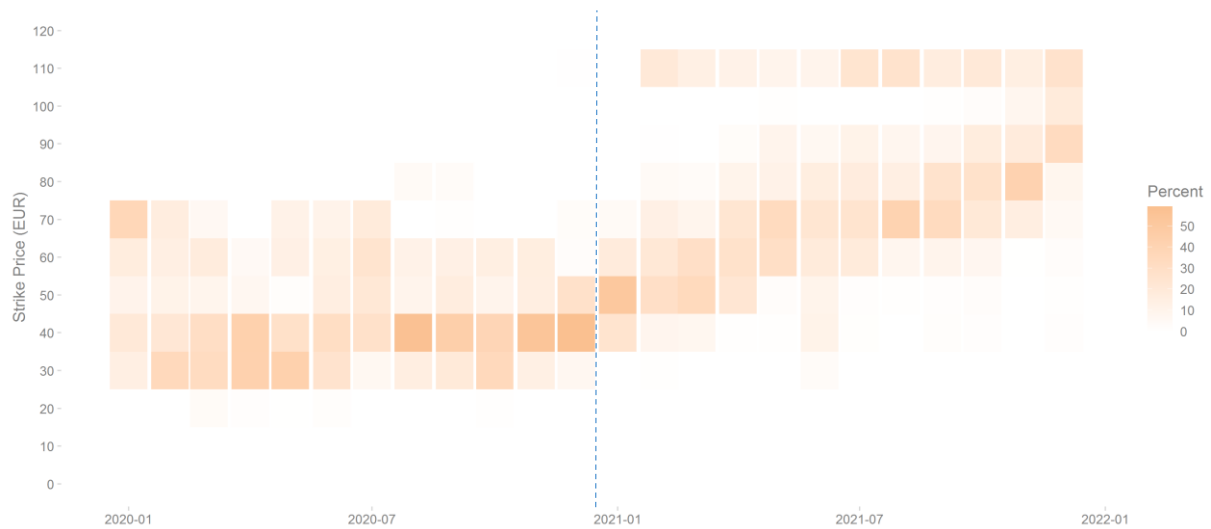


Figure 35: Relative notional amounts traded (%) in call options by strike price and month. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

233. After having investigated the strike prices of most traded options (in notional) the analysis focuses on the number of counterparties that are active each month in each strike price. Once again, the results depicted below are shown in relative terms (i.e. as percentages), with one month (one bar) adding up to 100%.
234. Figure 36 shows the relative number of counterparties active per strike price in put options. The first observation that we can make is that more strike prices become visible compared to the previous visualisation, which means although most of the notional amounts traded around the spot price (which is not shown in chart) market participants are active in other strike prices too. There seems to be a relation between spot prices and activity in different strike prices. Additionally, we can observe a small amount of market participants trading put options (with small notional amounts) above the spot price.

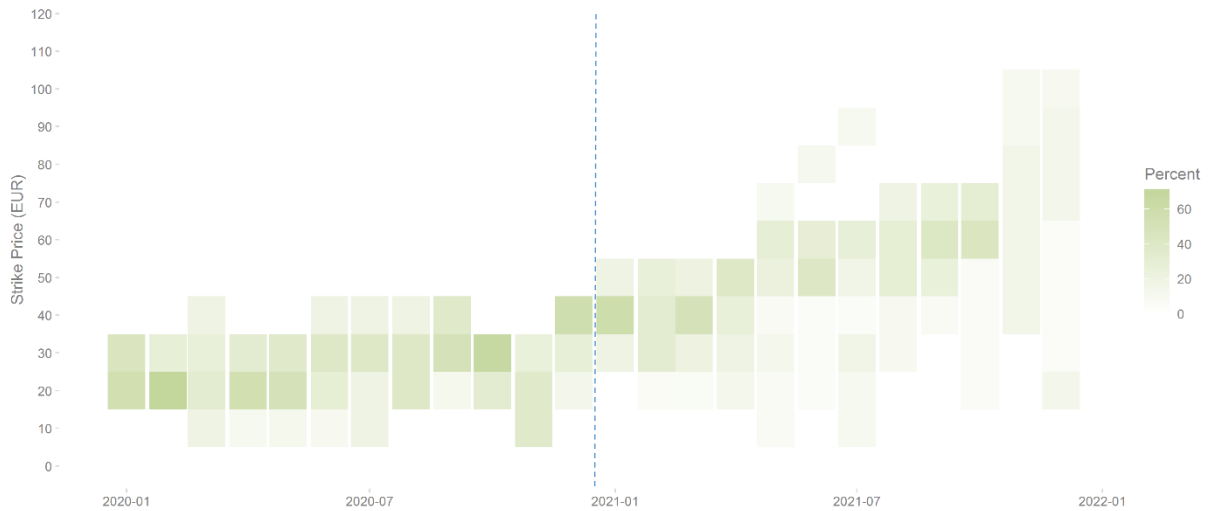


Figure 36: Relative number of counterparties (%) trading put options by strike price and month. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

235. Figure 37 shows the same analysis for call options. Like the chart above we observe a wider distribution along the strike prices compared to the traded notional charts. Compared with put options, we further witness a wider distribution across strike prices which is growing over time. In addition, these charts unveil activity on in the money options below the spot price, although their related notional amount is minor. Noteworthy in this context is the activity of deep in the money options in the end of 2021. Considering the other end of the option spectrum, i.e. out of the money call options, we observe that the relative notional amounts from Figure 35 are somewhat out of proportion compared to the number of entities active in these strike-prices. This indicates that these notional amounts traded are quite concentrated among a limited number of entities.

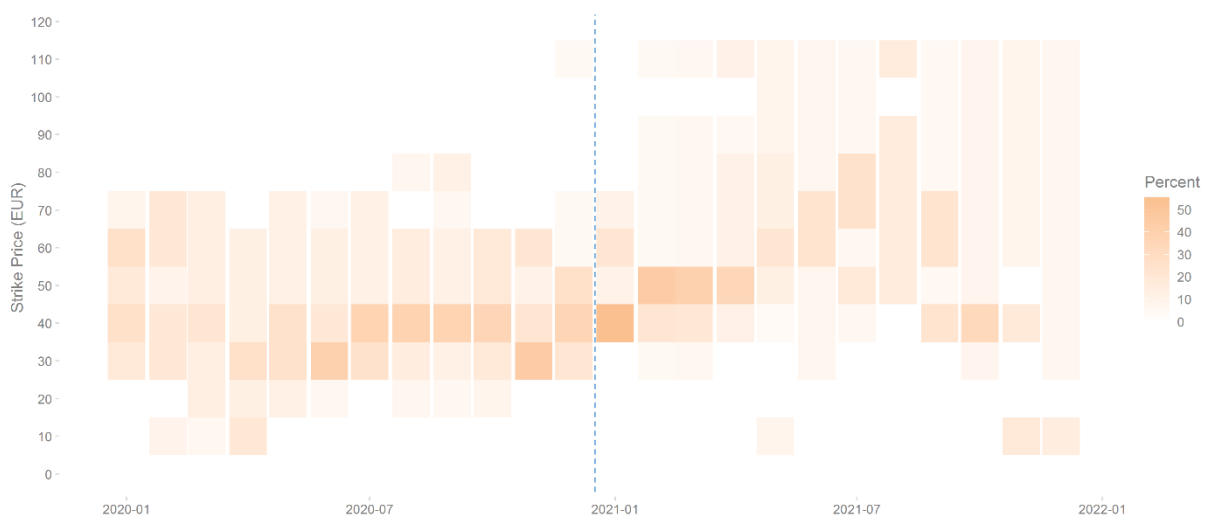
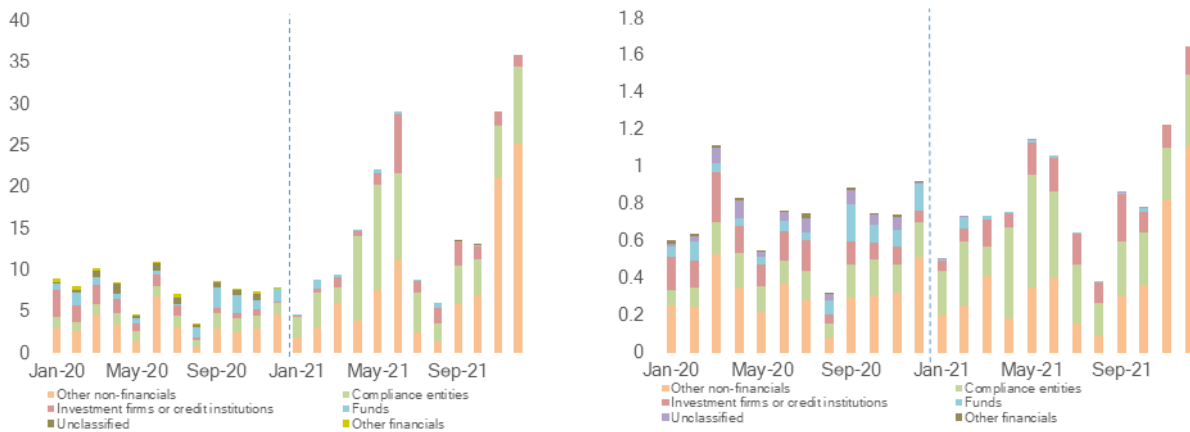


Figure 37: Relative number of counterparties (%) trading call options by strike price and month. Only client reports included. Date of withdrawal of the UK highlighted. Sources: TRs, ESMA.

236. The majority of notional amounts and trades executed have end-clients classified as ‘Other non-financials’ (see Figure 38). They account, on average, for 42% of the amounts and 40% of the trades. However, their share of notional amounts has increased, from 33% in January 2020 to 70% in December 2021. In the case of trades, the share at the beginning of the sample was 41% and reached 67% at the end of the period analysed. Compliance entities, on the other hand, are responsible on average for 30% of the amounts and trades.



4.3.4.6 **Figure 38:** Notional amounts (EUR billions, left chart) and number of trades (thousands, right chart) in options by month and sector of the end-client. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA. Post trade infrastructure: clearing members

237. In this subsection our analysis focuses on post trading aspects of the market, where we aim to shed light on post trade activity in emissions derivatives. In doing so we present an overview on the location of clearing members and concentration in clearing members. It should be noted that in this specific subsection some of the charts are produced on the whole sample of emission-derivative reports, unveiling especially post-trade operations that can be only observed in EMIR. The data sample used is described in the footnote of each chart. First, we highlight in Figure 39 the different post-trading roles and their notional amounts reported for each role. As mentioned in the introduction subsection of the EMIR analysis ESMA has made its analysis from the end-client angle. This allowed ESMA to observe who is trading such instruments, e.g. by sector. During 2020, clearing activities (clearing member – CCP trades) represented on average more than 60% of the amounts reported per month. Following the withdrawal of the UK, trades between non-clearing members and clearing members account for most of the notional amounts executed, representing as well approximately 60% of the monthly amounts.

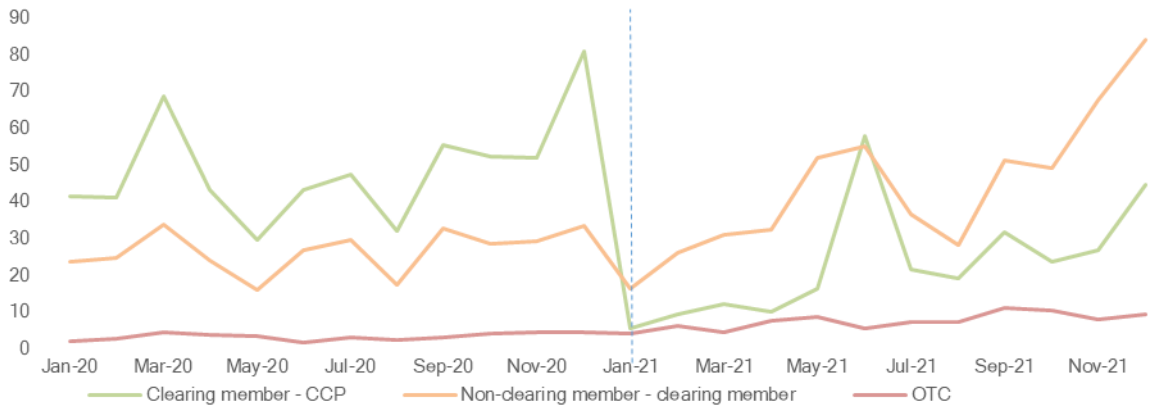


Figure 39: Notional amounts (EUR billions) by month and post-trade activity role. All reports included, selected roles displayed. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

238. The Herfindahl-Hirschman index of concentration displays higher values when analysed from the clearing member perspective (see Figure 40) instead of the client’s point of view. The overall trend is similar, with options being more concentrated than futures and the overall index. In 2020 the overall index averages 0.1 compared to 0.19 in 2021.

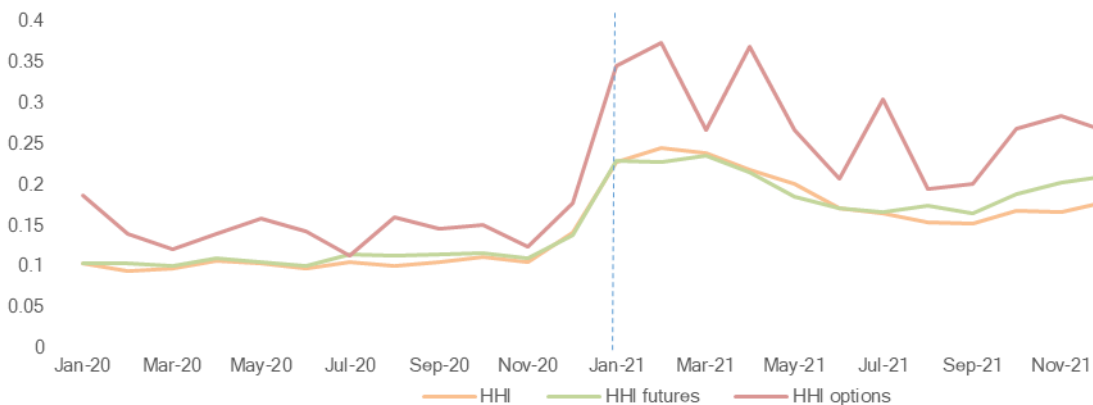


Figure 40: Herfindahl-Hirschman index of concentration by notional amount traded per clearing member by month and contract type. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

239. Most of the notional amounts of EUA derivatives traded with EEA30 clearing members are cleared by clearing members located in FR (see Figure 41). On average, this corresponds to 60% of the amounts and 63% of the trades. In the recent months, clearing members located in NL have increased their share of the activity, reaching 26% of the notional and 48% of the trades in December 2021.

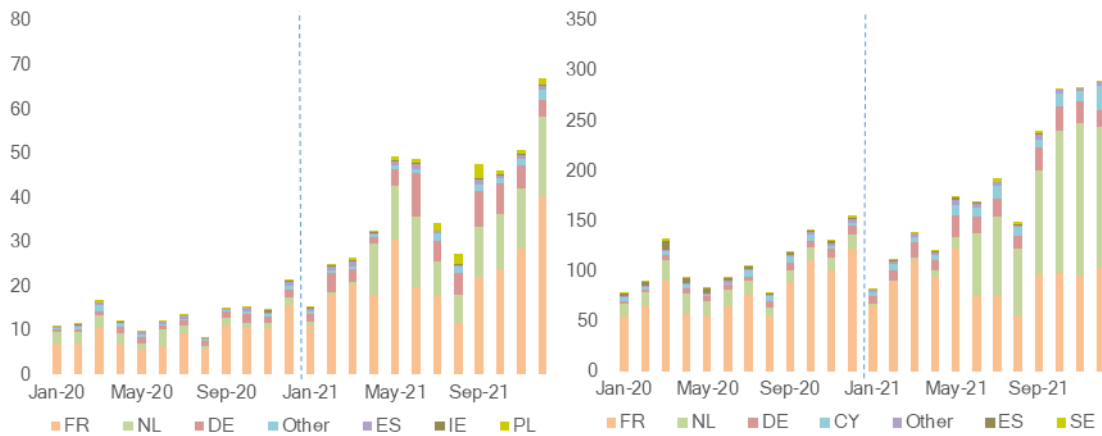


Figure 41: Notional amounts (EUR billion, left chart) and number of trades (thousands, right chart) by country of the clearing member for the top six EEA30 countries (ordered by notional amount). Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

240. The number of clearing members observed in the client reports has slightly decreased, from 43 in January 2020 to 37 in December 2021 (see Figure 42). Following the withdrawal of the UK on 1st January 2021, the number of clearing members observed decreased by 15%.

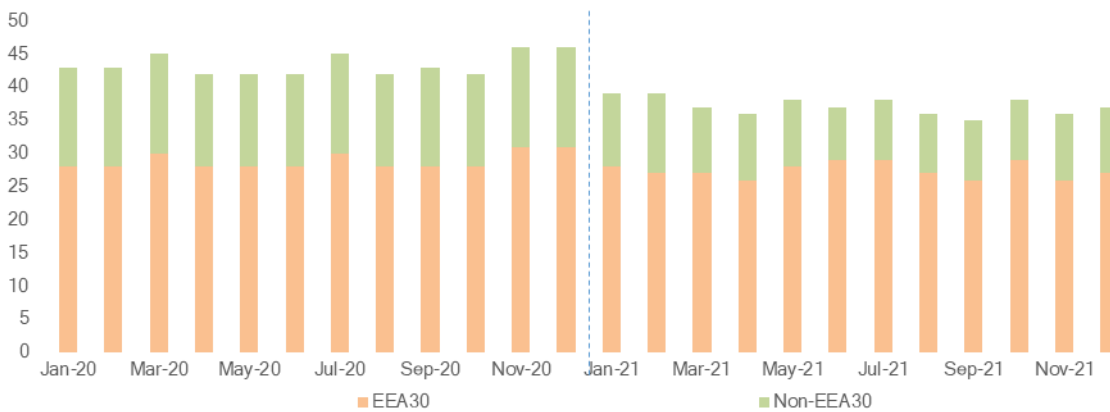


Figure 42: Number of clearing members by month and region. Only client reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

4.3.4.7 Related derivatives: cross-market observations

241. In this subsection, ESMA extends the focus of the analysis towards other commodity segments that are related to emission allowances. These are mainly oil, gas and coal derivatives, so commodities that are related in the value creation chain in industrial processes. The goal is to understand whether there is an overlap between the entities trading these derivatives over-the-counter and how they have evolved over the last two years.

242. Figure 43 shows the number of entities trading emission derivatives and their usage of other related derivatives. Beforehand we need to bear in mind, like for the rest of this EMIR subsection, that with the withdrawal of the UK the number of entities reporting declined. This is clearly visible by the drop in the chart between December 2020 and January 2021. Considering the different categories, we can observe “emissions only” (35%) and “more than one” (47%) clearly dominate the number of entities. This means that emission allowance derivatives are either used by entities solely without any related derivative or they use more than one related derivative. If entities only use one additional related derivative it is likely to be either oil (7%) or power (7%) derivatives while it is unusual to use coal (1%) derivatives.

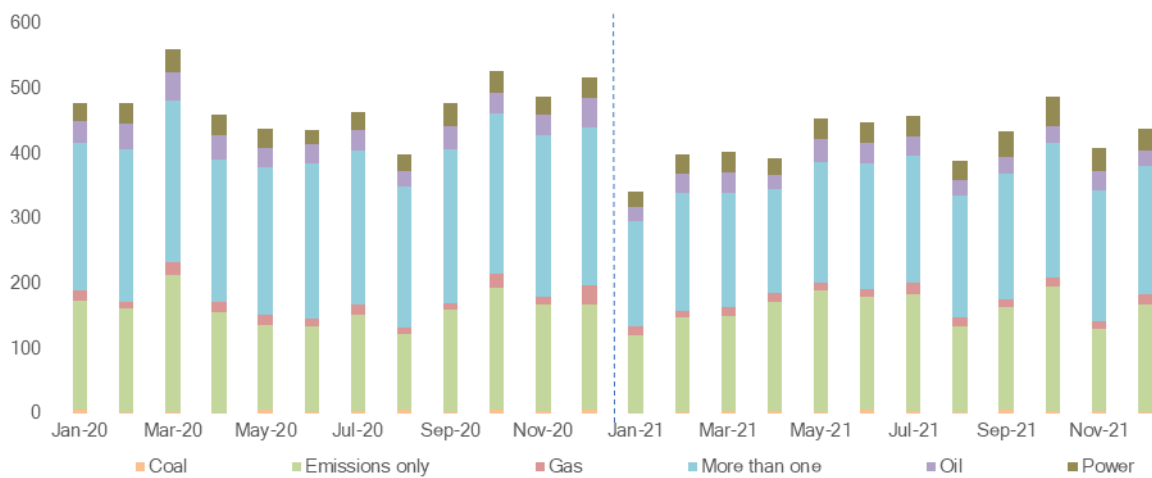


Figure 43: Number of entities trading of EU ETS allowances and other related commodities. Categories show the other commodity derivative used. If more than another category was identified, it is classified as ‘More than one’. All reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

243. Oil and oil products are the predominant commodity by notional amounts traded OTC (see Figure 44). On average in the period studied they represent 94% of the amounts traded in energy-related commodities, followed by gas with 4%. EUAs represented 0.2% of the amounts traded in January 2020 and 0.7% in December 2021.

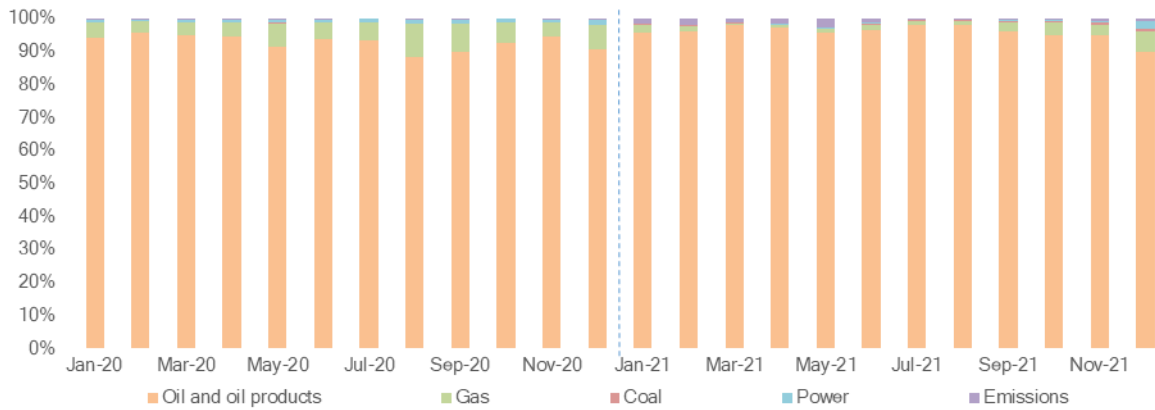


Figure 44: Relative notional amounts traded (%) OTC by commodity type and month. Only energy-related commodities included. All reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

244. For the same commodity types, Figure 45 displays the relative share of notional amounts by contract type. Futures dominate, with 94% of the amounts on average, followed by options, contracts for difference and swaps with approximately 2% each. The share of amounts traded with futures has remained relatively stable, shifting from 92% in January 2020 to 91% in December 2021.

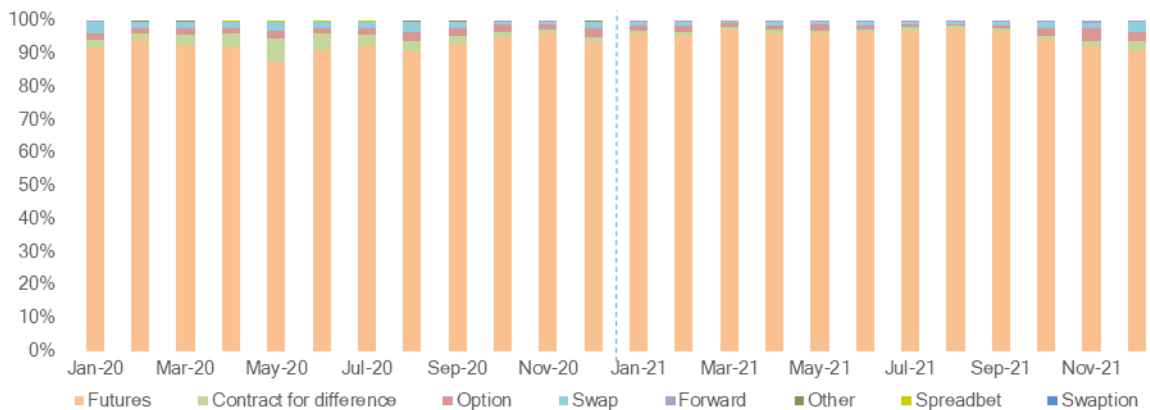


Figure 45: Relative notional amounts traded (%) OTC by contract type and month. Only energy-related commodities included. All reports included. The dotted bar marks the UK withdrawal date from the EU. Sources: TRs, ESMA.

4.3.5 Analysis based on MiFID transaction reports

4.3.5.1 Introduction: data characteristics and limitations

245. For the following subsections, ESMA used transaction data reported under Article 26 of MiFIR which contains information about trading activity. This dataset provides important additional insights on trading in emission allowances due to the wider scope of reporting

compared to EMIR. In particular, trading in spot emission allowances, non-derivative instruments and the activity of third-country firms are more visible in this dataset. Notably, post-Brexit data is more complete than in EMIR reports because counterparties located in the UK are no longer subject to the obligation to report under EMIR while they remain visible in MiFIR reports due to the existing obligation of Trading Venues to report those trades that are executed by members that are not subject to MiFIR.

