esma European Securities and Markets Authority

Preliminary report

Emission Allowances and derivatives thereof

15 November 2021 | ESMA70-445-7

Table of Contents

1 Executive Summary

Reasons for publication

The European Trading Scheme (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 asks ESMA for a first preliminary assessment of European carbon markets by 15 November and tasks it to analyse, by early 2022, the trading of emission allowances (EUA). This report presents the preliminary assessment of carbon markets and derivatives thereof.

Content

Following an introduction (Section 2) where ESMA describes the mandate received as well as the functioning of the primary and secondary markets on emission allowances, the report is structured as follows:

Section 3 presents the regulatory environment for the EU carbon market under financial regulations such as MiFID II/MiFIR, MAR and EMIR. Indeed, since 2018, emission allowances are financial instruments and hence subject to a series of requirements aiming at ensuring the transparency and the integrity of this market. This section describes in particular regulatory requirements related to the information that national securities supervisors obtain from entities trading in emission allowances and their derivatives.

Section 4 presents a preliminary assessment of recent market developments in the carbon market, based on data available at short notice. Firstly, ESMA has assessed the price evolution of EUA and derivatives thereof as well as their volatility, on the basis of commercial data. This assessment shows that EUAs have more in common with energy commodities than with other traditional financial instruments, such as shares or bonds. Secondly, ESMA has used data available from weekly position reporting to assess the evolution of the number of market participants and their open positions in carbon markets. This assessment shows that the number of counterparties holding a position on EUA futures has tended to increase since 2018 in all categories of counterparties, in relatively homogeneous proportions. This is in line with the observed expansion of the EU ETS markets.

Furthermore, open positions are to a large extent in the hands of investment firms (40% to 47% depending on the period considered) and non-financial counterparties (45% to 50%), hence the remaining percentage of open positions, held by investment funds and other financial counterparties, remains low (around 8% recently). The breakdown of open positions between the various categories of counterparties does not appear to have significantly changed since 2018 and is broadly in line with the expected functioning of the

market, whereby non-financial entities buy EUA futures to hedge their carbon price exposure while financial counterparties act as intermediaries to facilitate trading and provide liquidity to the market.

Next Steps

Following this preliminary report, according to the mandate given to ESMA by the Commission, ESMA will produce, by early 2022, a report analysing the trading of emission allowances. In order to do so, ESMA intends to deepen its analysis of the EU carbon market based on the regulatory data available under the applicable MiFID II and EMIR requirements. This will allow the Commission to assess whether certain trading behaviours would require further regulatory actions.

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, which is projected to last through the winter, and help Europe's people and businesses. The Communication includes a “toolbox” that the EU and its Member States can use to address the immediate impact of current prices increases and identifies actions for strengthening resilience against future shocks.

2. One of the measures put forward by the European Commission in this Communication is to step up market surveillance of energy markets, including of the European carbon market. In this respect, the European Commission has 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. The primary market for emission allowances consists of auctions to which, in addition to compliance entities[1], most categories of market participants are able to participate in (e.g. credit institutions, investment firms, funds, commodity trading firms without compliance requirements), provided that as bidders they meet the relevant admission requirements as set out in the Auctioning Regulation 1031/2010[2] (Articles 18 and 19) – which guarantees a fair and open access for all auction participants. The admission requirements of the Auctioning Regulation require, among others, all the entities that are not compliance buyers to be established in the EU, the opening of an account in the Union registry[3], appointing of at least one bidder’s representative, existence of technical arrangements but also compliance with the admission requirements of the auction platforms (e.g. evidence of personal reliability and professional qualification, recognition as a trading participant by the clearing house).

4. In the EU, most[4] Member States have jointly procured the German regulated market EEX as the common platform to auction the allowances under the European Emissions Trading System (EU ETS) defined in the ETS Directive[5]. Separate auctions are organised by EEX on behalf of Germany and Poland.[6]

[1] Companies and aircraft operators who are obliged to participate in the EU ETS.
[2] Commission Regulation (EU) No 1031/2010 on the timing, administration and other aspects of auctioning of greenhouse gas emission allowances
[3] 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.
[4] Germany and Poland have an opt-out clause.
[5] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC
[6] EEX will also organise the auctions of the allowances belonging to the UK, since the EU ETS Directive continues to apply to and in the UK in respect of the generation of electricity in Northern Ireland, on the basis of the Protocol on Ireland/Northern Ireland.

5. EEX auctions two types of allowances: EU allowances (EUA) and EU aviation allowances (EUAA). The auctions take place on a daily basis according to a fixed calendar[7]. One allowance permits the emission of one tonne of carbon dioxide equivalent (CO2).

6. In January 2019, a Market Stability Reserve (MSR) was introduced in order to deal with the surplus of allowances as well as a supply adjustment mechanism to increase the system's resilience to major shocks. The system operates according to pre-defined rules, which adapt auction volumes changing the total number of allowances in circulation.

7. The secondary market for emission allowances consists of (1) contracts with a daily expiry, called "daily futures" or "spot" [8], (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).