246. The assessment carried out on MiFIR transaction data in the context of the EU carbon market revealed some transversal analytical limitations and policy related gaps with the latter being described in detail in section 6.2.2 of the report. Concerning the analytical limitations, the following should be considered to better understand the achieved results and the complexity in performing the different steps of the analysis.
247. First, as highlighted in ESMA's preliminary report, the main derivatives exchange on these instruments fully migrated from the UK to the Netherlands in June 2021. Thus, the time period for the analysis could only be reasonably based on a limited period from June 2021 until the end of 2021.
248. Second, the full set of data that was made available to ESMA has been subject to a complex process of interpretation due to the different structures of NCAs' databases. Given that this analysis covers data from 2021, these challenges were due to the absence of data centralisation and management at ESMA's level of the relevant MiFIR transaction data, which up until January 2022 was being collected and stored exclusively at the NCAs' level.
249. Third, the provision of de-duplicated data on the basis of a harmonised query was not possible due to the challenges raised by NCAs in relation to the limited timeframes as well as the need to develop a query for de-duplicating transaction data. This process is challenging when the order executed on the venue is aggregated for several clients or for the same transaction multiple reporting chains of intermediaries are involved. This is due to the incorrect use or absence of some identifiers that would facilitate reconstructing the history of trading patterns chains and deduplicate the transaction reports for carrying out quantitative analysis (see policy recommendation in section 6.2). However, during the analysis, it emerged that most transactions were executed on trading venues (94% of transactions reported a MIC code in the venue field, of which 88% in ICE Endex) and only 6% off-venue. The presence of transaction chains was found to be limited as the majority of reports included the MIC of the trading venue, an indication of market facing transactions.

4.3.5.2 Data analysis methodology

250. MiFIR transactions on EUA derivatives were received from BaFin, AFM and NOFSA and all data were harmonized and merged in a single dataset. The dataset was limited to dates from 1st June 2021 to December 2021. Venues are an important source of reporting for the MiFIR dataset that capture transactions between entities that are not subject to reporting obligations. Prior to the period of data examined, the main venue dealing in EUA related instruments had not fully migrated from the UK to NL. Therefore, the preceding period of data is far less representative of the actual trading activity. Records

pertaining to primary market transactions were excluded and the remainder of the data concerns only secondary market transactions. Two-sided reporting deduplication was performed matching the dimensions of buyer, seller, date, price and quantity at level of each transaction reports resulting in a modest reduction in the number of reports. The transactions were aggregated at level of each entity and the number of buy and sell transactions were calculated by counting the number of reports where a given entity is a buyer and the number of reports where the entity is a seller. The total number of transactions by entity used in this analysis is derived from the sum of buy and sell transactions divided by 2 for each entity.

251. ANNA, FIRDS, GLEIF and ESMA counterparty data were utilized to retrieve information on the instrument and counterparty characteristics (such as maturities, price multipliers, country allocation and sector classifications) to perform the assessment on the frequency and volume of trading. The trading frequency is estimated by counting the number of transaction reports. The volume was computed as the product of price, quantity and the price multiplier of a given instrument over different breakdowns. The price and quantity fields in some cases included products of price and quantity or quantity and price multipliers. In other words, in some cases the counterparties reported EUA equivalent quantities instead of quantities in terms of the derivative instrument traded. Concerning the price, in some cases the total price for the transaction was reported instead of the price per unit. The figures in these few cases were identified and converted to represent the expected quantities and prices that refer to the contracts and not the entire transaction or underlying instrument. For option contracts the strike price was used instead of the price. Thereafter, the number of transactions and volume bought or sold for each counterparty were aggregated across multiple dimensions, such as sector and type of instrument. In the remainder of the section (4.3.5), charts and figures exclude the trading activity and volumes bought or sold attributed to CCPs.

4.3.5.3 Entities participating in the market (count of buyers/sellers)

252. The transaction data under analysis allows the identification of the disposer of the financial instrument and clients whether it is a physical person (National ID) or a legal entity (LEI). For the purpose of Article 26 of MiFIR, an acquisition or disposal of a financial instrument includes a purchase or sale of a reportable financial instrument, a simultaneous acquisition and disposal for which there is no charge in beneficial ownership of the instrument or entering into or closing out of the reportable instrument. The aggregated data received from the three NCAs (NO FSA, BaFin, AFM) are mainly represented by legal entities (99.2% LEIs) and have been classified according to the approach defined in section 4.3.2. due to the absence of a sector allocation for the identifiers foreseen in the transaction reporting under Article 26 of MiFIR. As expected, Figure 46 shows that the main categories of active counterparties involved in the transaction activity over June 2021 and December 2021 were mostly investment firms or credit institutions, compliance entities, funds and other non-financials.

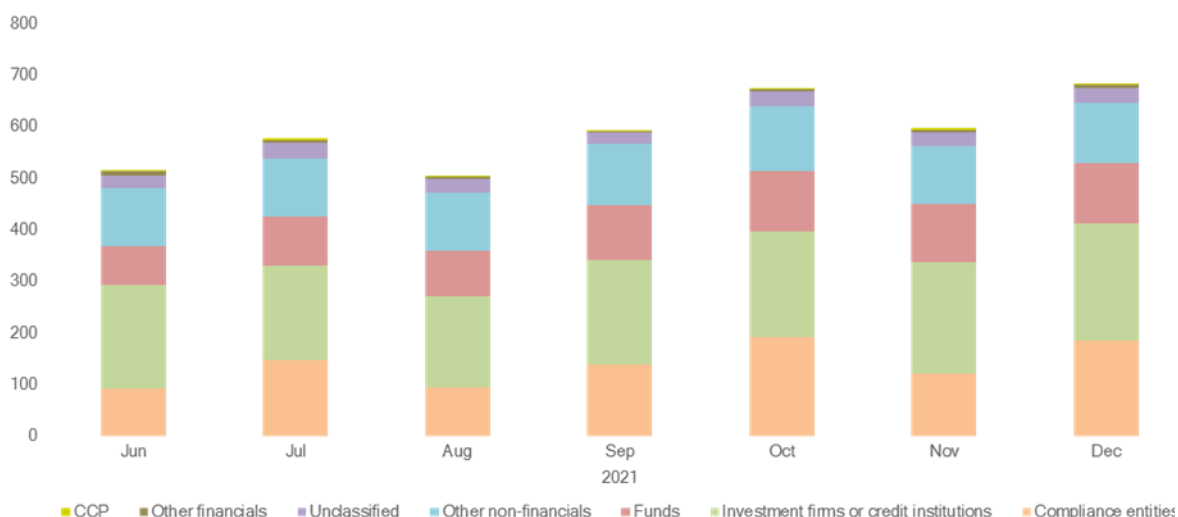


Figure 46: Number of distinct counterparties, excluding physical persons. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

253. The total number of identifiers for counterparties involved in the transaction activity over June 2021 to December 2021 is 3673, excluding the 2555 non-LEI that represent a negligible number of transactions for which the reported counterparties are mostly individuals, aggregate client accounts, and Venues. The remaining LEI codes have mostly been classified according to the following sectors: compliance entities (364), investment firms or credit Institutions (349), funds (180), other non-financials (155) and financials (9) and CCPs (4). Within the LEI pool of entities, 57 entities have no known classification, 28 EU based, 27 third country based and 2 UK based entities. Out the third country unclassified entities, the top 3 countries by count of entities are the US (11), CH (6) and KY (3).
254. The total number of trades executed for the period from 2nd half of 2021 is roughly equal to 2.3 million and includes all reports and counterparty identifiers (Entities, Physical persons) except CCPs. The percentage of entities classified as investment firms and credit Institutions represent 61.47% of total transactions (Figure 47).

	Investment firms or credit institutions	Other non-financials	Funds	Compliance entities	Unclassified	Other financials	Non-LEI
Jun-21	5.19%	2.27%	0.87%	0.59%	0.16%	0.73%	9.91%
Jul-21	7.86%	2.94%	1.16%	0.60%	0.32%	0.54%	13.58%
Aug-21	6.85%	2.47%	0.95%	0.54%	0.35%	0.07%	11.41%
Sep-21	10.33%	3.41%	1.38%	0.90%	0.38%	0.10%	16.74%
Oct-21	11.13%	3.18%	1.37%	0.78%	0.37%	0.02%	17.05%
Nov-21	9.56%	2.61%	1.64%	0.68%	0.36%	0.02%	15.04%
Dec-21	10.55%	2.80%	1.64%	0.67%	0.29%	0.02%	16.27%
	61.47%	19.67%	9.01%	4.77%	2.22%	1.49%	100.00%

Figure 47: Number of transactions as % of total by sector classification. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

255. As shown in the table above (Figure 47), only a small portion of transactions (2.22%) originates from unclassified entities and non-LEIs that represent physical persons (0.79%) and aggregated client accounts⁸¹ (0.58%).
256. Unclassified entities mostly trade futures (96%) and most counterparties are third-country entities. More concretely, about 78% of transactions involving unclassified counterparties involve US or CH entities.



Figure 48: Number of transactions by sector (Thousands). Source: MiFIR transactions provided by BaFin, AFM & NOFSA

257. The chart above (Figure 48) shows a stable and increasing trend over the different sector classifications and stratification in terms of frequency of trades by the different categories. In particular, the category of funds has increased more compared to the other's trading activity over the analysed period.

⁸¹ When the order executed on the venue is aggregated for several clients the buyer/seller fields are populated with the code 'INTC'.

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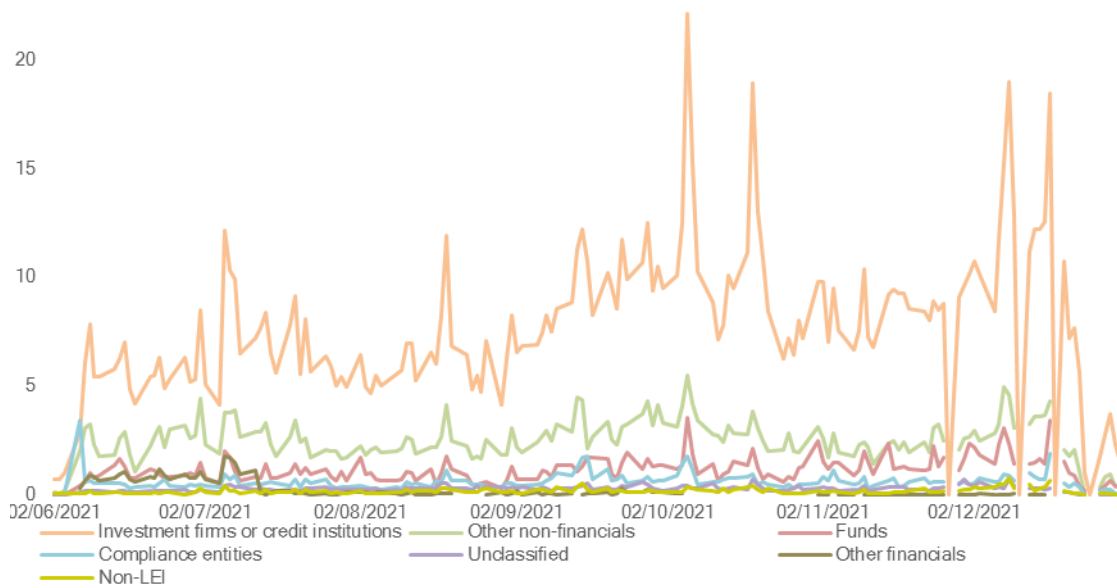


Figure 49: Number of transactions over time by sector (Thousands) including EU and non-EU buyers/sellers. Source: MiFIR transactions provided by BAFIN, AFM & NOFSA

258. The chart above (Figure 49) highlights the evolution overtime of the executed transactions associated to the relevant categories of sector classification across EU and third country counterparties involved in the reported transactions. The trade activity of compliance entities remained quite stable and low compared to the activity allocated to investments firms/credit institutions for which there are several instances of upward and downward shifts, especially in Q4 2021. This pattern seems to reflect the activity in the most liquid future contracts which have maturities at the year-end. Other non-financials and funds trend lines show a normal and stable pattern that is positioned between the major activity of investment firms and the harmonious low sloping trend of compliance entities. The highest number of executed trades was accounted for in October.

4.3.5.4 Overall trading activity and evolution in time

259. The chart below (Figure 50) shows the total number of transactions by country. The trading execution is concentrated in the NDEX trading venue in the Netherlands (~85%) and pertains largely to buyers and sellers that are located in the United States, the UK, the Netherlands and Germany. There is a presence of trades from counterparties in Switzerland and the Cayman Islands (6.8% and 6% of total transactions respectively). Cayman Islands entities are mainly other non-financial entities (3.3%) and funds (2.6%) over all transactions. The largest EU countries are NL (12.25%) and DE (11.41%) which come after the US (25.86%) and the UK (24.98%).

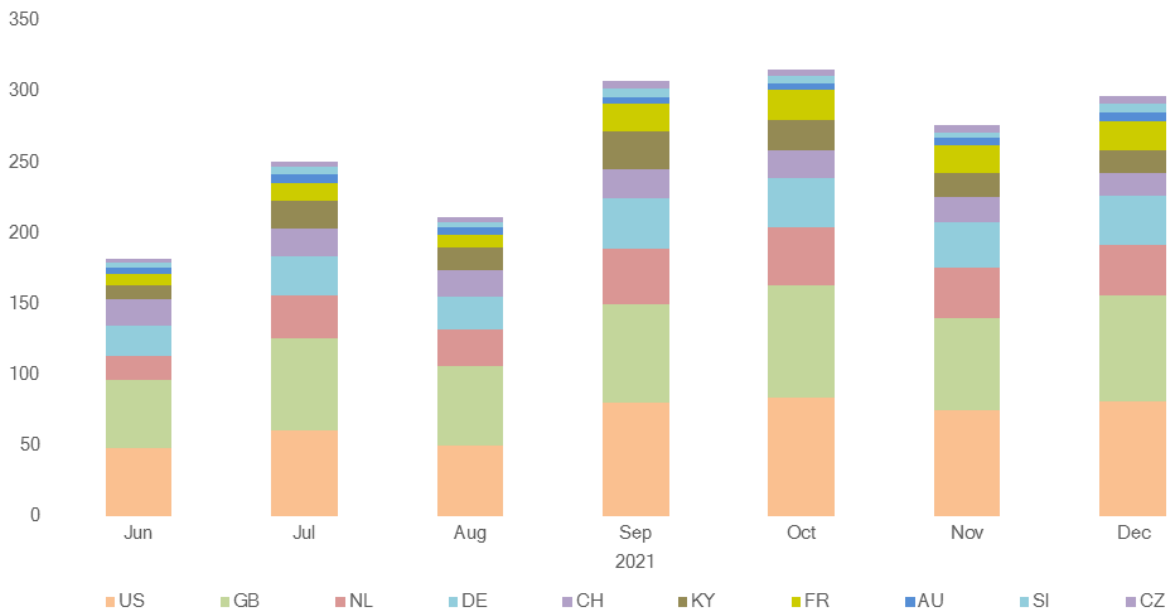


Figure 50: Number of transactions (Thousands) by top 10 countries including EU and non-EU buyer/sellers. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

260. Focusing on the top 10 by countries by number of trades within the EU (Figure 51), Germany and the Netherlands are confirmed as the most trading counterparties in terms of end buyer or seller. Entities from the Netherlands and Germany account for (33.30% and 31% respectively) of total trades, followed by France with (16.57%).

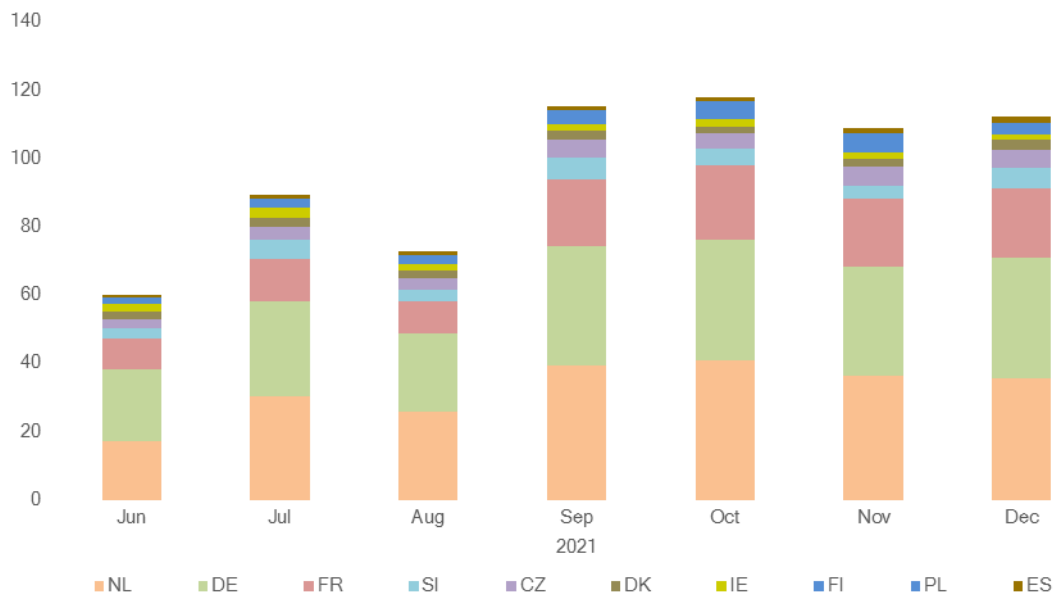


Figure 51: Number of transactions (Thousands) by top 10 EU countries. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

261. In terms of number of transactions, investment firms, credit institutions, other financials and funds mostly trade in futures (Figure 52). Trading activity in futures is higher for

maturities up to 1 year. The residual number of transactions traded are for entities that do not have an LEI and represent physical persons and aggregate accounts.

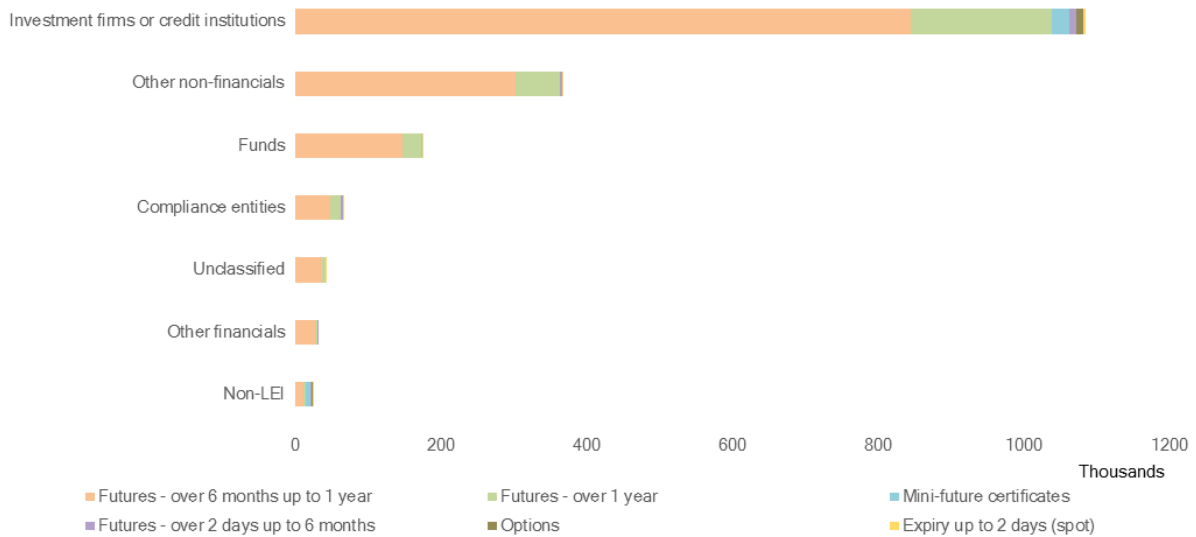


Figure 52: Number of transactions (Thousands) by instrument type and sector. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

262. The following chart (Figure 53) serves as a comparison between the sectors across countries. The largest sectors by number of transactions, are UK investment firms/credit institutions, followed by US Funds and in 3rd place DE Other non-financials. The chart outlines that the single most active sector in the market across countries, by number of trades, appears to be UK investment firms or credit institutions, followed by US funds and German other non-financials.
263. Overall, grouping the transactions by the sector and country reveals a significant presence in trading activity by third-country entities. These entities mainly represent high-frequency trading firms and market makers engaging in algorithmic trading that are acting as liquidity providers and are holding small net positions. While the presence of these entities in the market does not in itself raise concerns, ESMA considers that potential additional measures to improve the visibility of these activities in supervisory data might be needed.
264. The most frequently traded instruments across sectors and countries are in futures with a maturity between 6 months and 1 year. While German other non-financials, compliance entities and investment firms also present trading in futures with maturities of over 1 year.

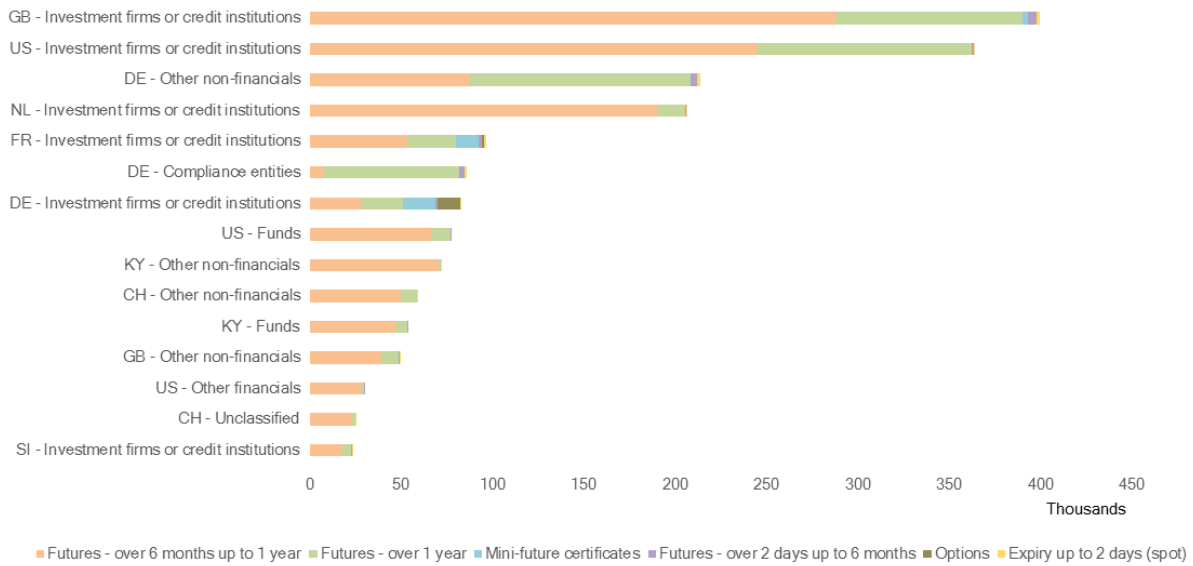


Figure 53: Top 15 combinations of sector classification and country by number of transactions (Thousands) including EU and non-EU counterparties. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

265. Concerning the instrument types traded, Futures dominate with important peaks between Sep-Oct 2021 and December 2021 especially for maturities up to 1 year (Figure 54). The trading activity in longer maturities (over one year) is mainly concentrated towards the end of the year, whereas the trading in futures with a shorter maturity lapse is consistently distributed over the months under analysis

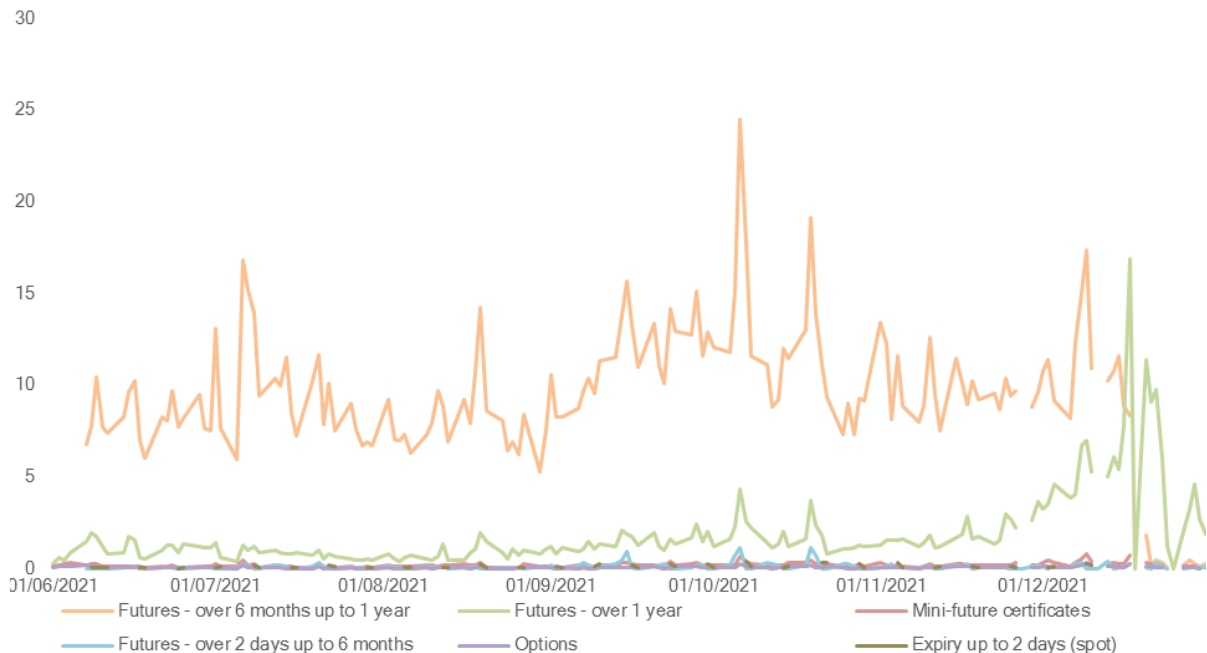


Figure 54: Number of transactions (Thousands) overtime by instrument type. Source: MiFIR transactions provided by BAFIN, AFM & NOFSA

4.3.5.5 Distribution of volumes by sector and instrument type

266. In terms of aggregated volume bought, Figure 55 below shows that investment/credit institutions dominate in terms of trading volumes across the period from June to December 2021.

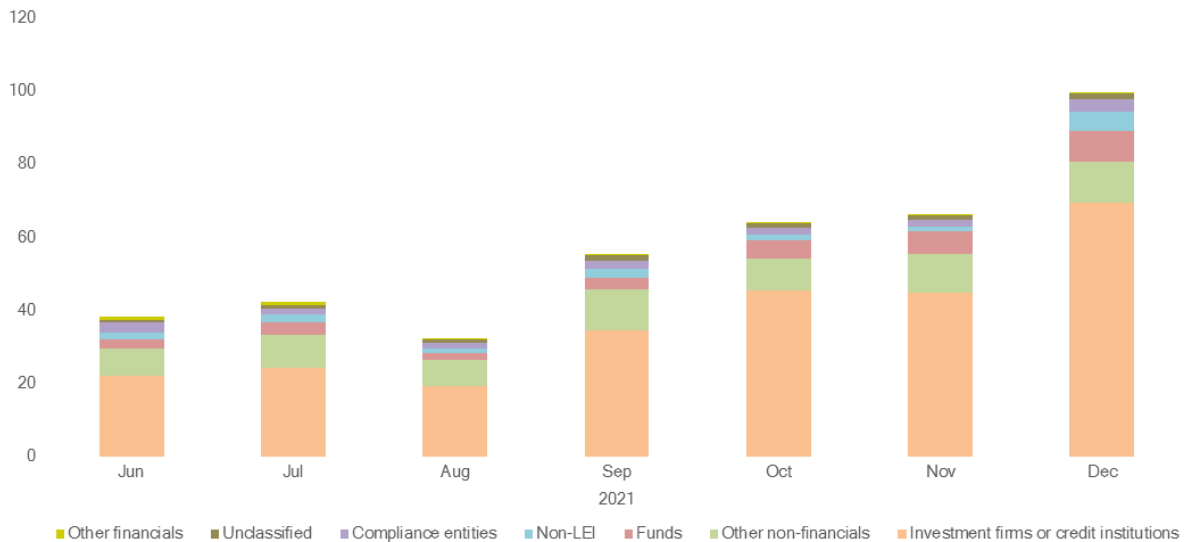


Figure 55: Total volume bought (EUR Billion) by sector including EU and non-EU counterparties.
Source: MiFIR transactions provided by BaFin, AFM & NOFSA

267. Figure 56 breaks down volumes by type of entity and reveals that 60% of the traded volume is concentrated in futures with maturities longer than 6 months. Investment firms/credit institutions and compliance entities, other non-financials and funds trade mostly in futures having maturities up to 1 year. Volumes in futures having longer maturities over 1 year relate the same top three sector categories (investment firms or credit institutions, other non- financials funds) and Compliance entities. Investment firms/credit institutions, funds and non-LEIs are also active in the option segment that accounts roughly the 30% of the total traded volume. Instead, the transaction volumes for spot and futures with short maturities are related to investment firms and credit institutions, meanwhile the Mini futures certificates represent only a small portion of the overall trading volumes across the diverse sectors.

268. The average monthly EUA equivalent volume traded for the period June to December 2021 is EUR 56.74 billion.

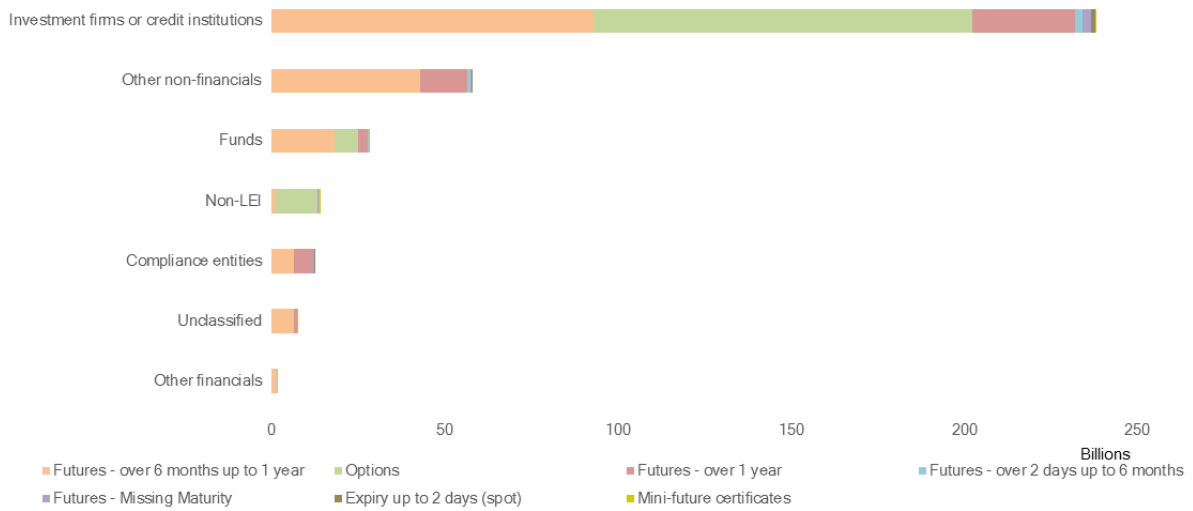


Figure 56: Total volume bought (EUR Billion) by type of instrument and sector including EU and non-EU counterparties. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

269. From Figure 56, we see the volumes in options steadily picking up from August 2021 to December 2021. The trading volume activity on futures having maturity over one year is mainly concentrated in end 2021, whereas the trading on futures with a maturity lapse shorter than one year is consistently distributed over the months under analysis. The other instrument categories have remained relatively constant in terms of volume traded from June to December 2021.

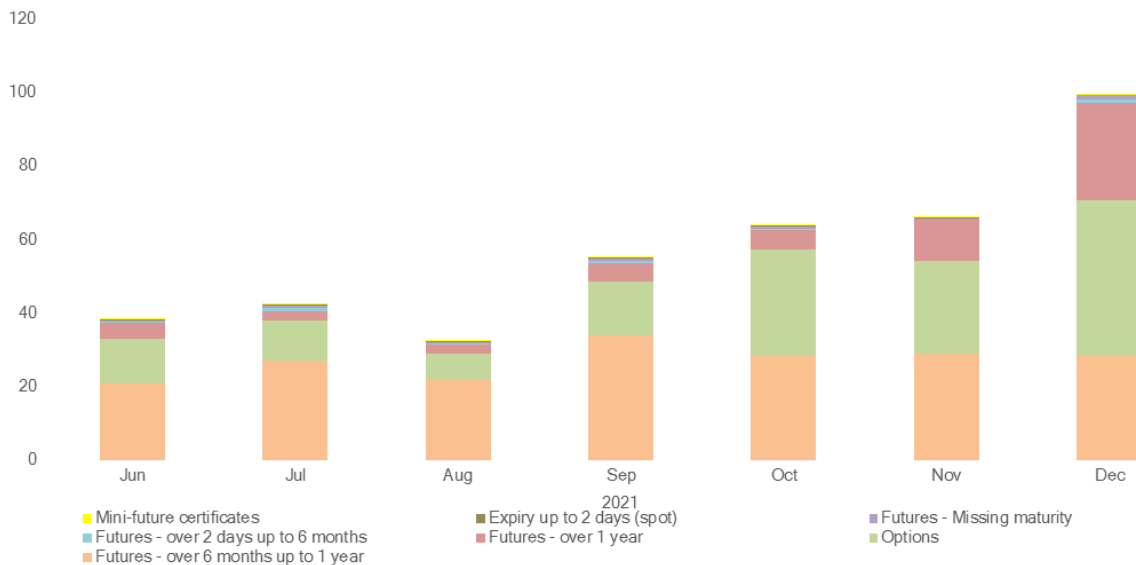


Figure 56: Total volume bought (EUR Billion) by instrument type. Source: MiFIR transactions provided by BaFin, AFM & NOFSA

4.3.6 Analysis based on weekly position reports

4.3.6.1 Weekly reports on EU ETS

270. Weekly position reports in emission allowances and derivatives on emission allowances – required only on the most liquid contracts, i.e. those with at least 20 market participants – served as basis for the initial assessment of the evolution of the number of market participants and their open positions in the carbon markets (see ESMA's preliminary report for more details). The available weekly position reports on EUA derivatives include and combine open positions in futures on EUAs and options on futures on EUAs on a delta adjusted basis, even when the option and the future contracts have a different venue product code. Put differently, all options are calculated to a delta adjusted futures equivalent.

Evolution of the number of counterparties

271. The number of counterparties holding a position on EUA futures has continued to increase throughout 2021 and the first months of 2022, for all the categories of counterparties, on both EEX and ICE (see Table 4 for EEX and Table 5 for ICE). The scale of the increase in the number of position holders was the same on both venues: on EEX, the yearly average number of position holders has doubled between 2018 and 2021, while on ICE the yearly average number of position holders increased by 106% over the same period. It is important to note that the observed increase in the number of position holders needs to be read in conjunction with the positions held (as discussed in the following section).
272. On EEX, the category of investment firms experienced the most growth (230% on average) from 2018 to 2022. During the same period the number of compliance entities and other NFCs has increased by 66%. ESMA notes that neither investment funds nor other financials are present on this venue, with the exception of a few participants in 2021. In total, from 2021 to 2022 the number of firms active on the EEX market increased on average by 3%. More specifically, the number of compliance entities slightly decreased by 7%, while the investment firms increased by 37%.
273. On ICE, where all categories are represented, the number of investment firms experienced a rapid expansion (+205%) from 2018 to 2022. During the same period, counterparties classified as compliance entities and other non-financials increased by 115% while the number of investment funds and other financials increased by 82%. In the last year, the number of firms active in the market increased on average by 3%. Both the number of investment firms and investment funds increased (by 16% and 1.6% respectively) while the number of compliance entities remain unchanged.
274. The most recent data confirm that all categories on all trading venues experienced an increase in number.

EEX	Compliance Entities and Other Non-Financials	Funds and Other Financials	Investment Firms	Total
2018	38	0	10	48
2019	44	0	16	60
2020	56	0	16	72
2021	68	1	24	93
2022*	63	0	33	96

* Data until 4 March 2022

Increase between average 2018 and average 2022*	65.8%	0.0%	230.0%	100.0%
Increase between average 2021 and average 2022*	-7.4%	-100.0%	37.5%	3.2%

Table 4. Average number of position holders on EUA futures, per category of counterparties, on EEX (source: EEX weekly position reports)

ICE	Compliance Entities and Other Non-Financials	Funds and Other Financials	Investment Firms	Total
2018	140	206	38	384
2019	154	248	41	443
2020	162	278	42	482
2021	301	368	100	769
2022*	301	374	116	791

* Data until 4 March 2022

Increase between average 2018 and average 2022*	115.0%	81.6%	205.3%	106.0%
Increase between average 2021 and average 2022*	0.0%	1.6%	16.0%	2.9%

Table 5: Average number of position holders on EUA futures, per category of counterparties, in ICE (source: weekly position reports of ICE Futures Europe and ICE Endex. Weekly reports of 11 and 18 June 2021 are not available)

275. When looking at the evolution of the types of participants in EUA futures and comparing it with the evolution of EUA prices, the rapid increase in the number of market participants highlighted above, starting from the second half of 2020, follows the surge in the price of EUA contracts traded on ICE closely. This is reflected in Figure 58 below, where the entities active in the market are classified as: 1) compliance entities and other non-financials; 2) investment firms and 3) investment funds and other financials.

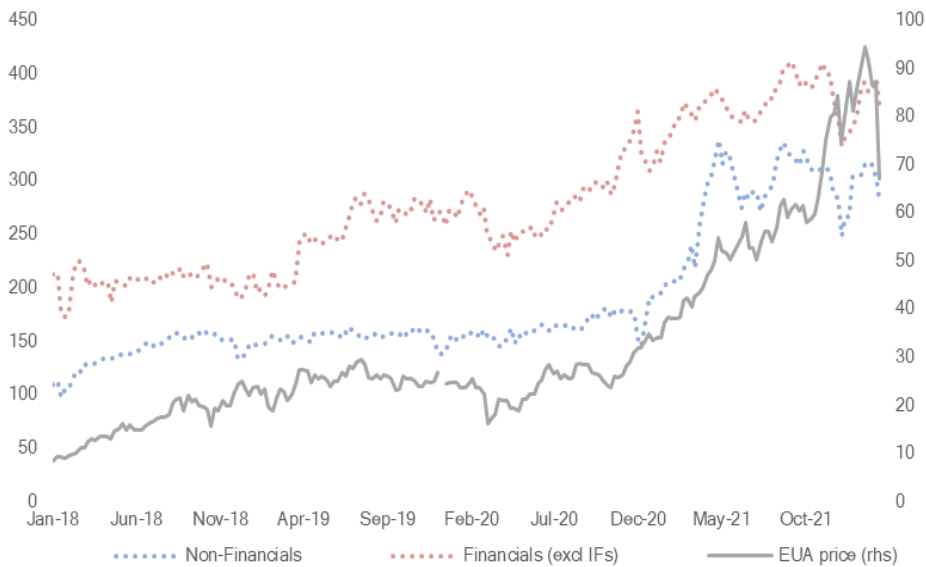


Figure 57: Number of financials (investment funds and other financials) and non-financials firms (commercial undertakings and Operators with compliance obligations under Directive 2008/87/ECs) trading EUA contracts on ICE Futures Europe and price of December EUA contracts on ICE ENDEX, in EUR per metric tonne of CO2. Source: ESMA commodity derivatives weekly position reporting, Refinitiv.

276. As shown in Figure 59 the ratio of financial firms (investment funds and other financials) to non-financials (compliance entities and other non-financials), trading EUA futures has been relatively stable at around 150% from 2018 until the end of 2020. After a short-lived surge at the beginning of 2021, it declined from Q2 to settle down at an average of 120%.

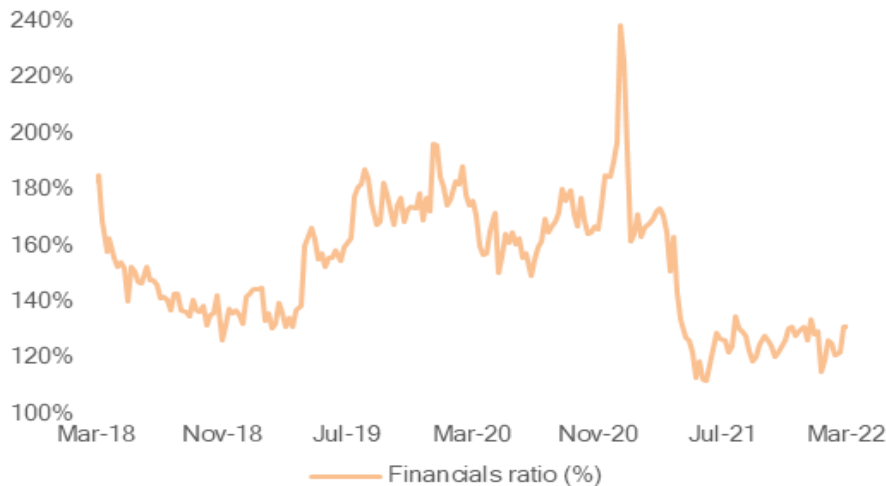


Figure 58: Ratio of financials (investment funds and other financials) over non-financials firms (commercial undertakings and Operators with compliance obligations under Directive 2008/87/ECs) trading EUA contracts on ICE Futures Europe, in %. Source: ESMA commodity derivatives weekly position reporting.

277. Moreover, looking at the correlation between the number of position holders and EUA futures prices, it can be observed that both the number of commercial entities and financials are strongly correlated with EUA prices (91% and 85% respectively).⁸²

	ICE EUA future price	Number of commercials	Number of financials
ICE EUA future price	1		
Number of commercials	0.9131	1	
Number of financials	0.8473	0.8912	1

Table 6: Correlation of price of December EUA contracts on ICE ENDEX, number of financials (investment funds and other financials) and non-financials firms (commercial undertakings and Operators with compliance obligations under Directive 2008/87/ECs). Source: ESMA commodity derivatives weekly position reporting, Refinitiv.

Evolution of the open positions

278. The evolution of the open positions (long positions and short positions aggregated) does not show marked changes over time. About half of the total open positions are held by compliance entities and other non-financials.

279. Notably, the percentage of open positions held by funds and other financials, increased reaching on average 10% of total open positions in 2019 and 2020, to then decrease from the second half of 2021 onwards. At the end of 2021, the position held by funds and other financials represented only 5% of the total open positions. The share of positions held by funds and other financials continued to shrink in the first quarter of 2022.

280. The most recent developments of open positions, disaggregated in long and short positions, show that the number of short positions of investment firms (typically the providers of allowances for non-financials in the futures market) temporarily exceeds the long positions of compliance entities and other non-financials. At the same time both long and short positions of funds and other financials decreased in absolute terms.

⁸² In a recent report, Oxera finds that, despite the increase in number of position holders, the volatility of EUA price (measured as standard deviation) has not increased. Moreover, the report finds a significant negative correlation in the number of positions held by investment funds and the volatility of EUA front-month future (Oxera, Carbon trading in the European Union, February 2022).



Figure 59: Open positions on EUA futures, per category of counterparties, on ICE and EEX (source: ICE and EEX weekly position reports). Weekly reports of 11, 18 and 25 June 2021 excluded or not available.

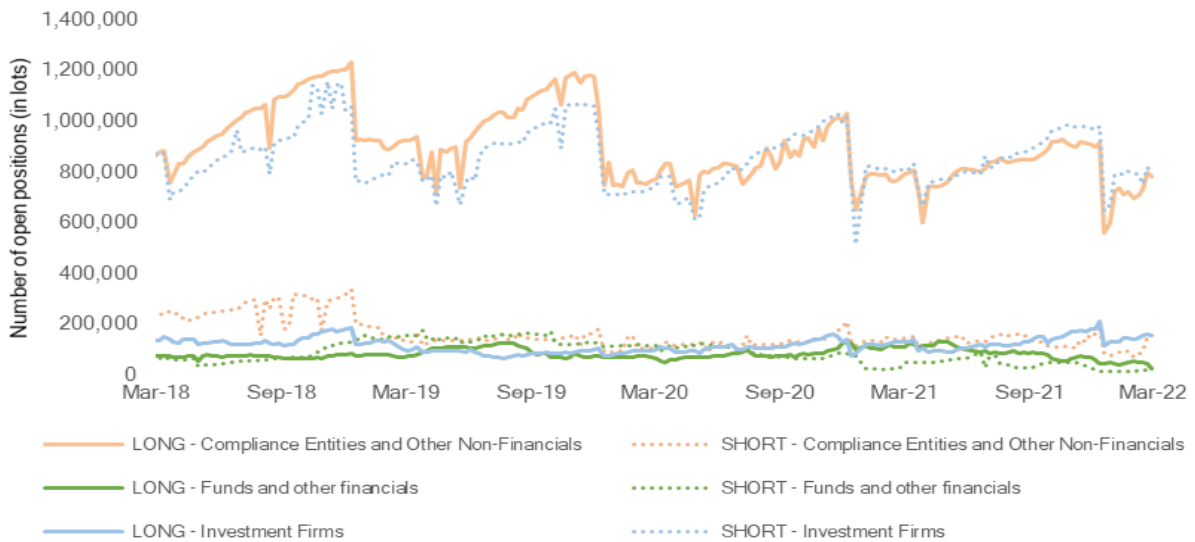


Figure 60: Long versus short open positions on EUA futures, per category of counterparties, on ICE and EEX (source: ICE and EEX weekly position reports). Weekly reports of 29 April, 31 December 2020 and 11, 18 and 25 June 2021 excluded or not available.

Hedging activity by non-financial entities

281. Looking at the hedging and non-hedging activity by compliance entities and other non-financials it can be observed that the relative share of hedging and non-hedging transactions has changed over time.
282. Overall, the majority of open positions held by compliance entities and non-financials in EUA futures is for hedging purposes. However, it is worth noting that while non-hedging transactions represented a very minor portion of the total in 2018 (on average around 30% of the total), these have been steadily growing throughout 2019. In the first quarter of 2020, half of the total open positions of non-financials consisted in trades with non-hedging purposes. The percentage of non-hedging transactions decreased in the second half of 2020, to settle down around a long-term average of 40% in 2021 and the first months of 2022.

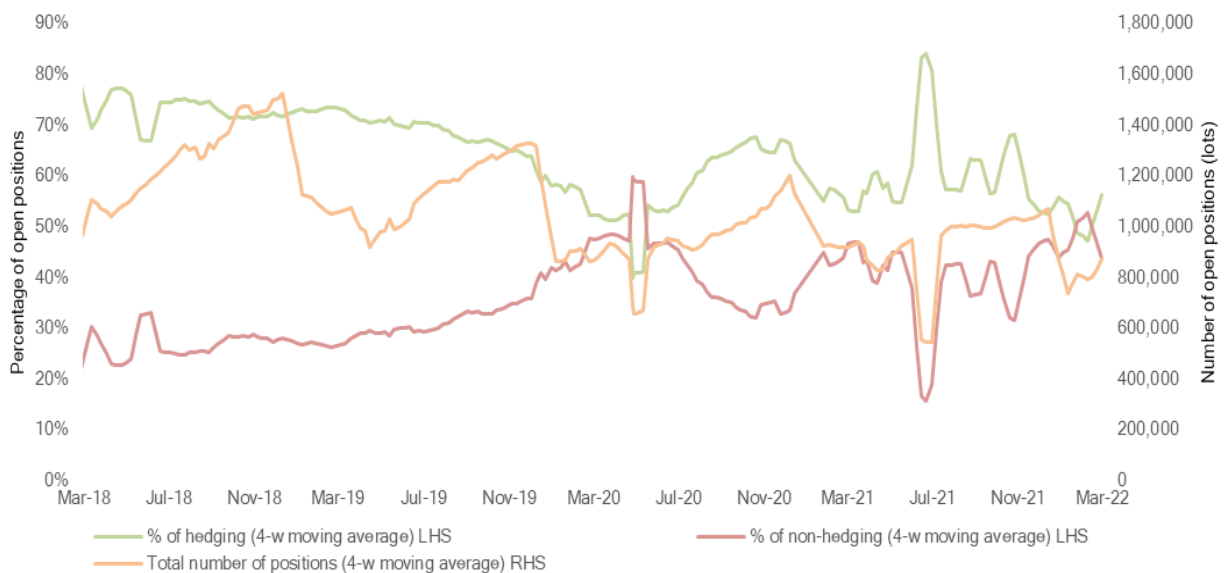


Figure 61: Number of open positions on EUA futures held by compliance entities and other non-financials, on ICE and EEX (source: ICE and EEX weekly position reports). Weekly reports of 11, 18 and 25 June 2021 excluded or not available.

4.3.6.2 Comparison with weekly reports on UK ETS

283. Following the UK's departure from the EU, a UK Emissions Trading System (UK ETS) was introduced on 1 January 2021 that replaced the UK's participation in the EU ETS. First auctions began on 19 May 2021, hosted by ICE Future Europe, followed by first trades of futures contracts (UKA) on the secondary market. Hence, a comparison of the two markets is possible only for a short time span and might not be representative. Furthermore, the observed divergences in the two markets could also be associated with the as of yet nascent stage of development of the UK ETS market.

Evolution of the number of counterparties

284. As it would be expected from a market in the making, the number of position holders increased in all categories of counterparties in the course of 2021 and continued to increase in the first quarter of 2022. Thus, the UK ETS market exhibited similar trends as the EU ETS market in terms of expansion of the average number of position holders. The scale of increase was more prominent in case of investment funds category where the average number of position holders more than doubled in 2022Q1 as compared to 2021Q4. Also the number of investment firms constantly increased during the analysed period.

ICE	Compliance Entities and Other Non-Financials	Funds and Other Financials	Investment Firms	Total
2021Q2*	21	0	5	26
2021Q3	28	6	10	44
2021Q4	34	16	14	64
2022Q1*	34	33	22	89

* Data as of 28 May 2021 – until 4 March 2022

Table 7. Number of position holders on UKA futures, per category of counterparties. Source: ICE

285. Notwithstanding the higher number of investment funds, investment firms registered a sharper increase of the total open positions held (i.e. both long and short). Thus, though the average number of position holders in 2022Q1 was significantly higher in case of funds, the total number of open positions was superior in case of investment firms.

Evolution of the open positions

286. While the compliance entities still held most of the open positions, at around 55% in 2022Q1, their share gradually decreased over the previous periods mostly influenced by an increase of investment firms' activity (see Figure 63). The current breakdown was largely resembling the one observed in case of the EUA futures market. Interestingly, in case of the UK ETS, the share of funds and other financials is more prominent (i.e. the share of open positions in 2022Q1 is two times larger than in case of EU ETS).

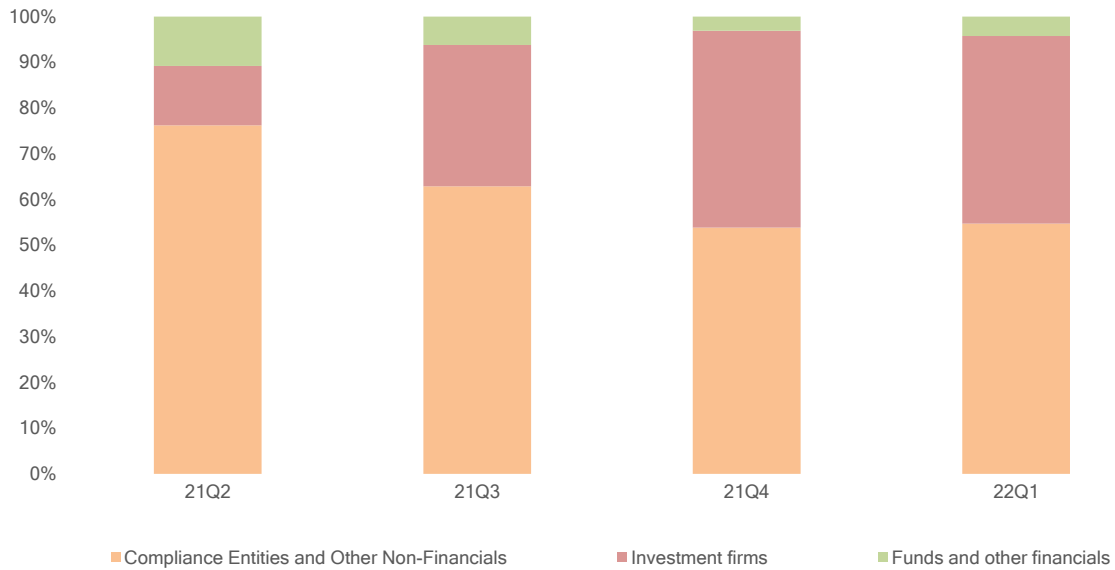


Figure 62. Share of open positions per category of counterparty in 2021 and 2022Q1. Sources: ICE

287. A slightly higher share of open positions held by compliance entities could indicate that those entities are stockpiling emission allowances as the market still lacks the pool of allowances that has built up over time in the EU ETS market. Put differently, as compared to the latter, the offer side on the UK ETS secondary market was lagging behind the demand side. This lag is more visible when comparing long positions of non-financials and the short positions of investment firms (see Figure 64 below). Thus, similarly to the EU ETS, these positions follow a similar evolution over time. However, in case of the EU ETS there is an almost complete overlap between the long positions of non-financials and the short positions of investment firms.