8. Three European trading venues offer a secondary market on the EU carbon market: EEX in Germany, ICE Endex in the Netherlands and Nasdaq Oslo in Norway (see Table 1). The EU carbon secondary market on ICE migrated in full from the UK trading venue ICE Futures Europe to the Dutch entity ICE Endex in June 2021, and the allowances under the UK ETS are since then available for trading on ICE Futures Europe.

9. Secondary markets play an important role by providing compliance buyers with an opportunity to acquire allowances without taking part in the primary auction. In turn, the primary market consists also of financial entities acting on behalf of their clients or aiming to sell allowances on the secondary market.

	Primary market	**Secondary markets**
EEX	*Spot auctions of:* EUA EUAA	Daily futures on EUA and EUAA Monthly, quarterly and yearly futures on EUA Yearly futures on EUAA Options on EUA Futures
ICE Endex	NA	Daily futures on EUA Monthly and quarterly futures on EUA Monthly and quarterly futures on EUAA Options on EUA Futures
Nasdaq Oslo	N/A	Daily futures on EUA Quarterly and yearly futures on EUA

Table 1: Carbon markets offering at EU trading venues

10. A comparison of recent data on open interest on the three trading venues EEX, Nasdaq Oslo and ICE Endex shows that the latter accounts for the largest share of the outstanding contracts. Almost 45% of the open interest on ICE Endex is concentrated in December 2021 expiry futures.

11. Besides the EU ETS, national or sub-national systems are being operated or are under development in Canada, China, Japan, New Zealand, South Korea, Switzerland, the

[7] 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.
[8] EEX references to "spot" and ICE references to "daily futures" both cover contracts with a daily expiry.

United Kingdom[9] and the United States. In 2020, the EU ETS accounted for almost 90% of the global carbon market value[10]. At 8.1 billion tonnes in 2020, the total traded volume of emission allowances in the EU was four times greater than the volume traded in North America, the next largest market[11]. Notwithstanding its continuous expansion, ESMA notes that the carbon market size is small as compared to, for example, the multitrillion oil and gas markets.

12. The proportion of OTC trading activity in the mandatory carbon market is marginal (in contrast to the voluntary carbon credits[12] that are traded OTC). Hence, as opposed to other derivatives markets, the carbon market is almost entirely traded on regulated markets and cleared in central counterparties (CCPs).

13. Following the brief overview of the carbon market provided in this introduction, this preliminary report focuses on (1) the regulatory environment which applies to the carbon market under the regulatory framework in ESMA's remit, i.e. the Markets in Financial Instruments Directive and Regulation (MiFID II and MiFIR), the Market Abuse Regulation (MAR) and the European Market Infrastructure Regulation (EMIR), and the tools available to ESMA and national competent authorities (NCAs) to monitor and supervise this market (Section 3); (2) a preliminary analysis of recent market developments in the EU carbon market on the basis of data immediately accessible to ESMA (Section 4).

3 Carbon markets and the regulatory environment in securities supervision

14. This section gives an overview of the relevant pieces of legislation for securities supervisors and how they apply to the carbon market. In particular, it focuses on the supervisory tools that securities supervisors have available to analyse and monitor the carbon market. For the purposes of this report this section has been drafted in a descriptive fashion to give an adequate overview of the existing regulatory environment. An in-depth analysis based on the data available will have to follow with the final report in early 2022.

3.1 Carbon markets under MiFID II/MiFIR

3.1.1 Financial Instruments

15. With MiFID II, emission allowances have become financial instruments under Annex I, Section C (11). In contrast to energy markets, spot markets of emission allowances do not fall under the realm of REMIT. Furthermore, despite being subject to weekly and daily position reporting, derivatives on emission allowances do not fall under the definition of commodity derivatives under MiFID II and are therefore not subject to position limits and position management controls.

[9] On 1 January 2021, the UK ETS replaced the UK's participation in the EU ETS.
[10] Refinitiv Carbon Market Review 2020.
[11] ISDA report on the Role of Derivatives in Carbon Markets.
[12] The voluntary carbon markets function outside of compliance schemes and enable participants to purchase carbon credits on a voluntary basis.

3.1.2 Transaction reports

16. The transaction reporting and reference data requirements under Articles 26 and 27 of MiFIR [13] have been introduced in the wake of the financial crisis, which revealed weaknesses in the former reporting requirements due to their narrow scope and lack of harmonization. The MiFIR reporting requirements were designed to provide NCAs with a full view of the market when conducting their market surveillance activities, including cross-markets and cross-asset class trading within the EU. To achieve this goal, Articles 26 and 27 introduced a uniform and standardised reporting regime across the EU; such regime replaced the national regimes in existence under the former MiFID I and increased the scope of financial instruments to be reported.

17. As a result of these changes, emission allowances and the derivatives on such emission allowances are reported to the NCAs as of January 2018. Article 26(2) of MiFIR covers both transactions in financial instruments admitted to trading or traded on an EU trading venue and OTC transactions. However, in the latter case, only OTC transactions in instruments that (i) are considered having the same characteristics (e.g. ISIN[14]) as the ones that are executed on trading venue[15] or (ii) have an underlying that is "traded on a trading venue" are subject to the requirements of MiFiR Article 26. As indicated in Table 1, Section 2 above, there is no secondary markets trading in spot emission allowances neither on EEX, nor on ICE Endex, nor on Nasdaq Oslo, thus OTC transactions in spot emission allowances are not subject to MiFIR transaction reporting while OTC transactions in derivatives on emission allowances are reportable if they fall under letter (i) and (ii).