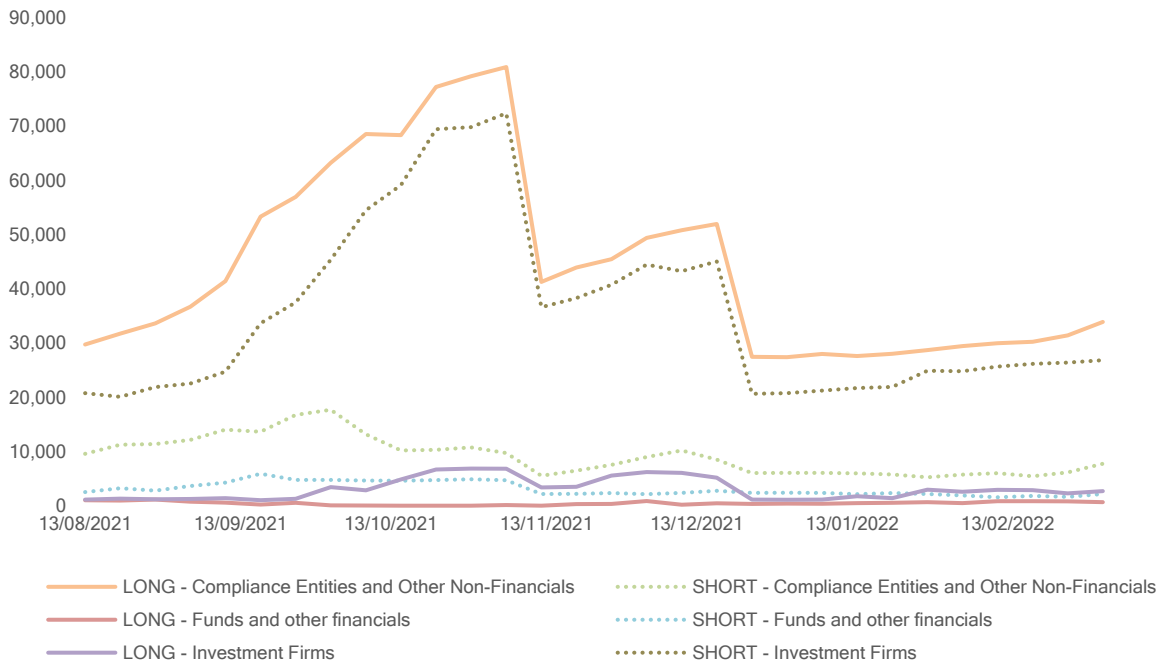


Figure 63. Open positions in UKA Futures per category of counterparty – Long vs. Short. Source: ICE

Hedging activity by non-financial entities

288. When analysing the breakdown between hedging and non-hedging activity for compliance entities and other non-financial entities, an almost equal share of respective positions can be noticed up until the end of 2021Q3 followed by an increase in the share of hedging activity for the rest of the analysed period (i.e. until 4 March 2022). The percentage of open positions held for hedging purposes has tended to gradually increase over time – an indication that these entities have only just started to hedge future sales – reaching a maximum level of around 76% in 2022Q1. However, on average, the share of hedging positions held by compliance entities – on EU ETS and UK ETS market – was almost the same at 60%. The latter is close to the long-term average observed on the EU ETS market.

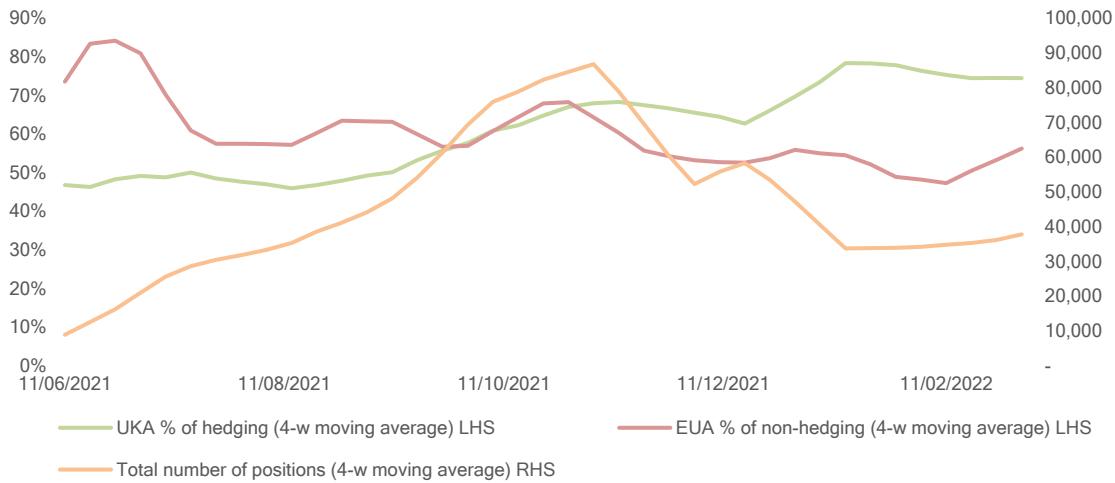


Figure 64: Positions held by compliance entities and other non-financials in UKA futures. Source: ICE

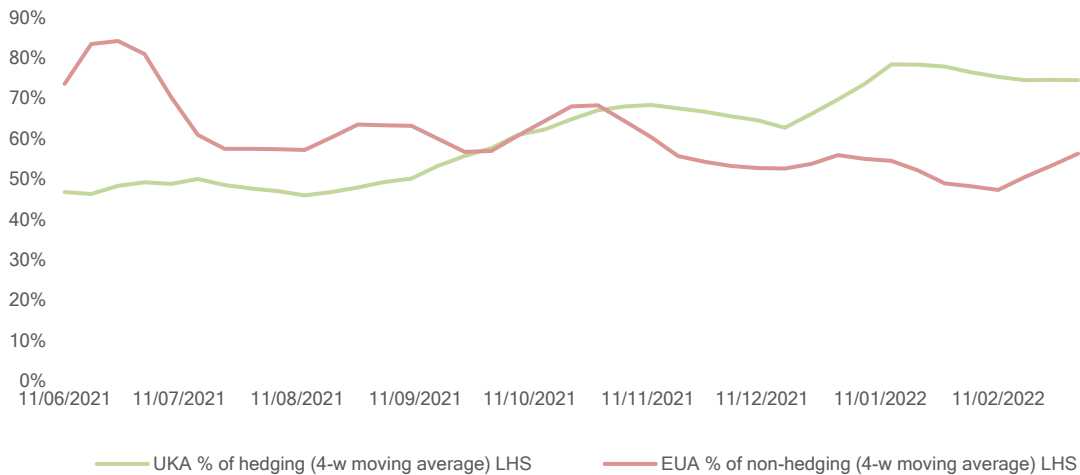


Figure 65: Hedging position held by compliance entities. Source: ESMA commodity derivatives weekly position reporting, ICE

4.3.7 Analysis based on daily position reports

289. The analysis in the following section is based on daily position reports which NCAs receive from trading venues as per Article 58(1)(b) of MiFID II. Daily position reports provide the position (generally expressed in lots) held by end position holders in EUA derivatives. Positions on options are aggregated with positions on the corresponding underlying futures on a delta-adjusted basis hence standalone positions on options are not shown in this analysis.

4.3.7.1 Overview of open positions in EUA derivatives

290. Figure 66 and Figure 67 below compare the total open positions on the three European trading venues offering EUA derivatives, i.e. ICE Endex (NL), EEX (DE) and Nasdaq Oslo (NO) in the second half of 2021. ICE Endex has a dominant position with 85% of the total positions while EEX holds the remaining 15% and the market share of Nasdaq Oslo remains fractional (around 0.03%). The rest of the analysis focuses on the positions held in the two main markets ICE Endex and EEX.

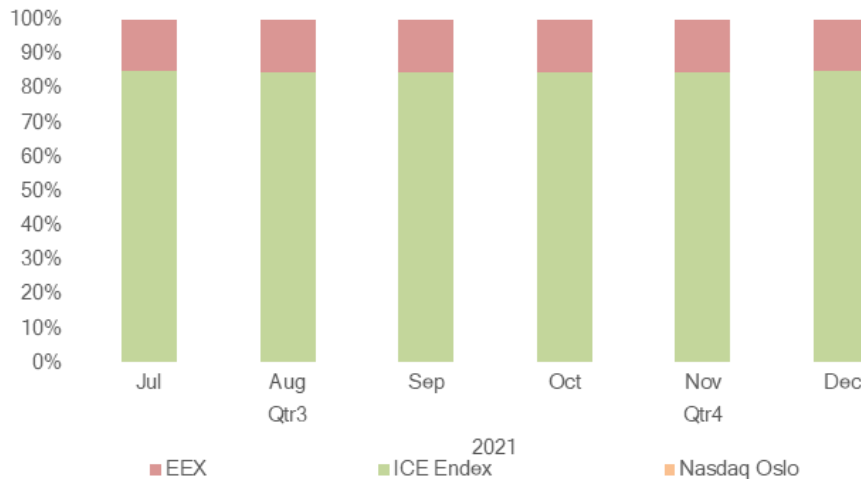


Figure 66: Gross positions⁸³ in EUA derivatives as percentage of the total, breakdown per trading venue (sources: ICE Endex, EEX, Nasdaq Oslo, ESMA)

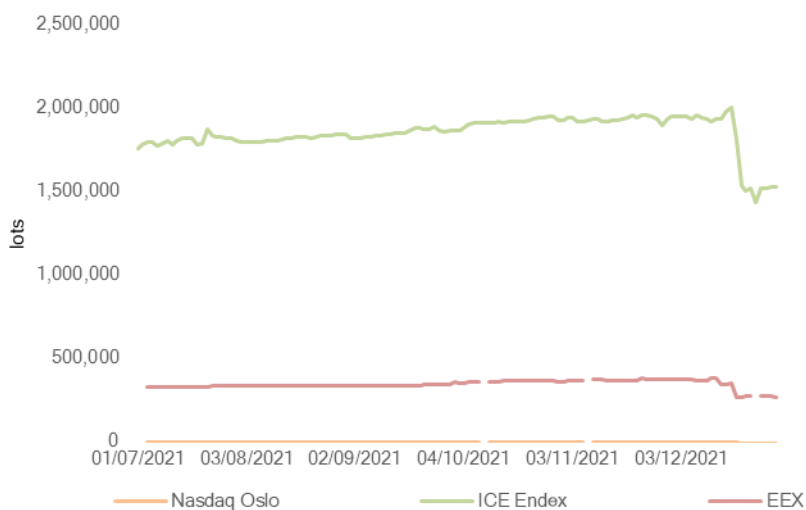


Figure 67: Gross positions in EUA derivatives in lots, breakdown per trading venue (sources: ICE Endex, EEX, Nasdaq Oslo, ESMA)

⁸³ Gross positions: the position of a given position holder on a given day and in a given instrument (at ISIN level) is taken in absolute value. Then all positions are added. If a position holder reports both a long position and a short position on the same day, same ISIN, the position is first netted then taken in absolute value.

4.3.7.2 Positions per category of position holder

291. Issues related to the classification of counterparties were discussed in Section 4.3.2 above. In light of the difficulty to accurately assign counterparties under the categories “compliance entities” and “other non-financials”, both categories have been merged in the analysis below, under the unique label “Non-financials”.
292. As already evidenced in the preliminary report, on both venues, the bulk of open positions in EUA derivatives is held by non-financial counterparties on the long side, and investment firms/credit institutions on the short side (Figure 68 for ICE Endex, Figure 69 for EEX). The net positions held by funds (which are almost exclusively active on ICE Endex) remained positive and represented 5% to 15% of the net positions of non-financials, based on ICE Endex data in the second half of 2021 (Figure 70).
293. When positions are aggregated on a gross basis (i.e. long positions added to the absolute value of short positions), the breakdown of positions between the main categories of counterparties is similar to the one depicted in ESMA’s preliminary report on the carbon market: in the second half of 2021 on ICE Endex, non-financials were holding 40 to 45% of the total gross positions, investment firms/credit institutions were holding around 50% and the share of funds remained below 8%.
294. On EEX, the gross positions are roughly equally split between non-financial on one side, and investment firms/credit institutions on the other side, given the absence of other types of counterparties on this trading venue (Figure 71).
295. Investment firms/credit institutions hold the largest positions in terms of average size (around 3,000 lots) while the average size of positions held by non-financials is roughly half of that (around 1,500 lots) and the average size of positions held by funds is much smaller (around 200 lots) (Figure 72).



Figure 68: Net positions in EUA derivatives on ICE Endex per category of position holder, in lots (sources: ICE Endex, ESMA)

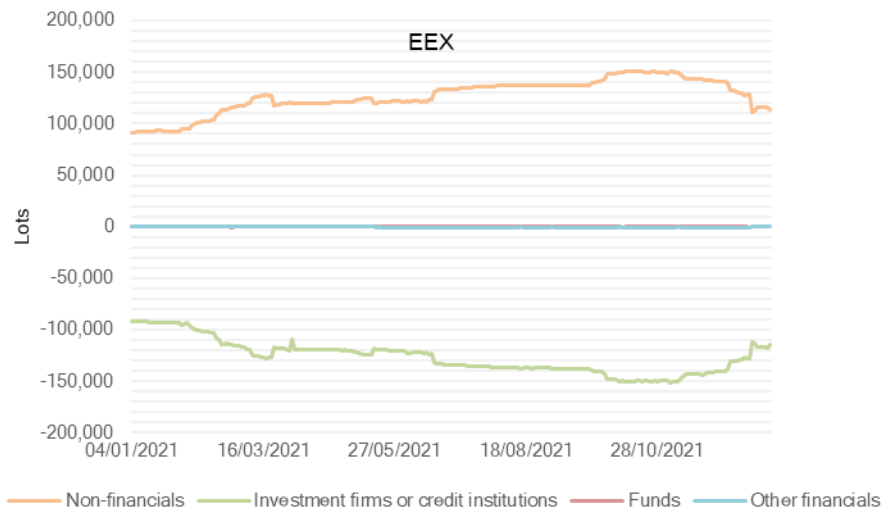


Figure 69: Net positions in EUA derivatives on EEX per category of position holder, in lots (sources: EEX, ESMA)

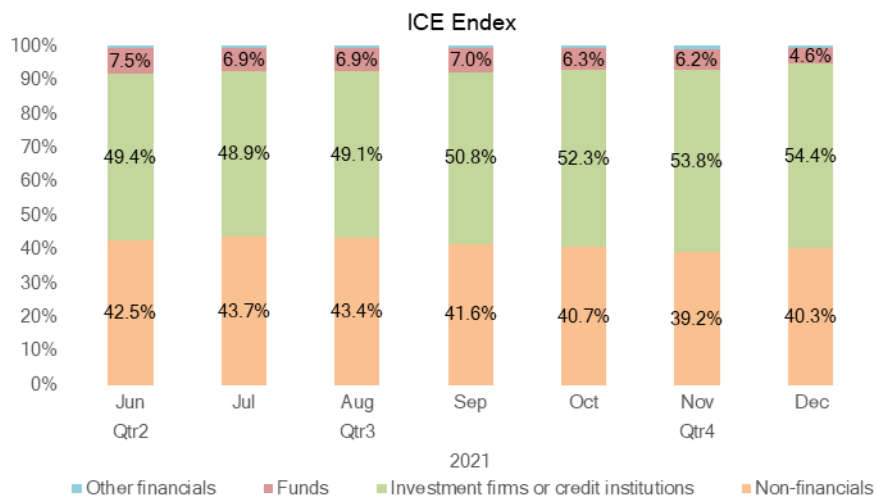


Figure 70: Gross positions in EUA derivatives on ICE Index per category of position holder, in percentage of the total (sources: ICE Endex, ESMA)

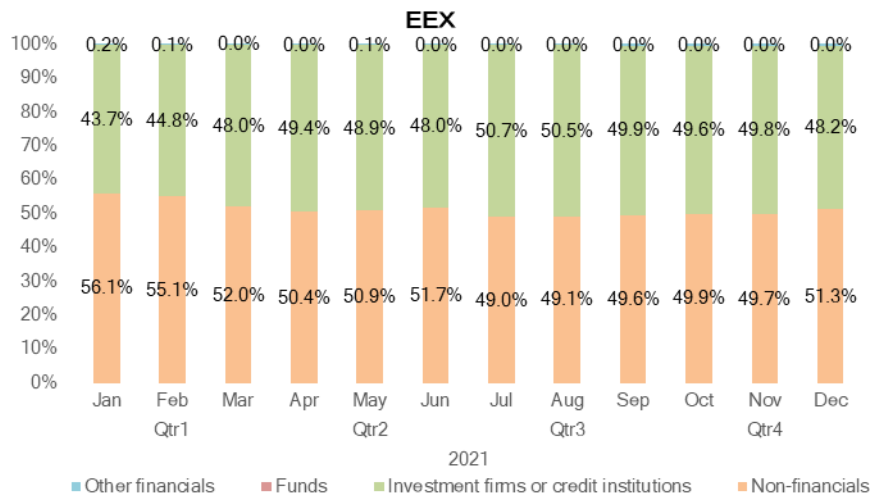


Figure 71: Gross positions in EUA derivatives on EEX per category of position holder, in percentage of the total (sources: EEX, ESMA)

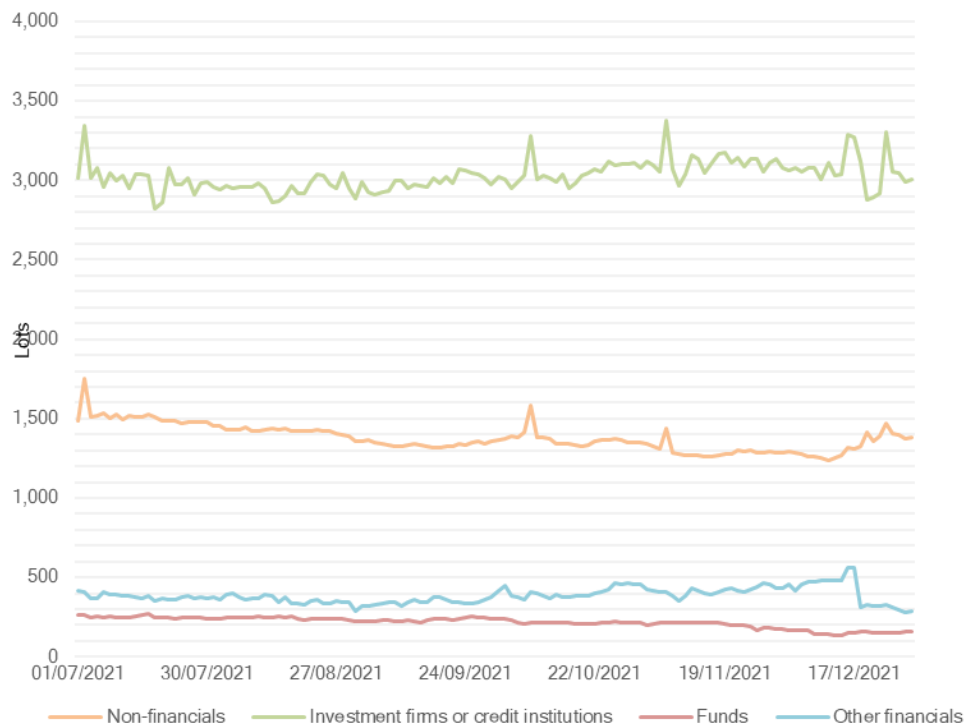


Figure 72: Average gross positions in EUA derivatives per category of position holder, in lots (sources: ICE Endex, EEX, ESMA)

4.3.7.3 Positions per type of instrument and maturity

296. Positions in the EU carbon derivatives market are concentrated in EUA futures and options. Positions in EUA futures and options consistently represent over 99% of the total gross positions based on ICE Endex daily position reports, meaning that EU aviation allowances (EUAA) remain a niche market.

297. Gross positions on the main market (EUA derivatives) are concentrated in the December expiry of the current year (Figure 73 for ICE Endex and Figure 74 for EEX).
298. On EEX, where the observation period is the second half of 2020 and the year 2021, two cycles can be observed, first the switch from the Dec/20 to the Dec/21 expiry, and then the switch from the Dec/21 to the Dec/22 expiry. The build-up of positions on the following December expiry (Dec/23) is also visible since early 2020, reflecting longer term hedging strategies. At any point in time, the December expiry of the current year represented 50% to 60% of the total open positions. The March expiry of the current year also attracted significant volumes, with a share of total positions gradually increasing from around 7% to almost 20% in the weeks before expiration (i.e. in February).
299. On ICE Endex, where the observation period is the second half of 2021, a similar pattern is observed. The positions in the Dec/21 expiry represented roughly 50% of the total positions at the beginning of the observation period (June 2021). They remained relatively stable until the month of October 2021, then gradually decreased to zero towards the end of the year 2021. In parallel, the positions in the next December expiry (Dec/22) gradually and smoothly increased, from around 300,000 lots in June 2021 to around 450,000 lots in early 2022. The positions on the Dec/22 expiry in early 2022 were roughly the same as the positions on the Dec/21 expiry in June 2021, i.e. around 50% of the total gross positions.
300. Besides the December expiry of the current and next year, which together account for 70% to 80% of the total gross positions, there are also significant positions on the next two December expiries (Dec/23 and Dec/24) as well as on the March expiries (Mar/22 and Mar/23).
301. One part of the open positions on the front year December expiry are rolled over to the December expiry of the next year, while another part is kept until expiry and results in the delivery of the physical allowances (as seen in the sharp drop in the open position when the contract matures, which does not coincide with a sharp increase on the next December expiry).
302. This trading dynamic is consistent with the expected functioning of the carbon market: non-financial counterparties gradually build up their hedging positions with longer-dated futures contracts to cover their expected future needs, using first contracts expiring in December of the year Y+1, then Y+2, then Y+3 etc. The hedging needs for the current year have been built up progressively in the previous years, hence the gross positions in the futures contracts expiring in December of the current year tend to be flat. In addition, the calendar in accordance with which compliance entities are required to surrender their allowances⁸⁴ (i.e. 30 April of the year Y based on the emissions of the calendar year Y-1) explain that significant volumes are also visible on the March expiries.

⁸⁴ Article 12 (3) of Directive 2003/87/EC: For the period until 31 December 2020, Member States shall ensure that, by 30 April each year, the operator of each installation surrenders a number of allowances, other than allowances issued under Chapter II [aviation allowances], that is equal to the total emissions from that installation during the preceding calendar year as verified in accordance with Article 15, and that those allowances are subsequently cancelled. For the period starting from 1 January 2021, Member States shall ensure that, by 30 April each year, the operator of each installation surrenders a number of allowances,

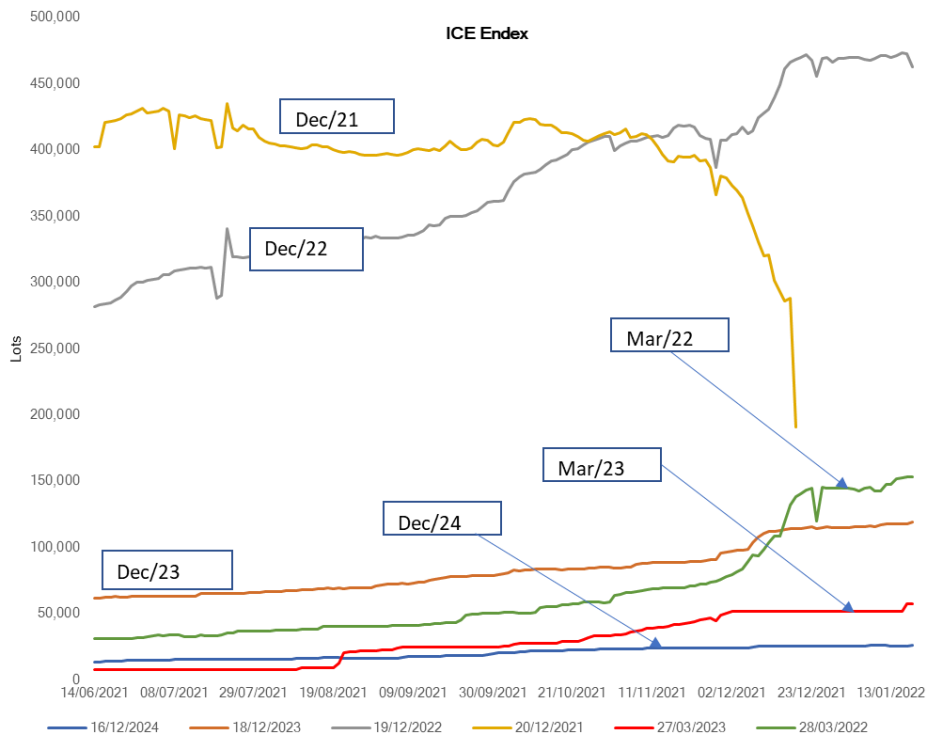


Figure 73: Gross positions in EUA derivatives on ICE Exend per contract expiry, in lots (sources: ICE Exend, ESMA)

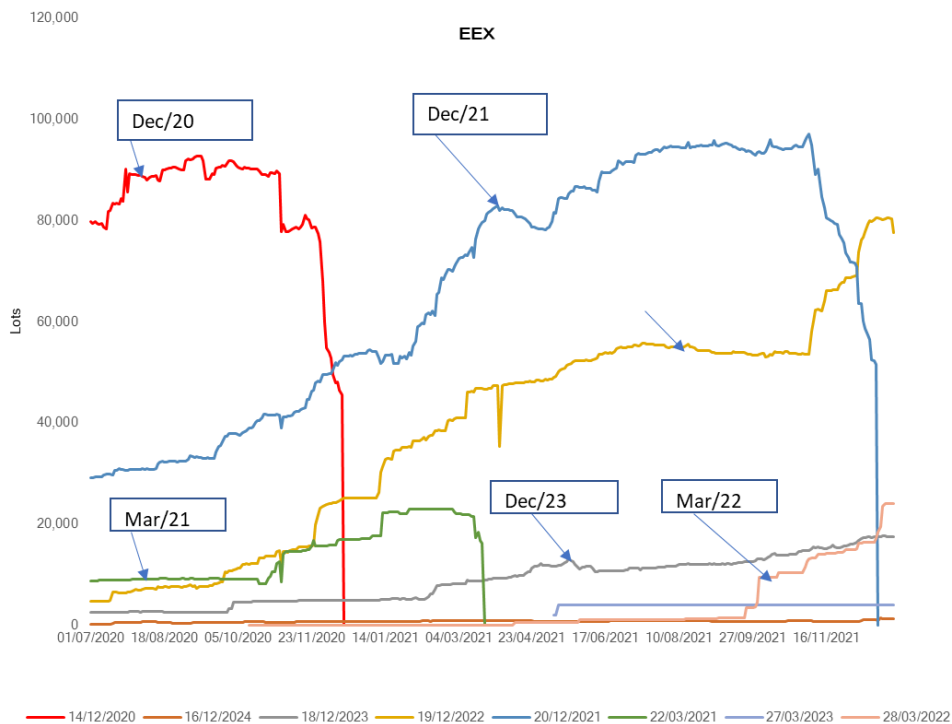


Figure 74: Gross positions in EUA derivatives on EEX per contract expiry, in lots (sources: EEX, ESMA)

that is equal to the total emissions from that installation during the preceding calendar year as verified in accordance with Article 15, and that those allowances are subsequently cancelled, subject to the review referred to in Article 28b.