18. As illustrated in section 3.2 below, transaction and reference data reporting under MiFID is one of the tools that enables NCAs to systematically monitor for abuses under the Market Abuse Regulation (MAR)[16]. An additional set of information that is used by NCAs to conduct their market monitoring activities is the order data collected in accordance with Article 25 of MiFIR. This data is important to detect "market manipulations". Order data information is not included in the transaction reporting and NCAs will have to gather such data through requests to the trading venues[17]. Transaction data is also useful for broader market monitoring activities[18] as it provides insight into how firms and markets behave and

---

[13] Article 26 Obligation to report transactions and Article 27 Obligation to supply financial instrument reference data of REGULATION (EU) No 600/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012

[14] ISIN or International Securities Identification Number is a 12 character alpha-numeric code that uniquely identifies a financial instrument, across the world.

[15] The Traded on a Trading Venue (ToTV) concept is not defined in MiFIR nor there is an empowerment for ESMA to define it in technical standards. For this reason, ESMA issued an opinion. The effect of the opinion is that it excluded most of OTC derivatives from the ToTV definition and left the application of reporting obligations to the discretion of the counterparties to the transaction. ESMA has recently proposed a new approach to the ToTV concept in the MIFID Review report on transaction reporting. This approach is based on the instruments traded by Systematic Internalisers .

[16] Recital 32 of MIFIR states that "The details of transactions in financial instruments should be reported to competent authorities to enable them to detect and investigate potential cases of market abuse, to monitor the fair and orderly functioning of markets, as well as the activities of investment firms.

[17] However, such data is not available in a common harmonized format. In its Final Report on the MAR review (section 10.1 of the MAR Report – ESMA70-156-2391), ESMA proposes that trading venues should record and subsequently submit order book data upon the NCAs' requests in an electronic and machine-readable form and using a common XML template in accordance with the ISO 20022 methodology.

[18] Article 24 – Obligation to uphold integrity of markets of REGULATION (EU) No 600/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 *"Without prejudice to the allocation of responsibilities for enforcing Regulation (EU) No 596/2014, competent authorities coordinated by ESMA in accordance with Article 31 of Regulation (EU) No 1095/2010 shall monitor the activities of investment firms to ensure that they act honestly, fairly and professionally and in a manner which promotes the integrity of the market"*.

can be used by supervisors for various purposes, including monitoring market stability and analysing market trends during times of uncertainty.

19. The purpose of transaction reporting is to provide NCAs with information about transactions. It aims at providing a representation of the transaction that informs the NCA about relevant circumstances under which the transaction took place. Depending on whether or not the investment firm is dealing for one or multiple clients, a transaction may have to be reported in more than one report.

20. In order to fulfil their duties, NCAs require an accurate and holistic view of transactions that are within the scope of reporting requirements. This view allows NCAs to have an audit trail of trading activity in the financial instruments under their supervision with crucial data elements that include traders/brokers, decision makers, buyer/sellers, traded prices, amounts and accurate timestamps[19]. An investment firm should therefore ensure that a collective view of the transaction reports reported by the investment firm as the executing entity accurately reflects all changes in its position and in the position of its clients that arise from reportable transactions in the financial instruments concerned at the time the transactions were executed. It should be noted that, unlike position reports, transaction reports are not intended to capture the investment firm's or the investment firm's client's actual position. What is of interest is the change in position resulting from reportable transactions[20].

21. Each national supervisor in the EU receives transaction data under Article 26 of MiFIR according to the rules illustrated in the next paragraph[21]. This data contains information about each executed transaction, which, concerning instruments traded on a venue or where the underlying is traded on a venue, is combined with the reference data related to the instrument in which the transaction is executed that is published by ESMA via the Financial Instrument Reference Database System (link).

22. While reference data is submitted centrally to ESMA, transaction data is submitted to the NCA of the investment firm that has executed the transaction. The NCA receiving the transaction report on a financial instrument will share the same report with the relevant NCA (RCA) for that specific financial instrument. The RCA is the NCA responsible for the supervision of the trading activity in the given financial instrument.

23. For emission allowances and derivatives traded on EEX and Nasdaq Oslo, the NCAs are, respectively, BaFin and FIN-NO since the start of MiFIR reporting while, for derivatives on emission allowances traded on ICE, the RCA since January 2018 has been the UK FCA while the AFM took over the responsibility after the migration of trading from the UK ICE Futures Europe to the Dutch entity ICE Endex in June 2021. As mentioned in section 2 above, these derivatives were predominantly traded on ICE Futures Europe, thus reports

[19] The full set of data elements required for transaction reporting under MiFIR Article 26 is available in Annex 1, Table 2 of the Commission Delegated Regulation (EU) 2017/590 of 28 July 2016 supplementing Regulation (EU) No 600/2014 of the European Parliament and of the Council with regard to regulatory technical standards for the reporting of transactions to competent authorities.
[20] Detailed instruction on how to provide a full view of all changes of positions concerning to the same execution of transaction for specific trading scenarios applicable are provided in the Guidelines on transaction reporting.
[21] According to the first two paragraphs of Article 26(1) of MiFIR.

on derivative transactions executed up until 31st December 2020 largely remained with the UK FCA. ESMA and the NCAs have no longer immediate access to such data.

3.1.2.1 ESMA analysis to be delivered in 2022

24. The outcome of the analysis based on MiFIR transaction data that ESMA intends to deliver by early 2022 will aim at showing the distribution of trading in emission allowances and derivatives thereof par type of entity and the respective locations of such entities as well as what are the typical trading patterns (*e.g. own account Vs agency; client based Vs proprietary etc.*.) concerning the transactions that are executed on the German, Dutch and Norwegian venues.

a) Scope

25. As illustrated in paragraphs 8-10 above, secondary market trading in emission allowances and derivatives thereof is concentrated on three trading venues in Germany, the Netherlands and Norway. According to the transaction reporting obligation, the members of these three trading venues that are investment firms authorised under MiFIR are obliged to report the transactions executed on these venues. For those members that are not MiFIR investment firms, the trading venue is subject to the obligation to report the respective transactions executed through its systems according to MiFIR Article 26(5)[22]. The aggregation of the reports indicated in this paragraph should provide the overview of the transactions in emission allowances that are considered as "*executed on trading venues*" under MiFIR[23].

26. As explained in paragraph 20 above, reporting entities are obliged to provide a full view of all changes of positions concerning to the same execution of transaction. This means that transaction reports should include not only the information about the market side of the transaction but also information about any associated allocation to the client, where relevant. For example, if an investment firm acquires some financial instruments on own account and then sells the same amount of instruments to its client(s) the reports by the investment firm should indicate that the net change for the investment firm is flat and the client(s) has acquired the instruments. Further, the individual reports for a transaction should be consistent with each other and accurately reflect the roles of the investment firm, its counterparties, the clients and the parties acting for the clients under a power of representation.

b) Time period

27. As indicated in paragraph 23 above, the analysis based on MiFIR transaction data will have an important limitation concerning the derivative markets because reports on transactions in derivative on emission allowances executed up until June 2021 largely

[22] Article 26 Obligation to report transactions, point 5 - "*The operator of a trading venue shall report details of transactions in financial instruments traded on its platform which are executed through its systems by a firm which is not subject to this Regulation in accordance with paragraphs 1 and 3*".

[23] For the purpose of transaction reporting, a transaction is considered to be executed on a Trading Venue when (a) the buying and selling interest of two parties is brought together by the Trading Venue or (b) the buying and selling interest of two parties is not brought together by the Trading Venue but the transaction is nonetheless subject to the rules of that Trading Venue and is executed in compliance with those rules. For further details, see Guidelines Transaction reporting, order record keeping and clock synchronisation under MiFID II section 5.4 - Execution of a transaction on a Trading Venue.

remained with the UK FCA. ESMA and the NCAs have no longer access to such data. Thus, the analysis of the derivatives markets can only be based on limited time period from June 2021 until the end of 2021.

28. However, concerning the emission allowances and derivatives traded on the German and Norwegian markets, whilst not representing the largest markets[24], the analysis based on MiFIR transaction data could be performed over a longer time period and would potentially give more insights on the evolution of the market since the start of MiFIR reporting in January 2018.

c) Parties to the transactions

29. Depending on the trading scenario, the identification of the entity executing the transaction or the client on whose behalf the transaction is executed or subsequently allocated will be relevant. The buyer/seller can be a firm or an investment firm that is a market counterparty (i.e. executing member of a trading venue) or a client.

d) Categorisation of buyers/sellers and executing firms

30. Given that there is no field in the MiFIR transaction report template that would indicate the type of market participant, data quality issues might arise when assessing the distribution of trading based on the type of market participant. Such classification of market participants can only be based on a combination of the identifiers reported under MiFIR (LEI and Client IDs described below) and an external classification. For this analysis, ESMA aims to align as much as feasible with the classifications used for EMIR reporting and MiFIR position reporting (see paragraph 80 and section 3.3.1 below).

e) Location of buyer/sellers and executing firms

31. According to Article 26(6) of MiFIR[25] and Article 5 of RTS 22[26], buyers/sellers and executing firms that are eligible must be identified with a Legal Entity Identifer (LEI). On top of unique and consistent identification, the LEI provides access to more detailed reference data describing the entity to which the LEI is assigned, including the legal address of the entity allowing to determine the country of its establishment. Such data is accessible from the LEI database maintained by GLEIF[27].