4.3.7.4 Number of position holders per category

303. In the second half of 2021, the number of entities holding a position in EUA derivatives on ICE Endex ranged between roughly 500 and 700 unique entities, with a peak above 700 in September 2021. There was little variation in the number of investment firms/credit institutions [90 to 100] and other financials [around 20], while the number of non-financials and funds tended to increase/decrease in parallel (Figure 75).
304. On EEX, the number of entities holding a position in EUA derivatives was significantly smaller compared to ICE Endex, and ranged between roughly 80 and 120 unique entities, with a peak observed at the same time as on ICE Endex, i.e. in September 2021. The number of investment firms/credit institutions remained stable until March 2021 (around 20) then increased up to 40, while the number of non-financial position holders increased in parallel. The number of non-financial entities remained in the range [50-90] while the number of funds was below 10 over the observation period (Figure 76).
305. In the three main categories of counterparties (investment firms/credit institutions, non-financials and funds) roughly 40% of the gross positions of the category are concentrated in the hands of four to five large entities (Figure 77).
306. On average, the largest investment firms/credit institutions, as well as the largest non-financials, had open positions in around 10 distinct contract expiries, while the largest funds had open positions in only 5 distinct contract expiries (Table 9). This calculation was done using the top 10 position holders in each category.
307. This finding is in line with the expected behaviour of the different types of market participants: non-financial counterparties are building their hedging portfolios using the different contract maturities available, and therefore are found to be active across a wider range of maturities beyond the most liquid front year December expiry. Funds, on the other hand, and especially smaller ones, tend to hold positions mainly in the most liquid expiries, i.e. the December expiries of the years Y and Y+1.

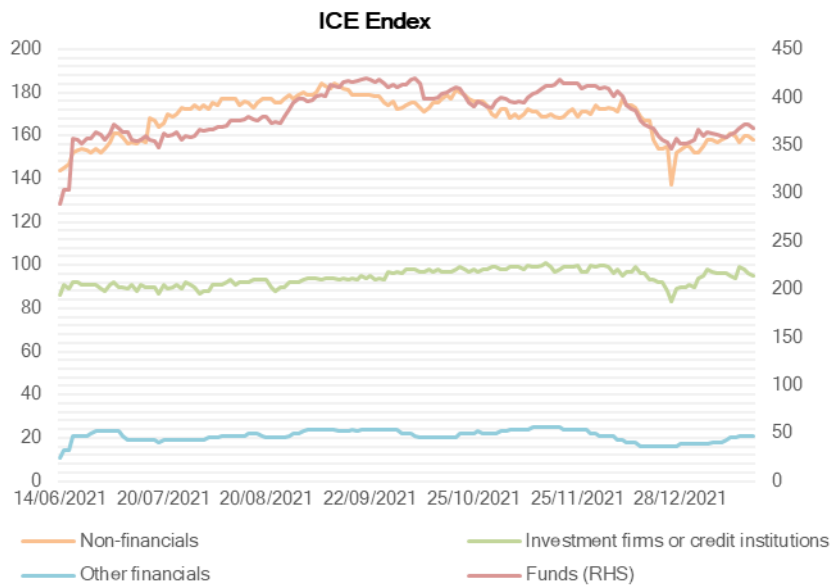


Figure 75: Number of position holders in EUA derivatives on ICE Index, per category of counterparty (ICE Index, ESMA)

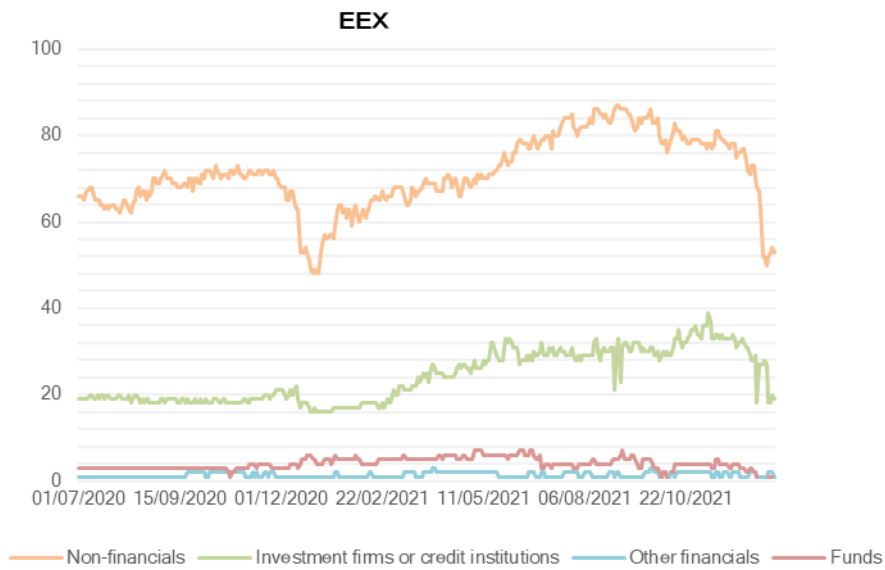


Figure 76: Number of position holders in EUA derivatives on EEX, per category of counterparty (EEX, ESMA)

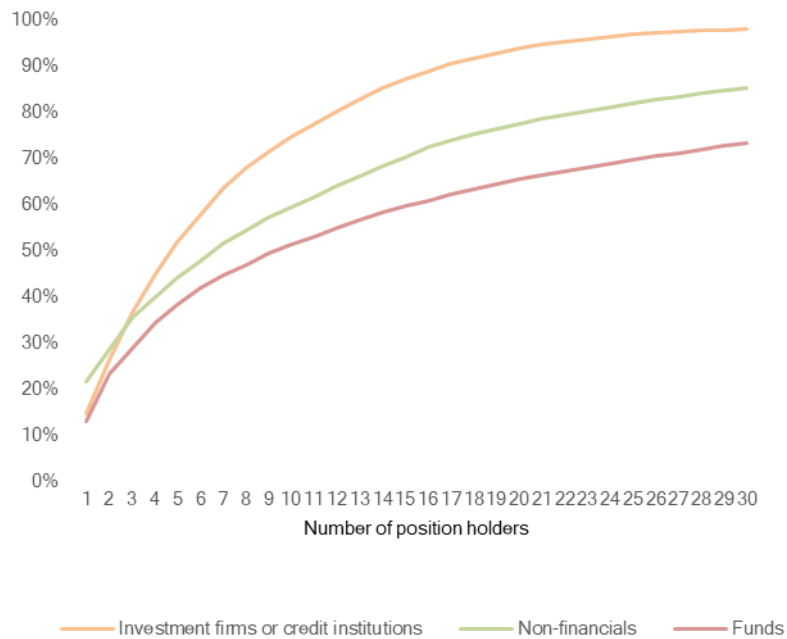


Figure 77: Gross positions held by the largest position holders as a percentage of the total positions of the category (source: ICE Endex, EEX, ESMA)

Number of distinct maturities	Min	Max	Average
Investment firms or credit institutions	6	13	9.3
Non-financials	4	12	8.0
Funds	2	8	4.8
Other financials	1	8	3.1

Table 9: Number of different maturities held by the top 10 position holders in each category (source: ICE Endex, EEX, ESMA)

4.3.7.5 Geographical distribution of position holders

308. The geographical distribution of position holders varies significantly based on the type of counterparty (Figure 78). The country corresponds to the jurisdiction of the LEI of the end-position holder, retrieved from GLEIF. Positions are not aggregated at the level of the parent position holder, and the jurisdiction of the parent entity is not considered.
309. The largest positions held by EU non-financial firms are held by entities located in the following 5 jurisdictions: Germany, Poland, Italy, Czech Republic and France. The presence of the United Kingdom, Switzerland and Singapore in the top 10 countries for the non-financials category is mainly explained by two factors: (1) large energy companies having a dedicated trading entity domiciled in those countries; and (2) the presence of large commodity trading firms (non-compliance entities) in those countries.
310. On the financial side, banks and investments firms most active in the market are split between the EU and third countries in relatively homogeneous proportions. The top 5 EU

countries are Germany, France, the Netherlands, Poland and Sweden, and the top 5 third countries are the US, Australia, the United Kingdom, Canada and Switzerland, in descending order of the total positions.

311. Within the fund category, third-country funds are largely dominant over EU domiciled funds both in terms of number of entities and in terms of their holdings. Third-country funds are mainly domiciled in the Cayman Islands, the US, Bermuda, Jersey and Guernsey. However, the geographical location associated with the LEI of the position holder has little relevance in light of the global nature of those market participants and should therefore be interpreted with caution. In terms of EU funds, the main countries of incorporation are Ireland and Luxembourg, with a combined share of 1.8% of the positions in the funds category, and 0.1% of the overall positions across categories.

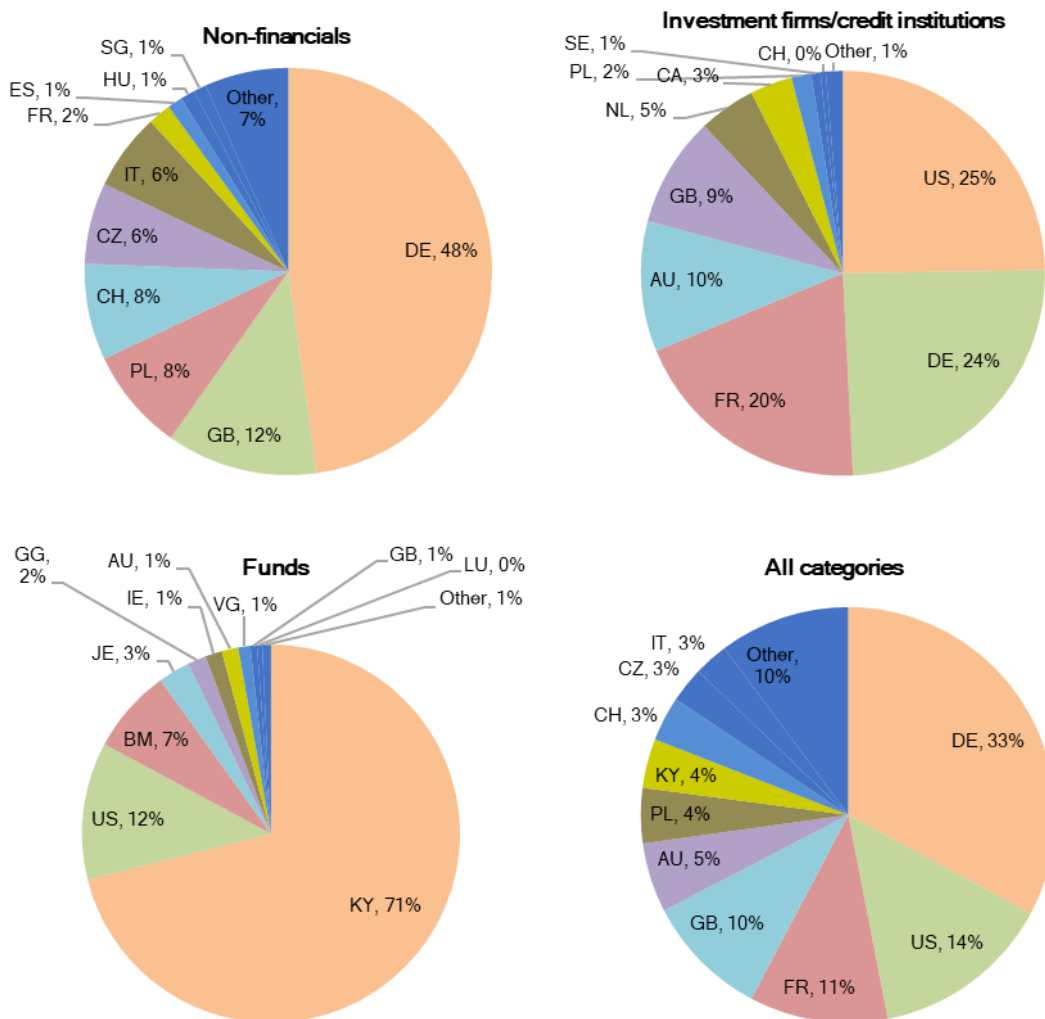


Figure 78: Gross positions in EUA derivatives - Top 10 countries (sources: ICE Endex, EEX, ESMA)

4.3.9 Analysis based on data from the Union Registry

4.3.9.1 Description of the Union Registry

312. In 2012 the European Commission established a database called the Union Registry to ensure the accurate accounting of EUAs issued under the EU ETS⁸⁵. The Union Registry records:
- a) The accounts of the Member States, legal or natural persons, which are necessary to obtain and transfer “physical” EUAs;
 - b) All transfers of EUAs (“transactions”) performed by account holders;
 - c) National implementation measures (i.e. list of installations covered by the EU ETS in each country and free allocations to each of those installations);
 - d) Tables indicating dates and volumes of nationally determined free allocations;
 - e) Annual verified CO₂ emissions from installations and aircraft operators;
 - f) An annual reconciliation of EUAs and verified emissions, where each company must have surrendered enough EUAs to cover all its verified emissions.
313. It is important to note that the Union Registry keeps track of ETS allowances only. Financial transactions take place outside the Registry and only subsequent deliveries of allowances are recorded.
314. An essential part of the Union Registry is the EU Transaction Log (EU TL) which automatically checks, records, and authorises all transactions that take place between accounts in the Registry. All transfers older than 3 years are made public on the EU TL public website.
315. For the purpose of this report, under Article 80(3)(h) of the Registry Regulation⁸⁶ DG CLIMA, acting as central administrator of the Union Registry, has granted ESMA access to the last four years of recorded transactions in the EU TL (2018 to 2022) as well as to the latest account balances of outstanding EUAs at the beginning of 2022.
316. One key challenge with using the EU TL data from a financial supervisory perspective was the limited availability of universal entity identifiers that can be used to uniquely pinpoint account holders/legal entities and match those with other data sources. Indeed, all of the regulatory data analyses carried out in the previous sections rely at least to some extent on LEIs, while LEIs were only recently introduced as a requirement to open an account in the EU ETS. To circumvent this problem, ESMA relied on a matching procedure developed by the European Commission’s Joint Research Centre (under a DG GROW mandate)⁸⁷.

⁸⁵ See https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/union-registry_en

⁸⁶ Until 2021, the operational and technical requirements of the Union Registry were specified in Commission Regulation (EU) 389/2013, and from 2021 in Commission Delegated Regulation (EU) 2019/1122 (known as the Registry Regulation).

⁸⁷ The matching procedure involves the identification of EU ETS account holders as ORBIS firms using EU TL public data. It leverages national company registration numbers and a validation logic relying on account holders’ names and/or location ESMA staff would like to thank in particular Simon Letout from the EC-JRC for his precious support and responsiveness. For further information see: JRC127805 - Letout S., Corporate micro-data in the EU Emission Trading System (EU ETS), EUR 31002 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-48773-9 (online), doi:10.2760/77710 (online).

317. The following subsections focus on the analysis of the Union Registry and in particular EU TL data. As the EU TL comprises a variety of instruments, including EUAs, EUAAs, their Swiss equivalents (CHUs & CHUAs), as well as previously used instruments such as Certified Emission Reductions (CERs) and Removal Units (RMUs), the following subsections exclusively cover EUAs which represent by far the largest proportion of the market.

4.3.9.2 Analysis of outstanding balances

318. Most allowances are held in Operator Holding Accounts and Trading Accounts. Operator Holding Accounts are accounts opened to fulfil compliance obligations under the EU ETS (by compliance entities) while Trading Accounts can be opened by any kind of market participant (compliance or non-compliance entities) and are subject to more flexible transfer rules⁸⁸.

319. In January 2022, there were almost 7,700 Operator Holding Accounts (excluding accounts with zero-balances) holding around 33% of outstanding allowances. Combining this with the Trading Accounts of compliance firms, 53% of physical EUAs were held by compliance entities. Another 39% were held in the Trading Accounts of non-compliance entities.

320. The EU TL data further show one Allocation Account and one Auction Account which are both run by the European Commission, and which represent the accounts used to distribute newly issued EUAs via free allocations and auctions, respectively. At the beginning of 2022 these accounts held 6% of EUAs. Furthermore, we see a few Aircraft Operator Accounts with around 1% of all outstanding balances⁸⁹.

⁸⁸ Transfers from Operator Holding Accounts is subject to a 26-hour delay and Operator Holding accounts can only transfer allowances to other accounts on their trusted account list. New trusted accounts can be added with a security delay of seven days. Trading accounts have more flexibility: they allow transfers without delay to accounts on the trusted account list and with a 26-hour delay when transferring to accounts not on the list.

⁸⁹ While Aircraft Operators predominantly cover their compliance obligations via EUAAs they would be allowed to use EUAs instead. This ensures arbitrage between both instrument types and the EUA price reflecting an upper bound also for EUAAs.

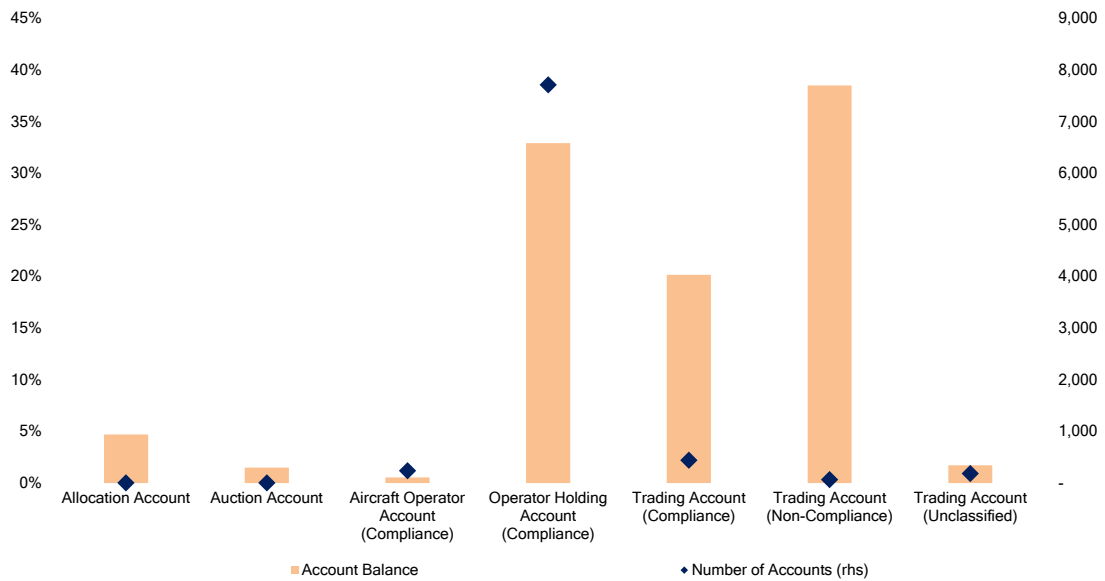


Figure 79: Share of outstanding account balances and number of accounts, by account type and entity classification. Sources: European Commission, ESMA.

321. Comparing outstanding balances and the number of accounts per account type, it becomes apparent that EUAs in Trading Accounts are markedly more concentrated than in Operator Holding Accounts⁹⁰. Moreover, when aggregating balances at an account holder level (i.e. legal entity level)⁹¹, this picture of concentration persists with the top ten legal entities holding 36% of physical EUAs in circulation, and the top 100 entities holding 75%.
322. Considering only Operator Holding and Trading Accounts and clustering together account holders within their corporate group⁹² we have identified the groups' economic sectors⁹³. This approach allows us to obtain a broad overview of the core business activities of firms holding EUAs without considering the specific activities of the subsidiaries holding these accounts⁹⁴. Based on this classification, we observe that around 40% of EUAs in circulation are currently held by financial companies⁹⁵.

⁹⁰ Average account balances in January 2022 are: 110,000 EUAs per Operator Holding Account, 1.2mn EUAs per Compliance Trading Account, and 14.6mn EUAs per Non-Compliance Trading Account.

⁹¹ One Account Holder (i.e. one legal entity) can be the owner of multiple Operator Holding and Trading Accounts.

⁹² The reconstruction of corporate groups was done relying on the LEIs of account holders and utilising relationship data from the Global LEI Foundation (GLEIF).

⁹³ Using Refinitiv EIKON economic sector classification.

⁹⁴ E.g., if a commodity trading entity is owned by a power producer, we aim at classifying the financial subsidiary according to their parent entity as non-financial.

⁹⁵ However, some financial entities hold EUAs on behalf of clients in their own accounts (omnibus accounts). Data from the Union Registry however, does not allow to distinguish between omnibus and own accounts.

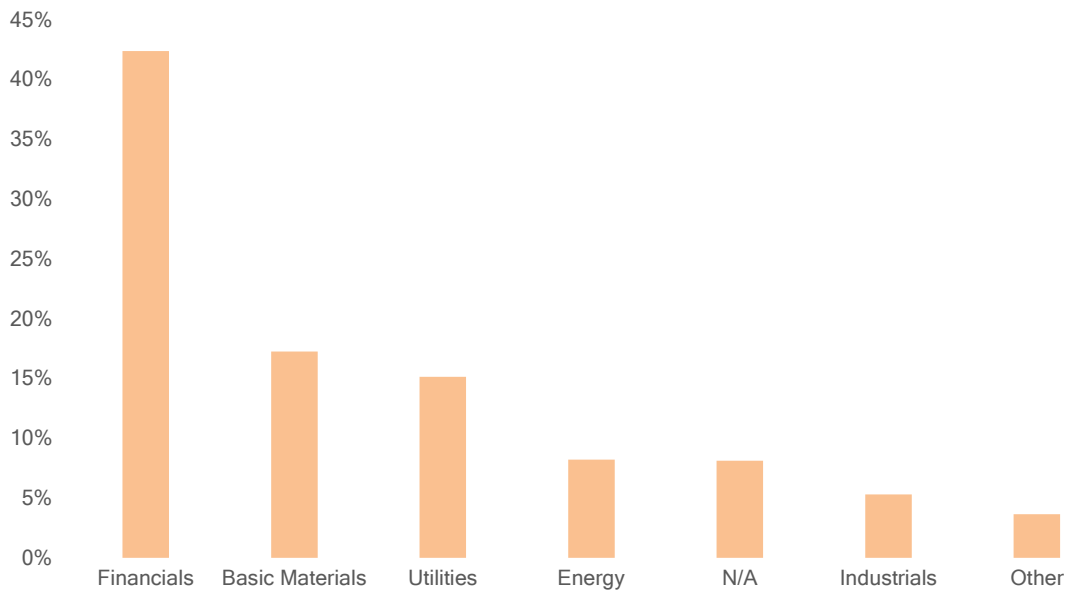


Figure 80: Share of outstanding account balances by economic sector of the ultimate owner. Sources: European Commission, GLEIF, Refinitiv, ESMA.

323. However, the presence of Financials is not unexpected given the relative importance of the EUA derivatives market. Since physical EUAs exhibit no storage costs, they serve as an effective hedge for the short positions that financials are taking when selling derivatives to compliance entities.
324. To further investigate the relationship between EUA account balances and derivatives, we combine the market snapshot of outstanding EUAs from the EU TL with open futures positions from ICE Endex as of 4 January 2022⁹⁶. The matching of both datasets is performed at group level using the LEIs of the ultimate parent companies which are present in both datasets.
325. As a result of this matching process, we are able to identify entities holding around 45% of all outstanding EUAs and ~80% of all open positions in EUA derivatives on ICE Endex. Financials account for the largest share of matches (32% of EUAs and 54% of open positions), reflecting their active participation in both physical and EUA derivatives trading.
326. Consistent with the previous sections, financials are predominantly taking short positions in derivatives markets. Comparing the number of short positions of those financial entities with their respective physical EUA holdings, we find a close positive relationship – the more physical EUAs are held in a firm’s accounts, the larger the number of short positions (depicted in Figure 81 as negative values). Although the sample only covers 22 entities and some firms may be missing as a result of the matching procedure, a correlation of -67% suggests nonetheless that most financials are buying physical EUAs with the plan to sell them again in the future (as opposed to just storing them), and that

⁹⁶ The analysis focuses on ICE Endex where the most liquid EUA-futures market is located.

most of their short positions are covered (i.e. they own the underlying), reducing future settlement risks.