32. Buyers and sellers could also be natural persons that are not eligible for an LEI. In such case, Article 6 of RTS 22 specifies that a natural person should be identified with the national identifier listed in Annex II of the RTS. As indicated in this Annex, the ISO 3166 country code should always be provided in combination with the national identifier to be

[24] As indicated in para xxx of the introductory section.
[25] Article 26 Obligation to report transactions, point 6 - "*In reporting the designation to identify the clients as required under paragraphs 3 and 4, investment firms shall use a legal entity identifier established to identify clients that are legal persons. ESMA shall develop by 3 January 2016 guidelines in accordance with Article 16 of Regulation (EU) No 1095/2010 to ensure that the application of legal entity identifiers within the Union complies with international standards, in particular those established by the Financial Stability Board*".
[26] COMMISSION DELEGATED REGULATION (EU) 2017/590 of 28 July 2016 supplementing Regulation (EU) No 600/2014 of the European Parliament and of the Council with regard to regulatory technical standards for the reporting of transactions to competent authorities, Article 5 - Identification of the investment firm executing a transaction: "*1. An investment firm which executes a transaction shall ensure that it is identified with a validated, issued and duly renewed ISO 17442 legal entity identifier code in the transaction report submitted pursuant to Article 26(1) of Regulation (EU) No 600/2014. 2. An investment firm which executes a transaction shall ensure that the reference data related to its legal entity identifier is renewed in accordance with the terms of any of the accredited Local Operating Units of the Global Legal Entity Identifier System"*.
[27] Home – GLEIF

used in transaction report. Thus, also in the case of natural persons, the information on the country location is easily retrievable.

3.1.3 Weekly and daily position reports

33. One of the stated aims of MiFID II was to implement the 2009 G20 commitment to improve the regulation, functioning and transparency of financial and commodity markets to address excessive commodity price volatility.

34. In accordance with Article 58 of MiFID II, trading venues trading commodity derivatives or emission allowances or derivatives thereof are required to comply with two sets of position reporting obligations.

35. Firstly, under Article 58(1)(a) of MiFID II, trading venues are required to make public a weekly report with the aggregate positions held by the different categories of persons for the different commodity derivatives, emission allowances or derivatives thereof traded on their trading venue. Those weekly reports must specify the number of long and short positions by such categories, changes since the previous report, the percentage of the total open interest represented by each category and the number of persons holding a position in each of the categories identified (investment firms or credit institutions; investment funds, other financial institutions and, in the case of emission allowances or derivatives thereof, operators with compliance obligations).

36. Publication of weekly position reports in emission allowances and derivatives on emission allowances are only required when there are at least 20 open position holders in a given contract on a given trading venue.

37. Trading venues must communicate that report to the competent authority and to ESMA. ESMA's role is limited to centrally re-publish the weekly position reports received for market participants to have one consolidated overview of weekly reports issued in the Union[28]. Competent authorities are responsible for ensuring that their trading venues properly comply with weekly position reporting requirements.

38. Secondly, under Article 58(1)(b) of MiFID II, trading venues trading commodity derivatives, emission allowances and derivatives on emission allowances are required to provide to their competent authority a complete breakdown of the positions held by all persons, including the members or participants and the clients, on their venue, at least on a daily basis. To that end, members or participants must report to the trading venue the details of their own positions held through contracts traded on that trading venue at least on a daily basis, as well as those of their clients and the clients of those clients until the end client is reached.

39. In the final report to be delivered to the Commission in 2022, ESMA will seek to analyse daily position reports on emission allowances and derivatives thereof. This analysis though will be subject to the limitation that the largest secondary market for derivatives on emission allowances was ICE Futures Europe until the migration to the Dutch venue ICE Endex in June 2021. Daily position reports on the largest market up until June 2021 are

[28] Available in ESMA's register

hence only available to the UK FCA. The analysis of position reports will therefore be subject to the same limitations as already described for transaction reporting in Section 3.1.2.).

40. It is worth noting that the co-legislators have decided not to apply position limits to emission allowances and derivatives on emission allowances which are not defined as commodity derivatives under MiFID II. Whilst position limits currently apply to all commodity derivatives traded on a trading venue, they will only continue to apply to agricultural commodity derivatives and critical or significant commodity derivatives under the Recovery Package for commodity derivatives.[29]

41. In accordance with Article 57(8) of MiFID II, trading venues trading commodity derivatives are required to apply position management controls. Under the Recovery package, ESMA received, among others, a mandate to develop draft regulatory technical standards to "specify the content of position management controls" and will be submitting its Final Report to the Commission by the end of November 2021. However, as derivatives on emission allowances do not qualify as commodity derivatives, trading venues trading derivatives on emission allowances are not required to apply such position management controls.

3.1.4 Transparency data

42. Total volumes and total number of transactions on emission allowances and derivatives thereof are reported to ESMA for the purpose of the MiFID transparency calculations. This reporting is performed on a daily basis in aggregated form, as for any financial instruments under the scope of MiFID. Because this dataset does not include information at counterparty level, ESMA has not considered it for the purpose of this report.

43. However, as part of its general supervisory convergence work, ESMA will further analyse the consistency and accuracy in the reporting of emission allowances and derivatives thereof to the relevant ESMA IT systems.

3.1.5 Orderly trading

44. MiFID II also has another set of obligations to be met by trading venues which are worth mentioning in this context. Those obligations apply whatever the financial instruments offered for trading.

45. Under MiFID II, trading venues are required to establish and maintain effective arrangements and procedures and have the necessary resources for the regular monitoring of the compliance by their members or participants with their rules. They must monitor orders sent, including cancellations, and the transactions undertaken by their members or participants under their systems in order to identify, among other things,

[29] 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

infringements of those rules, disorderly trading conditions or conduct that may indicate behaviour that is prohibited under MAR.

46. Disorderly trading conditions may occur when the price discovery process is hindered over a significant period of time or where the capacities of the trading systems are reached or exceeded. Risks to orderly markets may also arise from algorithmic trading or high frequency trading which MiFID seeks to prevent via specific organisational requirements both for members or participants and trading venues.

47. When they identify such significant infringement of their rules, disorderly trading conditions or conduct that may indicate behaviour that is prohibited under MAR, trading venues must immediately notify their competent authority thereof. The competent authority must communicate this information to ESMA and to the competent authorities of the other Member States. ESMA has not been made aware so far of disorderly trading in EUAs or derivatives on EUAs that would have been identified by trading venues.

3.2 Carbon markets under MAR

48. 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. In addition to those prohibitions, MAR provides for a number of ancillary rules to be followed by issuers and intermediaries 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.

49. While one could argue that a fair functioning of markets could be jeopardised by several typologies of behaviour and trading schemes, the focus of MAR is on market abuse. In that sense, any trading strategies will be assessed by NCAs against the limbs of the statutory prohibitions of market manipulation and insider trading under MAR.

50. MAR applies horizontally to all financial instruments admitted to trading on an EU regulated market or traded on an MTF or OTF.

51. Unlike spot commodity contracts that are not financial instruments and therefore are not subject to the full set of rules laid down in MAR[30] (with the consequence that only derivatives thereof are fully covered by the MAR provisions), emission allowances are financial instruments and directly subject, together with any derivative thereof, to the full set of MAR provisions.

52. Additionally, MAR also applies to behaviours and transactions, including bids, related to the auctioning on an auction platform for emission allowances or other auctioned products based thereon, pursuant to Regulation 1031/2010.

53. Article 7(1)(c) of MAR provides for a specific definition of inside information for emission allowances and auction products based thereon, defined as information which is non-

[30] 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.

public, precise and that, if made public, would be likely to have a significant effect on the prices of those instruments or related derivatives.

54. MAR provides that emission allowance market participants 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. However, all other participants that exceed the threshold must disclose information that could influence the price, for example planned closure of power generation capacities.

55. With particular reference to market manipulation, Article 12 of MAR expressly prohibits placing orders, entering into transactions or disseminating information through the media that give false or misleading signals as the supply, demand or price of a financial instrument, or that are likely to secure its price at an abnormal or artificial level.

56. Individual or concerted actions aimed at securing a dominant position over the supply of or demand for a financial instrument is also prohibited.

57. The same prohibitions apply also in relation to auction products based on emission allowances. Additionally, Article 12 of MAR expressly provides that buying or selling on the secondary market of emission allowances or related derivatives 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 Art. 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.

58. Annex I of MAR provides for a non-exhaustive list of indicators relating to false or misleading signals, price securing and the use of fictitious devices or any other form of deception.

59. To ensure prevention and detection of market abuse, Article 16 of MAR provides that market operators, investment firms operating a trading venue and any person professionally arranging and executing transactions are to establish arrangements, systems and procedures to detect and report to NCAs suspicious orders and transactions (STORs).

60. 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.

61. 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.

62. In addition to the obligation to identify and report suspicious orders and transactions, market operators and investment firms operating a trading venue are also subject to the obligation to establish and maintain effective systems and procedures to prevent market abuse, with the objective 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.

63. Like the mechanisms for the detection and reporting, preventative measures should be proportionate to the scale, size and nature of their 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.

64. From a supervisory perspective, NCAs with jurisdictions over carbon markets adopt a multi-step surveillance approach.

65. In Germany, BaFin follows up to the STORs received under Article 16 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. For all suspicious cases further investigations are performed and validated with data sources available (internal as well as external) in order to substantiate the initial suspicion or discard it.

66. 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.

67. In the Netherlands, the AFM uses several methods to perform market surveillance on the EUA derivatives market. First of all, the AFM performs data-driven multi-asset class market surveillance through an algorithm-based surveillance system. Given the fact that EUA-supervision only started in June 2021, the AFM is still in the process of setting up the EUA module within this system, that is based on algorithms designed by the AFM and on data that will be sent directly from ICE Endex to AFM, including orders. For the moment, only MiFIR *transaction (hence, no order) reporting data* is being received on a structural basis and used as input for the system. A specialized team monitors the EUA-markets during the day and analyses if any alerts should be further investigated.

68. In addition to the data-driven approach, the AFM values STORs highly. Market participants also play an essential role in preventing and detecting market manipulation as they represent the first line of defense. By submitting STORs, market participants can share their observations with their regulatory authority and contribute to creating a fair and orderly financial market. As pointed out in its latest Market Watch[31], the AFM is actively encouraging market participants to submit STORs, since they will also benefit from fair and orderly financial markets.

69. 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. The trading venue applies real-time and T+1 monitoring and is expected to submit STORs whenever they notice suspicious trading behavior on their platform. The AFM organises periodic Market

[31] See AFM Market Watch #4 @ AFM Market Watch | Topics AFM | AFM Professionals

Conduct 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.

70. The latest AFM Market Watch contains the first AFM observations based on the received transaction data. The goal is to generate a list of the most active market participants on the EUA market, to contact them or plan on-site visits where the AFM deems it relevant. An audit questionnaire has been sent to significant market participants to investigate the extent to which they comply with the relevant framework. During the first months of supervising the EUA derivatives market, the AFM did not impose any measures or sanctions on EUA market participants.