327. The opposite picture can be observed for non-financial firms with a positive relationship between entities' physical EUA balances and long positions in the EUA derivatives market. Although the relationship is with a correlation of 41% unequivocally positive, there is greater variance amongst the 81 firms included in the sample. This suggests that non-financials (which are predominantly compliance entities in this case) combine holdings of physical EUAs with long positions in EUA derivatives markets. The ratio of physical EUAs to derivatives varies to a large degree, presumably reflecting idiosyncratic factors (e.g. firm sector and size, organisational structure, business strategy, financial resources, access to derivatives markets, etc.). It should be noted that the average size of both physical holdings and net futures positions are smaller for non-financials than for financials – which is related to different concentration levels of the financial (high concentration) and non-financial (low concentration) sectors.

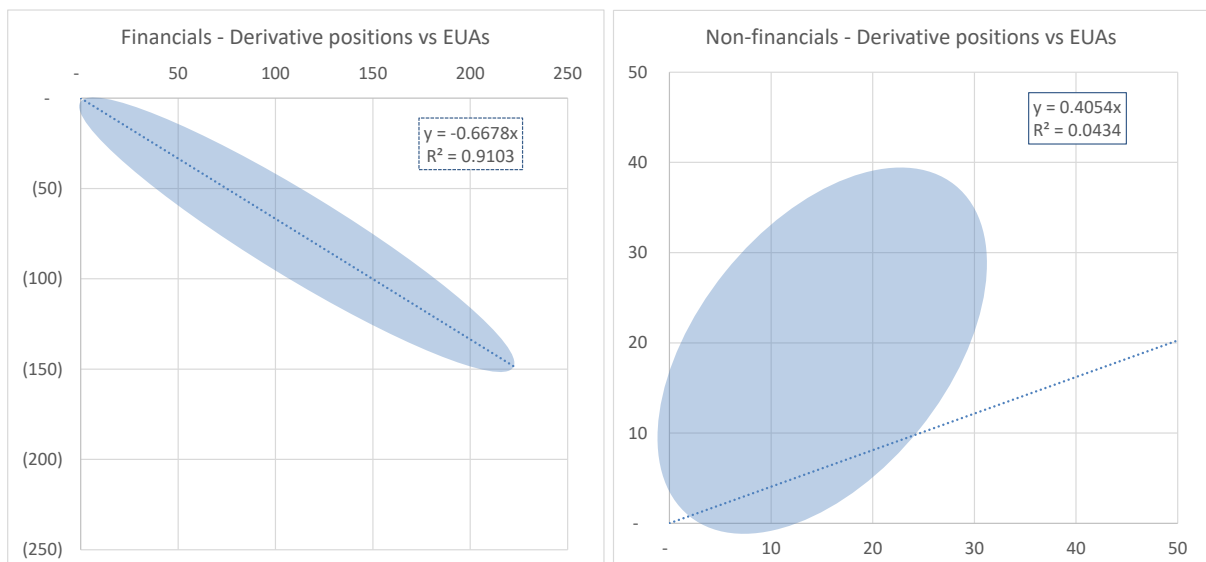


Figure 81: EUA account balances (in million, horizontal axis) and number of open positions in EUA derivatives (in million EUAs, vertical axis) in January 2022. Negative and positive values on the vertical axis indicate respectively net short and net long positions. The shaded area indicates the distribution of data points. All data at group level. Sources: European Commission, GLEIF, Refinitiv, ICE Endex daily position reports, ESMA.

4.3.9.3 Analysis of transactions

328. The next section focuses on the transfers of physical EUAs that were performed between 2018 and 2022 and recorded within the EU TL. It covers the following transaction types:

- a) **Creation** – the European Commission issues all EUAs by creating them on the EU Total Quantity Account, then transfers them for auctioning to the EU Auction Account and for free allocation to the EU Allocation Account;

- b) **Free allocations** – EUAs are transferred from the EU Allocation Account to the respective Operator Holding Account of firms entitled to receive free EUAs;
- c) **Auctioning** – EUAs are (i) transferred from the EU Auction Account to the Auction Delivery Account of the auction platform, and (ii) after being bought by market participants at an auction, they are transferred from the Auction Delivery Account to the successful bidder's Trading Account or Operator Holding Account;
- d) **Transfers** – account holders can transfer EUAs between their own accounts, or to other accounts to settle trades made outside of the Union Registry;
- e) **Surrenders or Deletions** – account holders transfer EUAs from their Operator Holding Accounts to the EU Deletion Account either as part of their annual compliance obligation, or to be cancelled without it being recorded as surrendering.

329. We have combined those transactions with the previously used classification of market participants to analyse the supply and demand dynamics in physical EUAs. To do so, we start from the snapshot of the outstanding balances (as of 4 January 2022) provided by the European Commission and derive weekly historical account balances using the transaction data from the previous four years.

330. Inflows of new physical EUAs in the market occur in two ways. First, through the EU Allocation Account, which receives once a year allowances from the EU Total Quantity Account (not shown in the figure below) and subsequently releases those for free to Operator Holding Accounts (compliance accounts). Second, through the EU Auction Account which continuously receives allowances from the EU Total Quantity Account and evenly distributes those through the established auctioning platform to successful bidders. Both sources of inflows are visible through (i) the abrupt surge of compliance accounts from free allocations (as the EU Allocation Account balances decrease) and (ii) the continuous increase of both compliance and non-compliance accounts over the calendar year from auctions.

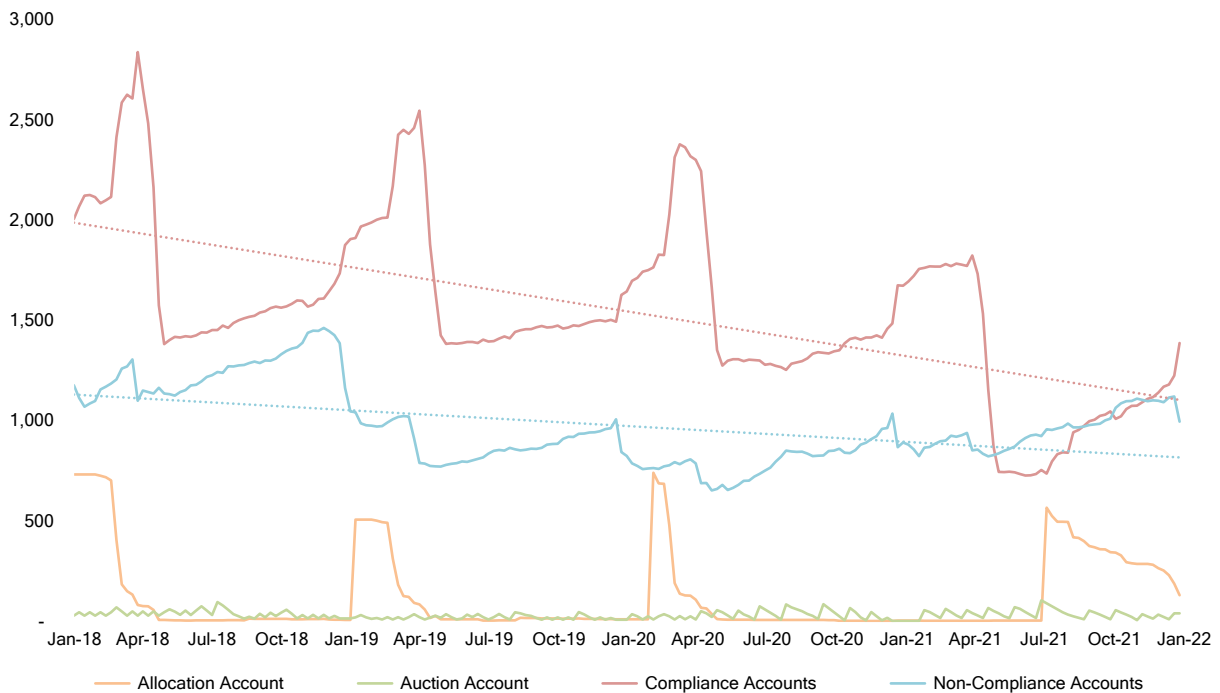


Figure 82: Outstanding account balances at a weekly frequency for compliance and non-compliance entities, in million EUAs. Covering Operator Holding and Trading Accounts for compliance entities, and Trading Accounts for non-compliance entities respectively. Unclassified accounts are omitted for clarity. Sources: European Commission, ESMA.

331. Market-outflows of physical EUAs occur in April of each year through the surrendering of EUAs, which are transferred from Operator Holding Accounts (compliance accounts) to the EU Deletion Account (not shown in the figure above) and is visible through a large drop in the account balances of compliance entities in April of each year.
332. The impact of futures contracts settlement can also be observed, with most contracts expiring in December and March of each year, leading to the delivery of EUAs from non-compliance to compliance entities. This mechanism is visible through the simultaneous increase of compliance account balances and decrease of non-compliance account balances around those months.
333. In line with the principles of a cap-and-trade system, market outflows (surrenders) outweigh market inflows (free allocations and auctions) – leading to a decreasing number of physical EUAs in circulation. Additionally, the decline of compliance account balances appears to take place at a faster pace than the decline for non-compliance accounts. As a result, during the second half of 2021, both kinds of entities were holding approximately equal shares of physical EUAs.
334. This divergence between compliance and non-compliance account balances also becomes visible when comparing annual inflows from and outflows to their respective accounts.
335. The figure below shows a comparable pattern between compliance and non-compliance entities from 2018 to 2020, with positive net flows in 2020 mainly due to the COVID-19 related economic slowdown and lower energy demand. Consistently, the overall market

shrank in both 2018 and 2019, but slightly expanded in 2020. However, for 2021 we find that compliance firms reduced their balances to an extent greater than in any of the previous 3 years, while non-compliance firms further increased their holdings of physical EUAs.

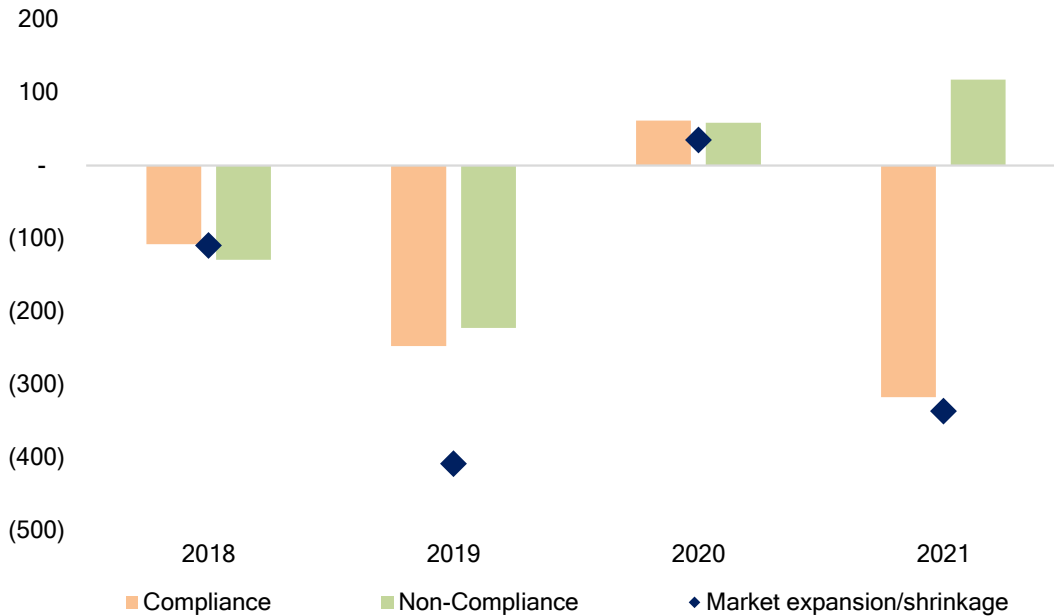


Figure 83: In- and outflows from EUA accounts per calendar year, shown as net transfers, in million EUAs. Covering Operator Holding and Trading Accounts for compliance entities, and Trading Accounts for non-compliance entities respectively. Unclassified accounts are omitted as a category but included in the overall market in- and outflows. Sources: European Commission, ESMA.

4.4 Conclusion of the carbon market data analysis

336. The data analysis performed above has evidenced the specificities and unique characteristics of the EU carbon market, as well as some of its complexities. The various data sources used for this report, including data on the primary market and its auctioning process and Union Registry data together with position, transaction, and trade repositories reports, also illustrate the challenges of having a comprehensive view of this market and an in-depth understanding of its developments.

337. Overall, ESMA considers that the data analysis has not unearthed any major abnormality or fundamental issue in the functioning of the EU carbon market from a financial supervisory perspective. A recent report by Oxera similarly concluded that the market is functioning as expected⁹⁷. Carbon prices significantly increased between January 2018 until mid-2019 and again since December 2020, with volatility increasing marginally (leaving aside the recent events in Ukraine). Several fundamental factors help to explain this, including the structural decline in the number of freely allocated allowances built into the cap-and-trade system, interventions by the Market Stability Reserve, and more

⁹⁷ Carbon trading in the European Union <https://www.oxera.com/insights/reports/carbon-trading-in-the-european-union/>

stringent greenhouse gas emissions reduction targets under the EU Fit-for-55 package. The economic recovery in Europe since mid-2020 coupled with rising energy prices (including from geopolitical tensions in late 2021) also led to growing demand for allowances. In this context, the emergence of new participants (and instruments) with buy-and-hold strategies warrants future monitoring to the extent that they may lead to a reduction in the supply of physical EUAs available for trading, even though the available evidence suggests that their impact is only limited so far.

338. Meanwhile, based on the multiple regulatory datasets collected and analysed for this report, the various segments of the EU carbon market appear to broadly function as expected. While primary markets are somewhat concentrated, the largest participants are also active in secondary markets and ensure that auctioned EUAs are disseminated to other secondary market participants. Trading in the secondary market between June 2021 (when ICE moved its EUA trading venue to Amsterdam) and December 2021 averaged EUR 57 billion per month. Most of the trading in the secondary market takes place through derivative contracts, which is in part a reflection of the EU ETS cycle: compliance entities must surrender allowances once a year, and many choose to take long futures positions with investment firms to make up for the shortfall between the allowances they may receive for free and their expected greenhouse gas emissions, as opposed to purchasing physical EUAs on the spot market. From this perspective, large holdings of EUAs in the Trading Accounts of investment firms is not a concern at this juncture, considering that these holdings appear highly correlated with the number of short positions these firms hold in EUA derivative markets.
339. The analysis of transaction-level and position-level data on derivative markets confirms this picture. Derivative markets are dominated by compliance entities and other non-financials that are holding long positions for hedging purposes and trading with investment firms holding short positions to make a market. The respective shares of positions held by investment firms, compliance entities, other non-financials, investment funds and other financials have remained steady over time, even as the overall number of position holders increased. Most of the trading volumes concentrate in the next (front-year) December expiry futures contract, with participants either taking “physical” delivery of the allowance at expiry or rolling over their position to the December expiry of the next year. There are also significant positions in the March expiry of the current year linked to the lifecycle of emission allowances which have to be surrendered in April, while trading in longer maturities remains marginal. Investment firms, credit institutions and compliance entities tend to trade futures across the maturity spectrum, while investment funds and other non-financial sector firms favour trading in futures with a residual maturity of less than one year and are increasingly trading in options.
340. Meanwhile, the comparison of transaction and position-level data unveils significant trading activity from high-frequency trading firms and market makers engaging in algorithmic trading, some from the UK and US, that are however only holding small net positions.
341. While the notional volumes traded in derivative markets have grown, some of this reflects the increase in underlying EUA prices, with similar increases observable in energy commodity derivative markets, which are sometimes traded in tandem with allowances.

An increase in the relative share of options in total notional volumes traded in late 2021 is a development that warrants monitoring – as do trends in the less transparent OTC market segment.

342. Finally, this section provides an extensive analysis of the types and origins of participants in EU carbon markets. The complexity of bringing several very large datasets based on different pieces of EU legislation from multiple sources cannot be understated. This creates challenges in terms of identifying entities and bringing differently structured datasets together, both necessary provide a consistent picture of the market. Changes that arose in the wake of Brexit impaired our ability to monitor trading and clearing activities of third-country entities and further led to a relocation of some market participants into the EU as the main trading venue for EUAs (in terms of volumes) moved from London to Amsterdam in June 2021. These challenges make it very complex to obtain a clear picture of who trades and from where and need to be addressed in order to improve future monitoring of EU carbon markets.
343. Despite these issues, and after recouping the different pieces of information, there are nonetheless several important takeaways. Perhaps most importantly, the role of third-country firms is intricate and appears to reflect different features of the market. First, UK-domiciled firms still undertook a significant share of trading in EUAs post-Brexit, with several (EU and non-EU headquartered) financial as well as non-financial groups centralising their trading operations in the UK. Second, the vast majority of EUA trading volumes were cleared with ICE UK Ltd, predominantly through third-country investment firms domiciled in the UK or the US acting as clearing members. Third, the high share of trading activity (in terms of volume and number of trades) by some third-country entities reflected to some extent the presence of algorithmic trading as well as high-frequency trading. Fourth, the number of investment funds taking part in this market is high but volumes traded and positions taken are small in comparison to other market participants. Investment funds located in third countries are the largest position holders among the investment funds.
344. Beyond the data challenges already highlighted, it is important to note that there are some caveats to these findings. Based on the information available, unless they are clearing trades concluded by EU clients (which remain visible post-Brexit), it is not possible to tell whether third country investment firms are acting as clearing members on behalf of non-EU clients or clearing their own transactions. Sophisticated corporate structures involving multiple entities and LEIs within large groups further muddy the picture, with intragroup trading seemingly making a non-trivial share of total trading. Omnibus accounts managed by investment firms on behalf of clients also contribute to complexify the overall picture. In this respect, future research will be essential to deepen our understanding of the EUA secondary market structure and activities of third-country firms.
345. ESMA has identified some policy recommendations that are based on the observations made when assembling this report. Those targeted policy measures would help addressing the challenges identified, contribute to enhanced market monitoring of the EU carbon market and assist with a better understanding on how the EU carbon market develops. Those policy recommendations are further detailed in the following section.

5 Policy recommendations and issues for consideration

346. As part of this report, ESMA has considered potential policy recommendations regarding the EU carbon market from the perspective of securities supervisors. Those policy recommendations include proposals to provide trading venues trading derivatives on emission allowances with additional monitoring tools, deliver more transparency to market participants and to the public, expand the scope of regulatory reporting and enhance supervisory market surveillance of the carbon market. ESMA is of the view that those recommendations can contribute to ensuring that the carbon market continues to facilitate price discovery and hedging while remaining free from manipulation and abusive practices, to the benefit of all market participants.
347. ESMA has also looked at two other possible courses of action on which it does not express policy recommendations but which it would like to raise to the Commission's attention for further consideration. Those include the introduction of position limits on derivatives on emission allowances and the setting up of a centralised market monitoring of the EU carbon market. In each case, the arguments in favour and against any such initiative are set out.

5.1 Extended scope of position management controls

5.1.1 Background

348. Under Article 57(8) of MiFID II, trading venues trading commodity derivatives are required to apply position management controls, including powers for the trading venue to:
- (a) monitor the open interest positions of persons;
 - (b) obtain information, including all relevant documentation, from persons about the size and purpose of a position or exposure entered into, information about beneficial or underlying owners, any concert arrangements, and any related assets or liabilities in the underlying market, including, where appropriate, positions held in commodity derivatives that are based on the same underlying and that share the same characteristics on other trading venues and in economically equivalent OTC contracts through members and participants;
 - (c) request a person to terminate or reduce a position, on a temporary or permanent basis, and to unilaterally take action to ensure the termination or reduction of the position where the person does not comply with such request; and
 - (d) require a person to provide, on a temporary basis, liquidity back into the market at an agreed price and volume with the express intent of mitigating the effects of a large or dominant position.

349. The Recovery Package for commodity derivatives⁹⁸ mandated ESMA to develop draft RTS to specify the content of position management controls. In its final report on technical standards for commodity derivatives⁹⁹ submitted to the European Commission on 19 November 2021, ESMA suggested that, as part of their position management controls, trading venues should be required to have arrangements in place for the ongoing monitoring of positions held by end position holders and parent undertakings in each commodity derivative traded on their trading venue. Because physically settled commodity derivatives, are more susceptible to disorderly trading practices, under ESMA's proposals, trading venues should also be required to set accountability levels for each physically settled contract traded on their venue. Accountability levels are not hard limits but are intended to act as a trigger alarm for the trading venue when a large position is being accumulated.
350. As derivatives on emission allowances do not qualify as commodity derivatives, position management controls currently do not apply to trading venues trading emission allowance derivatives.

5.1.2 Recommendations

351. ESMA recommends extending the requirements for position management controls, including the requirements set out in the draft RTS on position management controls, to trading venues trading derivatives on emission allowances. This would require amending Article 57(8) of MiFID II (and the draft on position management controls).

5.1.3 Impact and regulatory goal

352. The various pieces of data analysis show that the carbon market is a market in flux which, in addition, is unique in its design. ESMA considers that position management controls are well suited to add another level of surveillance to the market which would help in maintaining orderly markets.
353. Position management controls aim at addressing the specific challenges arising from commodity derivative trading and supplement the more general obligation for all trading venues to ensure fair and orderly markets. The extension of position management controls, including the ones set out in the draft RTS on position management controls, to trading venues trading derivatives on emission allowances will require those trading venues to introduce additional market surveillance tools, particularly setting accountability levels. Position management controls may also incentivise trading venues trading derivatives on emission allowances to more frequently assess the need to obtain additional information from market participants as to the nature and purpose of the positions held, while retaining discretion as to the follow-up actions that may be based on available information. ESMA therefore considers that extending position management controls to derivatives on emission allowances would enhance market oversight in those

⁹⁸ Directive (EU) 2021/338 of the European Parliament and of the Council of 16 February 2021 amending Directive 2014/65/EU as regards information requirements, product governance and position limits, and Directives 2013/36/EU and (EU) 2019/878 as regards their application to investment firms, to help the recovery from the COVID-19 crisis

⁹⁹ https://www.esma.europa.eu/sites/default/files/library/esma70-156-4710_final_report_technical_standards_for_commodity_derivatives.pdf

instruments and contribute to an even better understanding by trading venues of trading patterns on their markets.

5.2 Clarification of position reporting in emission allowances

5.2.1 Background

354. Under Article 58(1) of MiFID II, trading venues trading commodity derivatives, emission allowances and derivatives thereof must (1) make public a weekly report with the aggregate positions held by the different categories of counterparties and (2) provide the competent authority with a complete breakdown of the positions held by all persons on that trading venue, at least on a daily basis.
355. Whilst the Level 1 text sets out that daily positions in emission allowances, and not only in derivatives on emission allowances, should be reported to the NCA, some other terms used in Article 58(1), such as open position, long and short positions, which typically apply to derivatives rather than spot instruments, appear to have created uncertainty on how positions on spot emission allowances should be reported. ESMA notes that the daily position reports received from NCAs in the context of this report and the EU carbon market analysis performed did not include any position reports in emission allowances.
356. ESMA also notes that in accordance with the mandate received under Article 57(12) of MiFID II, Article 6 of RTS 21 (and RTS 21a) sets out criteria for determining whether a commodity derivative contract is an economically equivalent OTC contract to that traded on a trading venue for position limit purposes. No such definition is however provided for EEOOTC derivatives on emission allowances for position reporting purposes.

5.2.2 Recommendation

357. ESMA is of the view that the position reporting regime set out in MiFID II does not serve its intended purpose when it comes to position reporting in emission allowances. Position reporting in derivative instruments allows the regulators to monitor the evolution and in particular the build-up of positions over time, and its possible effect on both the derivatives and the underlying spot market. However, the same outcome cannot be reached as regards spot instruments, such as emission allowances, where positions in the contract remain open for a very short period. A position that reaches maturity is reported by the trading venue to the NCA as “zero”, which means that for emission allowances, the NCA will receive a “zero” report every other day when the transaction is finally settled and the emission allowance is delivered. The same holds true for daily futures. No meaningful information can therefore be drawn from those position reports by the NCA on the number of emission allowances held by market participants for market monitoring purposes. Furthermore, no information is available to the NCA of the spot trading venue on the emission allowances that have been freely allocated, auctioned in the primary market or surrendered. Considering the above, ESMA is of the view that the data already available in the Union Registry, which records the holdings of both financial and non-financial entities, would be a more relevant and exhaustive source of information on emission allowance account holders.

358. However, ESMA also notes that the Union Registry Regulation currently allows for omnibus accounts which do not permit the identification of individual holders. In addition to the recommendation set out in section 5.8, ESMA therefore recommends that the Union Registry Regulation should be amended in a way that allows for the identification of ultimate beneficial owners of emission allowances so that the Union Registry data can valuably be used by NCAs for the exercise of their market monitoring responsibilities. In parallel, ESMA recommends removing the position reporting in emission allowances and weekly position reporting requirements from MiFID II.
359. As regards EEOTC derivatives on emission allowances, ESMA stands ready to provide technical assistance to the Commission should the Commission consider that further clarification in Level 2 is needed.