3.3 Carbon markets under EMIR

71. Following the global financial crisis in 2008, at the Pittsburgh summit in 2009, G20 leaders committed to reform the OTC derivatives markets to improve their transparency, reduce systemic risks and prevent market abuse. The European Market Infrastructure Regulation (EMIR) was adopted in July 2012 to implement some of these commitments in the European Union.

72. In particular, with regard to increasing the transparency of the derivatives markets, Article 9 of EMIR sets up an obligation to report detailed information on conclusion, modification or termination of any derivative contract (both OTC and ETD) to trade repositories (TRs). Furthermore, Article 81 of EMIR requires the TRs to (i) publish aggregate positions by class of derivatives and to (ii) make the derivative data available to authorities according to their mandates. ESMA, as the supervisor of the TRs, has access to all derivative data.

73. The EMIR reporting obligation applies to CCPs[32] and all financial and non-financial counterparties as defined in the Articles 2.8 and 2.9 of the Regulation (EU) 2019/834[33]. Financial counterparties comprise investment firms, credit institutions, insurance undertakings, UCITS[34], AIFs[35], IORPs[36] and CSDs[37]. Non-financial counterparties are undertakings established in the Union other than the financial counterparties. The fact that the reporting obligation applies only to the EU-based entities that fall under the definition of a counterparty should be taken into consideration in case of a longer time-series analysis, as the volumes of trades reported under EMIR decreased significantly following Brexit and the ceasing of reporting to the EU TRs by the UK counterparties.

74. EMIR has a so-called ‘double-sided’ reporting regime, meaning that both counterparties to the derivative must report it to a TR (to the extent that they fall under the definition of a

[32] Central counterparties, as defined in the Article 2.1 of the Regulation (EU) 648/2012
[33] REGULATION (EU) 2019/834 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 May 2019 amending Regulation (EU) No 648/2012 as regards the clearing obligation, the suspension of the clearing obligation, the reporting requirements, the risk-mitigation techniques for OTC derivative contracts not cleared by a central counterparty, the registration and supervision of trade repositories and the requirements for trade repositories
[34] Undertakings for the collective investment in transferable securities, as defined in the Article 2.8(d) of the Regulation (EU) 2019/834
[35] Alternative investment funds, as defined in the Article 2.8(f) of the Regulation (EU) 2019/834
[36] Institutions for occupational retirement provision, as defined in the Article 2.8(e) of the Regulation (EU) 2019/834
[37] Central securities depositories, as defined in the Article 2.8(g) of the Regulation (EU) 2019/834

CCP or a counterparty under EMIR). This provision allows for reconciliation of the data reported by the two sides which in turns enables detection of inconsistencies and errors in reporting. To avoid double-counting of the derivative, the data should be deduplicated, meaning that where the same derivative is reported by both counterparties, it is counted only once in the aggregation. This can be achieved by using the Unique Trade Identifier (UTI), i.e. a code uniquely identifying a given derivative, as both counterparties to a given derivative shall report it with the same UTI.

75. Furthermore, further deduplication should be performed in the case of cleared derivatives to avoid double-counting of the same trades. To recall, in the process of clearing, a CCP interposes itself between the two counterparties becoming a buyer to the seller and a seller to the buyer. Under EMIR, in the case of clearing of derivatives not traded on a trading venue, counterparties must report both the original bilateral derivative (so called 'alpha trade') and the two derivatives resulting from clearing (so called 'beta' and 'gamma' trades). In the case of clearing of derivatives traded on a trading venue cleared on the day of execution, the counterparties must report only the two trades resulting from clearing (beta and gamma trades). The possible approaches for avoidance of double counting of cleared derivatives under EMIR have been described e.g. in the report on TRs public data[38].

3.3.1 Details of derivatives reported to the TRs

76. Details of the derivatives that counterparties must include in their reports to the TRs are specified in the RTS on reporting to the TRs [39] and comprise identification of the counterparties and other relevant parties to the derivatives, characteristics of the derivative product, transactional data as well as valuation and collateral data. The conclusion, modification or termination of a derivative must be reported by the end of the following working day, whereas the valuation and collateral data are required to be updated on a daily basis, thus EMIR data can provide both an up-to-date picture of the exposures on a given day as well as the precise information about trading volumes.

77. The following product details reportable under EMIR can be used to identify derivatives on emission allowances:

- Product identification (field 2.6) – this field contains the ISIN identifying the derivative. In the case of derivatives traded on the regulated markets, population of this field is mandatory, thus it should allow to easily identify the derivatives traded on EEX, ICE Endex and Nasdaq Oslo.

- Commodity details (field 2.66) – this field should be populated with a standardised code representing one of the types of underlying commodities. Code 'EM' should be reported in the case of derivatives on emissions. This field

[38] Section 3 of the Final Report on Draft technical standards on data to be made publicly available by TRs under Article 81 of EMIR

[39] REGULATIONS COMMISSION DELEGATED REGULATION (EU) 2017/104 of 19 October 2016 amending Delegated Regulation (EU) No 148/2013 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council on OTC derivatives, central counterparties and trade repositories with regard to regulatory technical standards on the minimum details of the data to be reported to trade repositories

is mandatory for all commodity derivatives (except for some commodity types for which commodity details are not required), thus it can provide additional information on OTC derivatives on emission allowances, where they are not identified with an ISIN in the field 2.6.