5.2.3 Impact and regulatory goal

360. ESMA is of the view that, based on the above amendments, EUA position reports can be a source of useful additional information for NCAs in the exercise of their market monitoring responsibilities and can notably help identifying the potential existence, or building, of large positions in emission allowances by a market participant which may be a source of concern or raise question marks. Additional information on the positions held by market participants in emission allowances over time will be of particular relevance considering the limited number of participants in the primary market as explained in section 4.3.3, noting that the Union registry cannot be relied upon to that end due to the use of omnibus accounts. More generally, ESMA considers that emission allowance position data will contribute to a better understanding of the EU carbon market dynamics and market participants' trading strategies.
361. As further explained below, ESMA also believes that the carbon market is of great interest to the wider public and is of the view that more information should be provided to the public not only on emission allowance derivatives but also on emission allowances. Clarification of position reports in emission allowances as recommended above should be a further step in that direction.
362. Lastly, further clarity on the definition of EEOTC derivatives on emission allowances may contribute to a more comprehensive position reporting of emission allowance derivatives, although ESMA notes that the EEOTC reporting obligation only applies when the position results from a transaction involving an investment firm.

5.3 Improved granularity and consistency of weekly position reports

5.3.1 Background

363. As explained in section 4.3.6.1, weekly position reports on emission allowance derivatives published by trading venues include and combine open positions in futures on emission allowances and options on futures on emission allowances on a delta adjusted basis, even when the option and the future contracts have a different venue product code. The combination of open positions held in futures on emission allowances

and options on emission allowance futures on a delta adjusted basis provides a useful view of the total exposure a category of counterparties may have to emission allowances.

364. ESMA is however aware of calls for more granularity in those weekly position reports which would represent a useful source of information for market participants.

365. ESMA also notes that the categories of counterparties for the purpose of the weekly position reports are defined in Article 58(4) of MiFID II as follows:

- (a) investment firms or credit institutions;
- (b) investment funds, either an undertaking for collective investments in transferable securities (UCITS) as defined in Directive 2009/65/EC, or an alternative investment fund manager as defined in Directive 2011/61/EC;
- (c) other financial institutions, including insurance undertakings and reinsurance undertakings as defined in Directive 2009/138/EC, and institutions for occupational retirement provision as defined in Directive 2003/41/EC;
- (d) commercial undertakings;
- (e) in the case of emission allowances or derivatives thereof, operators with compliance obligations under Directive 2003/87/EC.

366. However, and as explained in section 4.3.2, in the course of preparing the preliminary report, ESMA had been made aware of difficulties and inconsistencies in the classification of counterparties in the weekly position reports. The relevance and quality of data analysis based on weekly position reports is being affected by the reclassification of market participants across the different categories of counterparties over time as well by remaining uncertainties about the classification of certain counterparties.

5.3.2 Recommendations

367. ESMA has identified two courses of actions with regard to weekly position reports.

5.3.2.1 More granularity in weekly position reports

368. ESMA notes that in the US, the CFTC requires trading venues trading commodity derivatives to publish two sets of Commitment of Traders (CoT) reports on: 1) combined open positions in futures and options on futures on a delta adjusted basis and 2) open positions in futures only.

369. ESMA recommends having a similar approach in the EU and requiring trading venues to also publish weekly position reports on open positions in futures on emission allowances only in addition to the current combined report. This would require amending Article 58(1)(a) of MiFID II, Article 83 of Delegated Regulation (EU) 2017/565 and ITS 4.



370. ESMA would also see benefits in extending this increased transparency in weekly position reports to all commodity derivatives.

5.3.2.2 Additional guidance on counterparty classification

371. As part of the more in-depth analysis conducted of current counterparty classification for weekly position reports, ESMA has identified two main issues. The first one relates to the classification of funds, notably from third countries. The second one relates to the category “other non-financials” that appears to include several entities that should instead be classified as “compliance entities”.

372. ESMA has already produced a Q&A (see Q&A 22 under Position Reporting)¹⁰⁰ to further assist market participants with counterparty classification but, based on the analysis above, appreciates that more clarity is still needed in this area. Such further clarification could be provided in Level 2.

373. In the shorter term, and as a follow-up to this report, ESMA commits to work on additional guidance on counterparty classification. ESMA notes in particular that Article 58(4) of MiFID II cross-refers to definitions which are relevant for EU entities. However, non-EU entities are also active in the EU carbon market and need to be classified in the weekly position reports in a consistent way. ESMA considers that for transparency purposes, non-EU entities should be categorised in the same way as they would be categorised if they were established in the EU and subject to EU law.

5.3.3 Impact and regulatory goal

374. ESMA appreciates that the majority of the sources which are the basis of the data analysis in Section 4 stem from regulatory reporting. The EU carbon market by its design is of great relevance and interest also to the wider public and ESMA believes that there is merit in providing more granular information about the EU market to the public. The two-way provision of weekly position reports as suggested above would be one step in that direction.

375. Providing more transparency to the market on positions held in options on futures on emission will contribute to better understanding the strategies of the various categories of counterparties and help identify potentially emerging trading patterns or market trends.

376. In addition, ESMA considers that market participants and the wider public alike would benefit from a more robust and reliable counterparty classification in position reports which would improve the quality of the weekly position reports published.

¹⁰⁰ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-36_gas_commodity_derivatives.pdf

5.4 Refined transparency calibrations

5.4.1 Background

377. Under MiFIR, the scope of instruments covered by pre-and post-trade transparency and transaction reporting are closely aligned. The gaps or inconsistencies identified in transaction reporting with regards to spot emission allowances or derivatives on emission allowances in section 5.6 are therefore also relevant with regard to market transparency.
378. MiFIR provides for waivers from pre-and post-trade transparency that are based on the liquidity of the instrument and size of the order/transaction as further specified in RTS 2 for non-equity instruments. In the consultation paper published on 9 July 2021, ESMA set out proposals for reviewing, where appropriate, the Large in Scale (LIS) and Size Specific to the Instrument (SSTI) thresholds for commodity derivatives, emission allowances and derivatives on emission allowances and is currently considering how to best follow-up on those proposals.

5.4.2 Recommendations

379. ESMA is following up on the work initiated in the context of the MiFID II/ MiFIR review report on the transparency regime for non-equity instruments, including emission allowances and derivatives on emission allowances, set out in RTS 2. ESMA however notes that spot emission allowances and EUA derivatives are currently considered to be liquid instruments and that for such liquid instruments the Large in Scale (LIS) and Size Specific To the Instrument (SSTI) thresholds are therefore critical for determining whether pre-trade transparency will be available to market participants or whether the trading venue may operate under a pre-trade transparency waiver. Those thresholds are also material in determining whether post trade transparency will be real time or may be deferred taking into account the risks to which market participants are exposed. ESMA also notes that in its proposal for a MiFIR review, the Commission suggests deleting the SSTI waiver and deferral. Going forward, ESMA will therefore consider the potential need for recalibration of transparency thresholds for emission allowances and emission allowance derivatives. While the more detailed proposals for the review of RTS 2 have not yet been finalised, ESMA recommends that, once finalised, those proposals should be swiftly adopted by the Commission to ensure an appropriate level of transparency in the market.

5.4.3 Impact and regulatory goal

380. In considering areas where further transparency, or more refined transparency, could be provided on the EU carbon market, in addition to weekly position reports, ESMA remains mindful of the overall benefits that transparency brings to the market, improving its efficient and orderly functioning and ultimately contributing to financial stability. Appropriately calibrated market transparency, that also takes into account the potential market risks faced by market participants trading in large sizes, reduces information

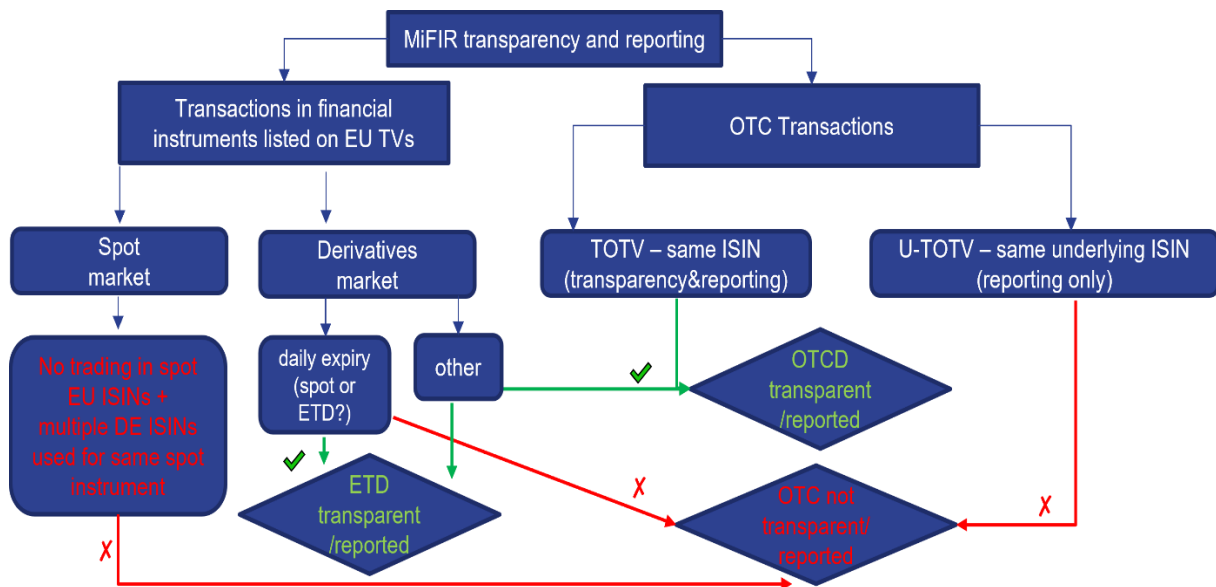
asymmetries, allows market participants to make more informed decisions and thereby increases the efficiency of the price formation process.

5.5 Increased transparency and reporting of OTC transactions

5.5.1 Background

381. ESMA has identified two key issues that significantly limit regulators' visibility of trading activities in OTC emission allowances and derivatives thereof. The first issue relates to the lack of reporting of OTC transactions in spot emission allowances (sub-section 5.5.1.1) and the second one concerns the lack of reporting of OTC transactions in derivatives (sub-section 5.5.1.2).

382. The diagram below illustrates where ESMA has identified reporting and transparency gaps.



5.5.1.1 OTC transactions in spot emission allowances

383. The ESMA preliminary report that was published in November highlighted the limitation of lack of reports on OTC transactions in spot emission allowances. The issue seemed to be purely of a legal nature due to the scope of Article 26(2) of MiFIR, which limits reporting to OTC transactions in spot instruments that are considered having the same characteristics (e.g. ISIN) as the ones that are executed on trading venues (the so-called ToTV instruments). As it appeared that spot emission allowances were not traded on any of the three European trading venues, OTC transactions in spot emission allowances could not fall under the scope of MiFIR transaction reporting due to the lack of venue trading in these instruments.

384. Further to subsequent investigations, ESMA has observed that in fact some of the financial instruments traded on EEX are reported as "spot emission allowances" and,

therefore, venue trading in these instruments does occur. However, the ISIN reported for those instruments has a “DE” prefix and does not correspond to the “EU” ISIN assigned to the spot emission allowances in the ISIN Guidelines¹⁰¹ that is displayed on the EC website¹⁰², this EU ISIN might be subsequently traded OTC. Consequently, any OTC transaction in a spot emission allowance having the same ISIN as the one advertised on the EC website is not reported under MiFIR.

385. In addition, the DE ISIN assigned at the time of the auction of the emission allowance on EEX primary market is different from the DE ISIN assigned to the spot allowances that EEX admits for trading on the secondary markets. Therefore, reporting entities might not report an OTC transaction in a spot emission allowance with a DE ISIN because it is unclear which DE ISIN should be used for determining the reportability of the transaction on the basis of the ToTV concept: (a) the DE ISIN used at the time of the auction or (b) the DE ISIN assigned to the spot contract admitted to trading on the secondary market. This issue affects the consistency of the MiFIR transaction data reported.

5.5.1.2 OTC transactions in derivatives on emission allowances

386. Further to subsequent investigations, ESMA has identified a difference in the way trading venues refer to and report EUAs which have a very short delivery date (expiry up to 2 days). As illustrated in the above section, EEX refers to those instruments as “Spot (daily expiry)” and reports them to ESMA under the classification of spot “Emission Allowances”. ICE Endex and Nasdaq refer to those instruments as “Daily Futures” and report them to ESMA under the classification of “Derivatives on Emission Allowances”.
387. OTC transactions in derivative instruments with an expiry of up to 2 days that are offered on ICE Endex and Nasdaq are not reported because they are not considered ToTV. Given that these contracts have a short expiry, they are reported with a different ISIN each day. Due to the narrow application of the ToTV concept, which is based on having the same ISIN for the equivalent instrument traded OTC, OTC transactions in these instruments are equally not reported under MiFIR.
388. Finally, given that the instruments with daily expiry that are offered on ICE Endex and Nasdaq are reported as a derivative instrument, they could still be considered as falling within the scope of the transaction reporting obligation due to the underlying emission allowance being traded on a trading venue. However, also in this case, the OTC transactions in the equivalent instruments are not reported because the ISIN reported in the underlying field for these instruments is the ISIN with the EU prefix and thus it is not the same as the DE ISIN reported by EEX when admitting the spot emission allowance on the secondary market. Nevertheless, even if with some limitations, additional

¹⁰¹ Page 13, point 3.8 of the ISIN UNIFORM GUIDELINES RELATING TO ISO 6166 (9th edition): Microsoft Word - 5_1_ISIN Guidelines Version 19_Nov 2021_Draft_Clean version.docx (anna-web.org)

¹⁰² https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/ensuring-integrity-european-carbon-market/isins-eu-ets-emission-allowances_fr



information on OTC transactions is available in the Union Registry (see para 398)¹⁰³ and in EMIR reports (see paras 229 and 245)¹⁰⁴.

389. While ESMA appreciates that OTC transactions are likely to be limited when measured against the overall market, these issues raise concerns, as contracts which are essentially identical in nature are classified as different types of financial instruments and reported as such by trading venues. This affects the consistent application of varying reporting (MiFIR/EMIR) and transparency obligations (MiFIR), which means that the resulting data collected/published under these obligations may be skewed and/or subject to different reporting and transparency calculation requirements.
390. It is important to highlight that Articles 7 and 10 of Commission Delegated Regulation (EU) 2017/565 set out the distinction between a spot contract and a derivative contract as regards MiFID II Annex Section C(7) instruments and to C(4) currency derivatives respectively. Article 7 of Commission Delegated Regulation (EU) 2017/565, which clarifies the scope of commodity derivatives covered by C(7) notably provides that a spot contract is defined as a “*contract for the sale of a commodity, asset or right, under the terms of which delivery is scheduled to be made within the longer of the following periods: (a) 2 trading days and (b) the period generally accepted in the market for that commodity, asset or right as the standard delivery period.*”

5.5.1.3 Summary of inconsistencies

391. The table below provides a summary of the inconsistencies found in the ISIN codes, instrument classification codes as well as other characteristics reported to ESMA on EUAs with very short delivery date.

¹⁰³ Since 2021, all entities have to report if the transactions in emission allowances were purely bilateral, namely involved only the buyer and the seller which are both non-financial entities. However, the data retrieved from the registry was partial because (1) the OTC bilateral transaction indicator is not provided for nearly 46% of all transactions included in the registry and (2) it is difficult to assess how many of those bilateral transactions reflect intragroup trades.

¹⁰⁴ EMIR data reported post-Brexit is not complete due to the lack of reporting of trades where counterparties are UK based.

Characteristics	EEX	ICE Endex	Nasdaq
Commercial name	Spot (daily expiry)	Daily futures	Daily futures
ISIN in FIRDS (RTS 23) Note: EEX reports both auction ISINs and secondary markets ones	DE000C3JALT8 DE000C3JALS0 DE000C3L0V29 DE000C3L0V03	One ISIN per day with NL prefix	One ISIN per day with NO prefix
MiFIR ID (RTS2)	EMAL	DERV	DERV
Underlying sub-product	EU Allowances (EUA)	EU Allowances (EUA)	EU Allowances (EUA)
Underlying ISIN in FIRDS	Blank	EU000A1RRN98 or Blank	Blank
Asset class of underlying (RTS2#3)	None	COMM	EMAL
CFI in FIRDS	ITNXXX	FCNPSX	FCNPSX
Delivery period	T+1 (before 16:00) T+2 (after 16:00)	T+1	NA

Table 10. Summary of the inconsistencies

5.5.2 Recommendations

5.5.2.1 Short term: potential guidance on definition of spot EUAs and ISIN reporting

392. ESMA intends to address both issues identified in the previous sections in stages. First, concerning the use of multiple ISINs with “DE” prefix to identify the same spot emission allowances that are displayed on the EC website¹⁰⁵ with the “EU” prefix, ESMA intends to provide guidance to ensure that only “EU” ISINs are used for the purpose of reporting. Such guidance would ensure that OTC transactions in instruments with a short expiry listed on all three European venues are reported under MiFIR Article 26.
393. Second, concerning the definition of spot EUAs, it should be noted that, while the definition of ‘spot contract’ as set out in the CDR (EU) 2017/565, pursuant to Articles 7(2) and 10(2), applies to ‘commodities’, there is no specific legal definition to distinguish EUA spot contracts from EUA derivatives beyond the high-level wording contained in MiFID II. Given the absence of an explicit legal definition to distinguish EUA spot contracts from EUA derivatives and the small proportion of venue trading in instruments with short expiry (0.4% of trades representing 4.6 % of volumes bought) compared to the overall venue trading, ESMA recommends providing further guidance on the definition of spot EUAs. Such guidance would ensure that the instruments with short expiry listed on ICE and NASDAQ are subject to the same transparency requirements as the one traded on EEX, thereby ensuring a level playing field among these venues. ESMA intends to reflect

¹⁰⁵ https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/ensuring-integrity-european-carbon-market/isins-eu-ets-emission-allowances_fr

together with the EC on the appropriate legal tool to address this issue in the short term while, in the medium term, the relevant level 2 measures¹⁰⁶ should be further amended.

5.5.2.2 Long term: review MiFIR scope of transparency and regulatory reporting

394. In 2021 ESMA analysed¹⁰⁷ the functioning of the Traded on a Trading Venue (ToTV) concept as a basis for defining the scope of OTC derivatives subject to transparency and reporting. In this context, ESMA provided policy recommendations that are also valid for the EUA derivatives market. This concept narrowly determines the scope of OTC derivatives that are subject to the transaction reporting and transparency obligations under MiFIR, leaving NCAs with limited visibility on this market.
395. In the context of this report on the functioning of the emission allowances markets and considering the lack of visibility of the OTC market for EUAs, ESMA would like to reiterate the need to increase the transparency with the removal of the ToTV concept. This method would also simplify the reporting for entities by removing the need to implement complex checks to be performed at transaction level to assess whether an OTC derivative is considered ToTV and thus subject to transparency and reporting.

5.5.3 Impact and regulatory goal

396. The issues identified by ESMA affect the consistency of the MiFIR regulatory reports and transparency publications by different market participants. Due to the lack of clarity concerning the definition of spot EUAs, the scope of ToTV as well as the ISINs to be used for reporting, the application of transparency and reporting obligations is left to the discretion of the reporting entities. The resulting data published and reported may be either missing elements or skewed. For example, the same EUA based instrument reported by different market participants might not be grouped in the same liquidity class for the purposes of the transparency calculation.
397. In addition, the same EUAs and related derivatives are treated differently under MiFIR and other applicable sectoral acts (e.g. EMIR) and therefore subject to varying reporting and transparency requirements depending on how they are reported by market participants. For example, the EMIR reporting scope covers only derivative contracts, thus the inconsistent qualification of the same type of instruments either as a derivative or as spot, would result in some partial reporting to the Trade Repositories under EMIR. As for the MiFIR reporting scope, this covers ToTV instruments and derivatives thereof, so the issues identified by ESMA in this section equally result in partial/inconsistent reporting to the NCAs.
398. In terms of overall impact, while ESMA is not in a position to fully assess the scale of OTC trading in EUAs that is missing in MiFIR transaction data due to the issues identified

¹⁰⁶ Commission Delegated Regulation (EU) 2017/565 setting out the distinction between a spot contract and a derivative contract.

¹⁰⁷Section 5.2 in the MiFIR review report on the obligations to report transactions and reference data
https://www.esma.europa.eu/sites/default/files/library/esma74-362-1013_final_report_mifir_review_-_data_reporting.pdf

in this section, the partial data¹⁰⁸ retrieved from the Union Registry indicates that the proportion of OTC transactions recorded in the registry is significant however it may also include intragroup account transfers. For these reasons, ESMA considers that the proposed recommendations included in this section will contribute to more effective monitoring of the OTC markets while providing complete, consistent and reliable transparency data to the end investors.

5.6 Tracking chain of transactions in MiFIR regulatory reports

5.6.1 Background

399. As highlighted in the section illustrating the analysis of MiFIR transaction data, the process of de-duplicating transaction data can be rather challenging when the order executed on the venue is aggregated for several clients or when for the same transaction multiple reporting chains of intermediaries are involved. This is due to the incorrect use or absence of some identifiers that would facilitate reconstructing the history of trading patterns chains and deduplicate the transaction reports for carrying out quantitative analysis.

5.6.2 Recommendation

400. The experience gained from the analysis of MiFIR transaction data provides further evidence to support the ESMA recommendation presented in section 6 of the MiFIR Review Report published in March 2021¹⁰⁹. The report highlights the importance of including a new identifier in the case of grouping orders¹¹⁰, which should be generated and reported by each executing entity that is grouping orders for its clients and should be unique for the market-side and client-side reports of the executing entity. In addition, the report recommends including explicit obligations for reporting entities to obtain the same trading venue execution (TVTIC) code that was assigned by the trading venues to both sides of the trade as prescribed in RTS 24.

5.6.3 Impact and regulatory goal

401. ESMA would like to ensure maintaining a consistently high level of market surveillance and integrity for the EUA market. To that end, the TVTIC code that was assigned by the trading venue to both sides of the trade could be used more effectively if combined with the proposed new code for identifying the corresponding client allocations in cases where the order executed on the venue is aggregated for several clients.

402. These codes will ensure that client-side reports and market side reports pertaining to the same transaction are not double counted and will enable regulators to trace the market

¹⁰⁸ Partial because (1) the OTC bilateral transaction indicator is not provided for nearly 46% of all transactions included in the registry and (2) it is difficult to assess how many of those bilateral transactions reflect intragroup trades.

¹⁰⁹ [esma74-362-1013_final_report_mifir_review_-_data_reporting.pdf \(europa.eu\)](https://www.esma.europa.eu/sites/default/files/library/2016-1452_guidelines_mifid_ii_transaction_reporting.pdf)

¹¹⁰ As defined in chapter 5.23 of the ESMA guidelines: https://www.esma.europa.eu/sites/default/files/library/2016-1452_guidelines_mifid_ii_transaction_reporting.pdf.



execution to the client allocation more accurately, including where orders are aggregated and result in the execution of a transaction for the benefit of several clients.

5.7 ESMA access to primary markets transactions

5.7.1 Background

403. According to Article 36 of the Auctioning Regulation, the auction platform must report to the competent national authority under MiFID¹¹¹ complete and accurate details of every transaction executed on the auction platform that results in the transfer of emission allowances to the successful bidders. The report must include all the relevant details using the data standards and formats required under the relevant MiFIR technical standards on transaction reporting¹¹².
404. Reporting under Article 36 Auctioning Regulation is limited to the buy side of the transaction, which means that EEX will report only the purchase (bidder vs. CCP), while the sell side (member state vs. CCP) is not reported. Since Article 36 of the Auctioning Regulation contains a special rule for reporting of transactions on a primary market auction, there is no separate reporting obligation under Article 26 of MiFIR for bidders that are authorised as investment firms.

5.7.2 Recommendation

405. Secondary market trading in emission allowances and related derivatives is highly interconnected with the primary markets due to the progressively limited supply of emission allowances subject to auctions and the obligation for compliance entities to surrender emission allowances based on the total emissions of the previous year (see section 4.2.3 above for further details). Given that the information on primary market activity is essential for the effective monitoring of these markets, ESMA is of the view that the EU Auction Regulation should be amended further to ensure that the relevant competent authority as well as ESMA also receives the information on primary markets transactions in line with the amendments introduced in Article 26 of MiFIR, following the ESA review¹¹³.

5.7.3 Impact and regulatory goal

406. As outlined in section 5.10, automatised access to this data will ensure that the data pool available to ESMA for monitoring EUAs markets is as complete as possible and can be integrated into ongoing monitoring activities.

¹¹¹ As defined in Article 67 of MiFID II

¹¹² Annex I of Commission Delegated Regulation (EU) 2017/590

¹¹³ According to the revised MiFIR Article 26 on transaction reporting “the competent authorities shall without undue delay make available to ESMA any information reported in accordance with this Article”.

407. Therefore, the change recommended by ESMA would help in having an easier and more complete overview of the EUA market which would improve surveillance and overall help in maintaining orderly markets.

5.8 Improved EUA registry

5.8.1 Background

408. Since 2012 all EU ETS operations have been centralised in the Union Registry, which is a database operated by the European Commission that holds accounts for all entities participating in the ETS markets (operators with compliance obligations as well as other entities trading EUAs without compliance obligations) where EUAs are registered. The book entry in an entity's account in the Union Registry is prima facie proof of ownership of an EUA. Other than records which are required for operators to comply with ETS requirements (such as the recording of verified CO₂ emissions and their reconciliation with allowances), all transactions between accounts in the Registry are also registered. As explained before in this report, the Union Registry does not include information related to the financial leg of a transaction on EUAs.
409. Despite the fact that accounts in the Registry might be used as omnibus accounts (which makes it difficult to identify the final holder of the EUA), the information in the EU Registry is very valuable for the supervision of EUA markets. Ensuring it is legally and effectively accessible to NCAs, the same way that other regulatory data sets, would contribute to complete the information that supervisors could use to identify better potential abusive trading practices.
410. When carrying out the analysis required for the preparation of this report, ESMA has come across several barriers with regards to the data in the Union Registry. In particular, the identification of accounts' holders has proven challenging. The Registry Regulation introduced only as of 1 January 2021 the obligation for accounts in the Registry to be identified with an LEI (where assigned). As a consequence, the number of accounts that can currently be identified with an LEI is very low. Furthermore, the requirement to flag pure OTC transactions in the settlement data recorded in the EU registry (EU transaction log) was not accompanied by any validation rule to ensure that the data inputted in the register actually contained such flag. As a result, this information is not provided for nearly 46% of all transactions in 2021 included in the registry.
411. Furthermore, the fact that accounts can be used as omnibus accounts where the account holder holds EUAs on behalf of third parties may have two implications, first in terms of data available to NCAs through the Registry as already highlighted in Section 5.2 on the Clarification of EUA position reporting; secondly, on the segregation applicable to the assets of final owners which currently does not seem to have been defined in the Registry Regulation.

5.8.2 Recommendation

412. In order to lift the identified barriers, ESMA encourages the Commission to urge administrators of national registries to ensure the timely implementation of the requirement related to the identification of accounts holders with LEIs. In addition, to increase data harmonisation and avoid duplication of reporting flows in line with ESMA and EC data strategies¹¹⁴, ESMA would recommend further changes to the EU registry regulation to ensure that the data available to NCAs and ESMA through the Registry is aligned with the same standards and structures used in regulatory reports under MiFID/EMIR. This should facilitate access by NCAs and subsequent assessment in conjunction with other data sets. Furthermore, ESMA invites the Commission to consider assessing whether asset segregation rules, when accounts in the Registry are used as omnibus accounts could improve the functioning of the registry (e.g. allowing for better protection of assets and greater visibility of the final EUA holder in the EU Registry).

5.8.3 Impact and regulatory goal

413. As indicated in section 5.10, ESMA considers that access to the data contained in the Union Registry by authorities responsible for the supervision of EUA markets, as well as the exchange of this data among them, should be facilitated and automatised to make sure the data pool is as complete as possible and can be integrated into market surveillance activities.
414. Therefore, the change recommended by ESMA would help in having an easier and more complete overview of the EUA market which would improve surveillance and overall help in maintaining orderly markets.
415. Assets protection requirements are particularly relevant for fungible assets, such as EUAs, which might be kept in one account on behalf of several final assets holders. When the account in the registry is that of a CCP, requirements applicable to the CCP ensure that it maintains separate accounts allowing it to identify who is the owner of the assets. However, if any account in the Union Registry can be used as an “omnibus account”, having further safeguards for the protection of the assets by ensuring that records and accounts are kept that enable to segregate the EUAs held for its own account from those held on behalf of others would be appropriate to strengthen the protection of final EUAs holders.

5.9 Position limits

5.9.1 Background

416. As stated in Article 57(1) of MiFID II, position limits aim at preventing market abuse and supporting orderly pricing and settlement conditions, including preventing market

¹¹⁴ Strategy on supervisory data in EU financial services, COM(2021) 798 final.

distorting positions, without prejudice to price discovery on the market for the underlying commodity.

417. Under MiFID II, as amended by the MiFID II Recovery Package for commodity derivatives, position limits apply to agricultural commodity derivatives and to critical or significant commodity derivatives defined as commodity derivative contracts, other than agricultural commodity derivatives, with a net open interest above 300,000 lots.
418. As clarified in Recital (14) of the MiFID II Recovery Package, position limits continue to apply to all agricultural commodity derivatives “due to the critical importance of agricultural commodities for citizens”. The critical importance of agricultural commodity derivatives for citizens also justifies that agricultural commodity derivatives where the underlying commodity qualifies as food intended for human consumption are subject to stricter position limits than other commodity derivatives. As regards non-agricultural commodity derivatives, the intention was to restrict position limits to key benchmark contracts where price formation takes place and that may have a role in the pricing of the underlying commodity and other commodity derivatives.

5.9.2 Issue for consideration

419. Position limits currently only apply to commodity derivatives, and therefore not to EUA derivatives. Considering the concerns voiced over the last few months regarding the functioning of the ETS and the citing of position limits in the public discussion as a potential addition to the legislative framework, ESMA has considered the potential benefits and drawbacks of introducing position limits on EUA derivatives.

5.9.3 Impact and regulatory goal

5.9.3.1 Arguments in favour

420. Futures on emission allowances and options on futures on emission allowances are physically settled, which requires the underlying emission allowances to be delivered upon the predetermined delivery date. As noted in the 2011 IOSCO Principles for the Regulation and Supervision of Commodity Derivatives Markets¹¹⁵, “the trading of physical commodity derivatives differs fundamentally from the trading of financial-based derivatives in that the actual supply of the underlying physical commodity is restricted to a finite supply”. Due to this finite supply, market participants, individually or at group level, may seek to build and make use of a dominant position to squeeze or corner the market and secure the price of a commodity derivative or of the underlying commodity at an artificial level.
421. While recognising that risks to orderly markets also exist for cash-settled contracts where a position holder would have the capacity to influence the price of the underlying, ESMA’s analysis is that such risks are more salient for physically settled commodity derivatives.

¹¹⁵ <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD358.pdf>

As noted in ESMA's Review report on position limits and position management¹¹⁶, derivative contracts that require the delivery of a physical asset are most susceptible to manipulative behaviours when the deliverable supply for such contracts is small relative to the size of positions held by market participants.

422. Concerns about potential market squeezes appear relevant for the emission allowance derivative market considering not only that emission allowances are of a finite supply but also that this finite supply is, and will continue to be, reduced over time in line with the EU's decarbonisation agenda. Introducing position limits to prevent the building up of large derivative positions and restrict the quantity of emission allowances each person may make or take delivery of would therefore be appropriate for derivatives on emission allowances to limit risks of manipulative behaviour, with limits being adjusted on a periodic basis to the decreasing number of emission allowances to remain meaningful.
423. The argument could also be made that, as for agricultural commodity derivatives, the importance of the ETS market for citizens in light of a successful zero net emission strategy calls for a specific regulatory framework.
424. While position limits on derivatives on emission allowances would introduce additional requirements for market participants, the experience gained over the last three years did not demonstrate any detrimental impact of the bespoke position limits set by the relevant NCA on commodity derivatives trading. Furthermore, the position limit regime recognises that for markets to function effectively, participants must be able to both find and provide liquidity and remove unnecessary restrictions in the form of position limit exemptions. Hedging positions held by non-financial entities, do not count towards the position limits. Positions held by financial and non-financial counterparties resulting from mandatory liquidity provision on a trading venue are also exempted from position limits.

5.9.3.2 Arguments against

425. The introduction of position limits on derivatives on emission allowances would bring a significant change to the current regulatory framework and its impact on the functioning of the ETS market is difficult to fully anticipate.
426. Position limits may negatively impact the functioning of the emission allowance derivative market by preventing financial entities to continue fully playing their crucial role in providing liquidity to the market and acting as counterparties to compliance entities seeking to hedge their exposure to the market carbon price in the futures market.
427. Although the number of emission allowances issued will be reduced over time, some of the features of the ETS market appear to already mitigate the risk of market squeezes. The auctions of emission allowances take place daily and the auction platform has the possibility to introduce limits as to the maximum number of allowances that entities can bid for. In addition, under current legislation, free allocation of emission allowances will

¹¹⁶ https://www.esma.europa.eu/sites/default/files/library/esma70-156-2311_mifid_ii_review_report_position_limits.pdf

be available to eligible ETS operators up to 2030 and those emission allowances could be coming to the market in case of a potential squeeze.

428. Although MiFID II provides for an exemption from position limits for positions directly resulting from mandatory liquidity provision on a trading venue, such exemption would be too narrow to cover the less formalised liquidity provided by financial counterparties taking the other side of trades with non-financial entities. Introducing position limits may reduce liquidity in the emission allowance derivative market and thereby contribute to increased volatility and reduce market resilience.
429. Position limits may increase the cost and complexity for compliance entities to hedge in the future and will not further incentivise compliance entities to use the emission allowance derivative market as a useful risk management tool.
430. In addition to the market impacts described above, position limits would be a source of material implementation costs, including for compliance entities and trading venues. Setting position limits would also require determining, and regularly updating, the information on deliverable supply in emission allowances, starting from the number of certificates auctioned and then assessing the number of certificates actually available for trading and would therefore add complexity to the regulatory regime.

5.9.3.3 ESMA's assessment

431. ESMA, taking into consideration the results of the data analysis, does not have a final view about whether the introduction of position limits for the emission allowance derivatives market would be appropriate at this point in time. ESMA would however like to emphasise that introducing position limits would be new and uncharted territory and the decision if and how to establish a position limit regime for emission allowance derivatives should be the subject of a separate, in-depth analysis which goes beyond what is possible within the short timeline within which this report had to be drafted.
432. ESMA also wishes to highlight that a unique market like the one for emission allowances requires tailor-made solutions so any position limit regime would need to be calibrated precisely to the peculiarities of the EUA derivative market.
433. ESMA also considers that the introduction of position limits for derivatives on emission allowances should not be overburdened with expectations and it will not be the one measure which could address all concerns about the EUA market currently being debated at the political level.
434. In addition, consideration may also be given as to whether the appropriate level for setting limits would be at the physical certificate level, i.e. to the number of spot emission allowances a person may hold across the EU, rather than at the level of the derivative on emission allowances.

5.10A centralised market monitoring of the EU carbon market

5.10.1 Background

435. As ESMA experienced when assembling the data necessary for drafting this report, the available data on the EU carbon market appears quite fragmented (Table 3) and the datasets used for this report, including auction reports, EMIR trade repositories reports, transaction reports, weekly position reports and Union Registry data had to be collected from a variety of sources. As explained in section 4.3.1, each dataset has a specific scope in terms of counterparties and instruments covered and its own data format. The unprecedented data analysis of the carbon market performed by ESMA for this report brought to light the multiple challenges associated with reconciling those various data sources to have a comprehensive view of the carbon market.
436. As explained in section 4.3.5, the assessment of MiFIR transaction data received from the NCAs has been particularly challenging due to the fact that ESMA has never accessed this data in the past and that up until this year the data was exclusively collected and stored in the various NCAs' databases. However, as of 2022 ESMA receives all MiFIR transaction reporting data from the NCAs. To support the new DRSP supervisory tasks, ESMA has developed a new system to collect transaction data, store it and perform data quality controls and will be able to consistently process and clean this dataset, covering any misalignment in the process of gathering data. However, at present, ESMA only has the possibility to use transaction data for the supervision of DRSP, while, as this report proves, this dataset would be useful for other purposes. Provided that ESMA can use MiFIR transaction data received under Article 26(1) of MiFIR for the purpose of monitoring the emission allowances markets, this dataset could in the future enable ESMA to gain an even better insight of EUAs and derivatives thereof and also any other financial instrument referring to EUAs (e.g., ETC/ETNs and other structured debt instruments) that are not reported under EMIR.

5.10.2 Issue for consideration

437. ESMA is aware of considerations suggesting a more centralised approach to the monitoring of the carbon market and therefore in this report is taking the opportunity to provide some thoughts in respect of a potential centralisation of monitoring.
438. Currently, no example exists in the EU of a financial instrument within the remit of ESMA being centrally monitored at European level. Instead, European and national legislation describe the competences and powers of NCAs with regard to the monitoring and supervision of financial instruments being traded in their respective jurisdictions.
439. However, when looking at other markets in the EU, there is at least one example of central monitoring which is worth exploring and could be replicated in an adapted format for emission allowances in order to improve market oversight. Indeed, wholesale energy markets are centrally monitored by the Agency for the Cooperation of Energy Regulators (ACER).

440. The EU Regulation on Energy Market Integrity and Transparency¹¹⁷ (REMIT) established the basis for the monitoring of wholesale energy markets at European level by acknowledging the cross-border implications of manipulative behaviour and the subsequent need to have a central approach to market monitoring. REMIT describes the different roles and missions of national regulatory authorities (NRAs) and ACER and the need for these to cooperate closely. According to REMIT, ACER is best placed to carry out market monitoring at EU level as it has a Union-wide view of electricity and gas markets, while national regulatory authorities (NRAs) have a comprehensive understanding of developments of energy markets in their Member States.
441. ACER has developed systems of collection and analysis of data which allows it to detect potential manipulative behaviour in wholesale energy markets. Such information is shared with NRAs for enforcement action, if needed. NRAs can also monitor markets. As such, REMIT establishes a supervisory framework with two layers of market monitoring, one at EU level and another one (optional) at national level.
442. Enforcement however remains an exclusive competence of national authorities. Furthermore, ACER has the necessary powers and tools in place to ensure coordination with NRAs which include, among others, powers to request NRAs to commence an investigation in cases of suspicion of market manipulative behaviour.
443. ESMA has looked into whether there is a case for a centralised market monitoring of the EU carbon market similar to the role and responsibilities entrusted to ACER for gas and power.

5.10.3 Arguments in favour

444. As explained in the introduction, emission allowances are very distinct, unique financial instruments created by EU law, issued by the 30 countries participating in the ETS (27 EU Member States, Norway, Iceland and Lichtenstein), where the primary market takes place under an auctioning process and where emission allowance holders' accounts are held in a Union Registry operated by the Commission. The EU carbon market is a very European one by nature which can be taken as an argument more than for any other EU financial market or instrument for a centralised market monitoring at EU level. Moreover, the orderly functioning and reputation of the European carbon market are of critical importance to the EU as the EU ETS is expected to play a key role in achieving the increased EU's climate ambitions enshrined in the European Climate Law¹¹⁸.
445. To meet its objective, such centralised market monitoring should notably build on the pooling of transaction reports on emission allowances, including primary market transactions, transaction reports on derivatives on emission allowances, order data kept

¹¹⁷ Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency

¹¹⁸ Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), OJ L 243, 9.7.2021, p. 1–17

by the relevant trading venues and daily position reports, under harmonised data standards.

446. The intended positive effect would be that all relevant data would be available in one place allowing for the detection of patterns that may not be visible when looking at the data on a piecemeal basis. This centralised dataset could then be interrogated by purpose-built market surveillance software with the goal of triggering alerts of potential wrong-doing which would be independently analysed and passed on to NCAs.
447. Effective centralised market monitoring of the EU carbon market would also require streamlined access to enhanced EU registry data, complying with data standards customary to financial regulation and to the primary market transactions reported under the Auction Regulation in accordance with the recommendations in sections 5.8 and 5.7 above to ensure that an as complete as possible data pool is available for centralised market monitoring.
448. As it is the case for wholesale energy markets, manipulative behaviour in one segment of the EUA market (primary or secondary) can have cross-border implications. Trades in emission allowances take place across jurisdictions and especially in respect of OTC trades, detection of potential cross-border market abuse heavily relies on the cooperation between different national authorities.
449. With a longer-term view, centralised monitoring of the carbon market would also be an opportunity for synergies in cross-market monitoring (carbon vs gas/power) in close cooperation with ACER to potentially identify problematic behaviour which only becomes apparent when looking at an even broader dataset incorporating somewhat correlated asset classes like power and gas.

5.10.4 Arguments against

450. The setting up of a centralised monitoring of the EU carbon market would be a major change to the current organisation of market monitoring in the EU. It should be justified by an identified failure in the EU carbon market monitoring performed by competent authorities.
451. Such centralised monitoring would add another layer of monitoring to an already complex supervisory environment. It may be a source of substantial implementation costs, ranging from further data standardisation to the development of additional market monitoring technologies and skills.
452. It will also take time to implement and to assess whether the benefits expected from such significant change to the EU carbon market monitoring framework are indeed delivered.
453. As the market surveillance of EUAs only involves three countries, the Netherlands, Norway and Germany, amplified cooperation between these authorities and streamlined access to the standardised Union registry data and primary market transactions by all those authorities may prove a swifter way of enhancing the market monitoring of the EU carbon market.

5.10.4.1 ESMA's assessment

454. ESMA does not have a final view at this point in time whether a more centralised monitoring of the EU carbon market should be introduced. Also in this case, the topic requires a more in-depth analysis which could not be performed within the confines of drafting this final report.
455. In any case, any centralised approach should be custom-designed for the peculiarities of the EUA market and such design needs to be carefully considered to ensure that all relevant data sources are accessible to a central monitor on par with the corresponding sources available to ACER.
456. ESMA also considers it important to highlight that while a centralised monitoring of the EU carbon market may raise high expectations, it would only serve the purpose of better identifying potential market manipulation and abuse practices. It would not be able to address other concerns that have been voiced by a number of parties in relation to the EU carbon market. More specifically, a more centralised monitoring would not prevent price increases (or decreases) and it would not prevent market volatility in times of stress.
457. If a centralised monitoring of the carbon market was to be introduced, ESMA considers that there may be merit in assigning that task to ESMA.
458. Considering that emission allowances and their derivatives are financial instruments under MiFID, those instruments are already within ESMA's remit. ESMA has well established cooperation structures with the NCAs and is already discussing market structure, reporting, market integrity and commodity derivative issues with those NCAs on an on-going basis. ESMA is also continuously preparing single rulebook and supervisory convergence tools dealing with specific issues arising under MiFID, EMIR and MAR and as highlighted and evidenced in this report has a degree of experience in dealing with the carbon market itself. ESMA would naturally be able to approach any centralised monitoring from a European perspective and it would also be in a good position to cooperate with but also to learn from ACER who has implemented this type of centralised monitoring relatively recently. More specifically, the DRSP direct supervision mandate already enhances ESMA's monitoring and assessment capabilities of MiFIR transaction data and puts ESMA in the unique position of cross comparing and verifying the information with another directly available dataset under ESMA supervision – EMIR data on OTC derivatives. As of this year, ESMA benefits from centralised ARM and TRs data management, in-house advanced analytical tools, and specialised knowledge to look at MiFIR data and further improve their quality, usability, and comparability against EMIR data.
459. Finally and independently of any consideration of whether a centralised monitoring system should be implemented, ESMA recommends the introduction of a clear legal basis allowing for a comprehensive exchange of specific information between ESMA and ACER.
460. An exchange of data with ACER, in order to compare the evolution of the carbon market with the wholesale energy market, is in ESMA's view justified by the need to acquire the necessary information for a comprehensive understanding of the market trends, given

the strict interlinks between the two markets. However, there is currently no specific provision allowing an exchange of individual data with ACER in that sense. Given the level of concentration in some segments of the EUA market as evidenced in previous sections of this report, exchanging individual data with ACER for the sake of monitoring and assessing market developments would be necessary outside MAR provisions which rather aim at enforcing action against market manipulation.

5.11 Conclusions

461. ESMA has prepared this final report in response to the request by the Commission in its Communication on energy prices from 13 October 2021. ESMA appreciates being entrusted with this review of the carbon market and considers that assembling this report has unearthed some important findings which, if addressed, would improve the functioning of this market in the future.
462. As indicated in the preliminary report published by ESMA in November 2021, ESMA has performed a comprehensive data analysis utilising all available sources of data that provide deeper insights into the state of the EUA market. In addition, ESMA has provided a much more in-depth overview of how the EUA market itself, and how the surveillance of the EUA market, work in practice. ESMA is also conscious that recent developments in the carbon market are heavily influenced by the war in the Ukraine. ESMA has tried to integrate those developments into its analysis on carbon market prices but it had to apply a cut-off date of 4 March to be able to integrate data ahead of the submission of the final report to the ESMA Board of Supervisors. ESMA appreciates that these recent developments in the carbon market may well require additional analysis in the future.
463. ESMA has decided to describe and analyse all the elements contained in this report to provide policy makers with a factual, comprehensive and solid foundation to determine whether additional measures to regulate the EUA market are considered necessary.
464. At the same time, ESMA wishes to highlight again that there are certain shortcomings of the data ESMA was working with. Many of those are associated with Brexit and the simple loss of regulatory data due to the UK leaving the Union but others can and should be addressed at the EU level and ESMA has described the measures it would consider appropriate to improve quality and accessibility of data.
465. Overall, ESMA considers that the policy recommendations described in this report would contribute to improving the transparency and the monitoring of the EUA market. ESMA believes that the measures proposed would provide more information to market participants and the public at large about the carbon market and would help in maintaining orderly markets, thereby contributing to the continued adequate functioning of the EUA market which plays an important role for the Union's transition to a low-carbon economy.
466. ESMA would however also like to emphasise that the recommendations in this report are drafted from the perspective of securities supervisors. The recommendations are designed to promote fair and orderly markets, but they are not intended to control



absolute price levels or volatility of EUAs. Neither do they address fundamental factors, such as ambitious environmental policy objectives or the price of other commodities closely linked to EUAs such as gas.

467. ESMA considers that any more fundamental measures targeted at the EUA market are for the Commission and the Co-legislators. What ESMA has provided is some factual background information, based on data and securities supervisors experience, to allow EU policy makers to make informed decisions.
468. ESMA stands ready to help implementing any measures which the Commission, Council and Parliament decide on and would also be happy to provide additional analysis or advice during the course of any future deliberations in respect of the EUA market. In addition, ESMA will swiftly produce the supervisory convergence measures described in this report and will continue working with the comprehensive dataset accumulated to carry out analyses which were not possible in the short timespan available to deliver this report and thereby deepen its understanding of trading in carbon markets.
469. ESMA would like to emphasise its strong commitment not to lose sight of developments in the EUA market following the conclusion of this report, but rather to continue intensifying its focus on better understanding, explaining and monitoring this important market.

6 Annexes

6.1 Annex 1

470. The intraday volatility computed as Parkinson (1980) assumes the underlying follows a continuous Brownian Motion with no drift (i.e. stationarity). This estimator could be more reliable for illiquid markets.

$$\text{Intraday Volatility}_{st} = \sqrt{\frac{1}{4 \ln 2} \left(\ln \left(\frac{\text{High Price}_{st}}{\text{Low Price}_{st}} \right)^2 \right)^2}$$

471. High Price_{st} is the stock's highest trading price on day t , and Low Price_{st} is the stock's lowest trading price on day t .

472. The Rogers and Satchell (1991) volatility supposes the underlying tracks a continuous Brownian Motion with a drift (i.e. no stationarity). One limitation is that it does not account for jumps in price, that is the market show no surprise. H_{st} is the stock's highest trading price on day t , L_{st} is the stock's lowest trading price on day t , C_{st} is the stock's closing price on day t and O_{st} is the stock's opening trading price on day t .

$$\text{RS Volatility}_{st} = \sqrt{\ln \left(\frac{H_{st}}{O_{st}} \right) \left(\ln \left(\frac{H_{st}}{O_{st}} \right) - \ln \left(\frac{C_{st}}{O_{st}} \right) \right) + \ln \left(\frac{L_{st}}{O_{st}} \right) \left(\ln \left(\frac{L_{st}}{O_{st}} \right) - \ln \left(\frac{C_{st}}{O_{st}} \right) \right)}$$

473. The Herfindahl-Hirschman Index (HHI) is a widely used measure to determine the concentration of a market. The graphs based on the HHI show the development of concentration of open contracts by all counterparties (excluding central counterparties) in EUA derivatives markets and of EUA auctions held as EEX (See Section 5). 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:

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



6.2 Annex 2

Summary of the policy recommendations and issues for considerations

6.2.1 Policy recommendations

Topic	Section	Regulatory tool	Policy recommendation	Instruments covered
Position management controls	5.1	MiFID II Level 1 and Level 2	ESMA recommends extending position management controls to trading venues trading EUA derivatives.	EUA derivatives
EUA position reporting	5.2	[MiFID II Level 1 and Level 2] Union Registry Regulation	ESMA recommends deleting EUA position reporting under MiFID II. ESMA recommends that the account structure at the Union Registry is amended to allow for the identification of individual emission allowance holders so that the Union Registry can be used as a data source for market monitoring by NCA and transparency for market participants.	EUAs
Weekly position reports	5.3.2.1	MiFID II Level 1 and Level 2	ESMA recommends that trading venues publish weekly position reports on open positions in EUA futures only in addition to the current combined report on open positions in EUA futures and options on EUA futures.	Commodity derivatives EUA derivatives
Weekly position reports	5.3.2.2	MiFID II Level 2 ESMA guidance in the short term	ESMA recommends that further clarity is provided to market participants regarding counterparty classifications in weekly position reports.	Commodity derivatives EUA derivatives

Transparency calibration	5.4	MiFIR Level 2	As part of the RTS 2 review underway, ESMA will consider the potential need for recalibration of transparency thresholds for emission allowances and emission allowance derivatives.	EUAs and EUA derivatives
Transparency and reporting of OTC transactions	5.5	MiFIR Level 2 ESMA guidance in the short term	ESMA recommends providing further guidance to ensure that only “EU” ISINs are used for the purpose of reporting spot EUAs. ESMA recommends that further clarity is provided on the distinction between spot EUAs and EUA derivatives.	EUAs and EUA derivatives
Transparency and reporting of OTC transactions	5.5	MiFIR Level 1	ESMA recommends increasing the level of transparency in OTC derivatives with the removal of the ToTV concept and its replacement with the SI approach as outlined in its report on the MiFIR review of reporting obligations.	Derivatives instruments subject to transaction reporting
Chain of transactions in transaction reports	5.6	MiFIR Level 1 and related level 2 on reporting templates	ESMA recommends introducing a new identifier in the case of grouping of orders that would be generated and reported by only one entity per market execution and would be unique for the market-side reports and the client-side reports pertaining to the same execution	Financial instruments subject to transaction reporting
Primary market transactions	5.7	EU Auction Regulation	ESMA recommends that the EU Auction Regulation is amended to ensure that ESMA also receives the information on primary markets transactions in line with the amendments introduced in Article 26 of MiFIR, following the ESA review.	EUAs
Union Registry	5.8	EU Registry Regulation	ESMA encourages the timely implementation of the requirement for the identification of accounts holders with LEIs. ESMA recommends increased data harmonisation in line with the standards and structures used in regulatory reports under MiFID/EMIR and invites the Commission to consider assessing defining assets protections rules when accounts in the Registry are used as omnibus accounts.	EUAs



6.2.2 Issues for consideration

Topic	Section	Regulatory tool	Issue for consideration	Instruments covered
Position limits	5.9	MiFID II Level 1 and Level 2 (if implemented)	ESMA invites the Commission to consider the arguments in favour and against the application of position limits on the open position a person may hold in EUA derivatives and economically equivalent OTC contracts.	EUA derivatives
EU carbon market monitoring	5.10	MAR (if implemented)	ESMA invites the Commission to consider the arguments in favour and against a centralised market monitoring of the EU carbon market.	EUAs and EUA derivatives