78. EMIR data can be used also to obtain valuable information on the sector and geographic distribution of the counterparties, using the following reportable details:

- Nature of the reporting counterparty (field 1.7) – this field indicates whether the reporting counterparty is a financial counterparty (FC), non-financial counterparty (NFC), CCP or other.

- Corporate sector of the reporting counterparty (field 1.6) – in the case of FCs and NFCs, this field indicates the corporate sector(s) of the reporting counterparty. FCs are categorised according to the types of financial counterparties listed in the definition of an FC under EMIR, i.e. assurance undertaking, credit institutions, investment firms, insurance undertakings, AIFs, institutions for occupational retirement provision, reinsurance undertakings, and UCITS. NFCs are categorised according to the 21 main sections of Statistical Classification of economics activities in the European Community (NACE).

- Reporting counterparty ID (field 1.2) – reporting counterparty is required to be identified in all cases with a Legal Entity Identifier (LEI). On top of unique and consistent identification, LEI provides for a possibility to obtain certain counterparties reference data from the LEI database maintained by GLEIF[40], such as the legal address of the counterparty allowing to determine the country of its establishment.

- Country of the other counterparty (field 1.5) – this field includes the code of the country of the other counterparty.

- Other reportable details, such as notional (field 2.20) or value of the contract (field 1.17) can be used to calculate trading volumes in terms of notional or the outstanding exposures.

3.3.2 Reports made available by the TRs to the authorities

79. TRs are required to make accessible to the relevant authorities the details of the derivatives including:

- Reports of derivatives made by the counterparties in accordance with the RTS on reporting to the TRs[41] – these are the reports of conclusions, modifications

[40] Home – GLEIF

[41] REGULATIONS COMMISSION DELEGATED REGULATION (EU) 2017/104 of 19 October 2016 amending Delegated Regulation (EU) No 148/2013 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council on OTC derivatives, central counterparties and trade repositories with regard to regulatory technical standards on the minimum details of the data to be reported to trade repositories.

and terminations of derivatives as reported by the counterparties. They are referred to as 'trade activity reports' (TAR).

- The latest trade states of derivatives that have not matured or which have not been terminated – these are reports constructed by the TRs based on TAR. They show the most updated state of every derivative that is outstanding on the date of the report. These reports are referred to as 'trade state reports' (TSR).

80. In order to compute trading volumes on a given date or in a given period, data from TAR of relevant days should be used. In order to compute exposure on a given date, data from TSR of that day should be used.

81. Summing up, based on the reports made available by the TRs to the authorities ESMA could provide information about the evolution of aggregate trading volumes (in terms of number of trades and notional) as well as on the total exposures in the derivatives on emissions where at least one of the counterparties is an EU counterparty on the chosen dates. Additionally, the statistics could include a breakdown per jurisdiction of the counterparty (for both counterparties) and the nature and corporate sector of the reporting counterparty.

82. It should however be noted that the accuracy of the analysis may face certain limitations due to the data quality issues, such as underreporting, lack of reconciliation of data between the counterparties or outdated valuations[42].

3.3.3 Public data

83. The current requirements with regards to the public data are specified in the RTS on public data [43] and specify that the TRs should publish the aggregate open positions, transaction volumes and aggregate values including at least a breakdown per asset class. Currently, the public data are not granular enough to retrieve information about commodities on emission allowance.

3.3.4 Revised technical standards under EMIR REFIT

84. On 17 December 2020 ESMA published the Final Report on Technical standards on reporting, data quality, data access and registration of Trade Repositories under EMIR REFIT. The main purpose of these draft technical standards is to align the requirements in the EU with the globally agreed guidance on reporting of OTC derivatives and to establish more stringent requirements on the data quality. With regards to reporting of derivatives on emission allowances, the reports made under the revised technical standards will provide more granular information thanks to:

[42] Please refer to the EMIR and SFTR Data Quality report 2020 for more details.
[43] COMMISSION DELEGATED REGULATION (EU) No 151/2013 of 19 December 2012 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council on OTC derivatives, central counterparties and trade repositories, with regard to regulatory technical standards specifying the data to be published and made available by trade repositories and operational standards for aggregating, comparing and accessing the data

- The requirement to uniquely identify all derivatives either with an ISIN (in case of derivatives that are currently identified with an ISIN under MiFIR) or the UPI (Unique Product Identifier, in case of all remaining derivatives). Both ISIN and UPI will allow to select the relevant derivatives based on their underlying.

- More granular classification of the commodity and emission allowances derivatives, including a breakdown between Certified Emission Reduction (CERs), Emission Reduction Units (ERUs), European Union Allowance (EUAs) and Aviation European Union Allowance (AEUAs).

- The requirement to report the nature and the classification of the other counterparty (on top of the reporting counterparty).

- The more comprehensive reporting of the lifecycle events allowing for a more precise deduplication of the reports, e.g. in the case of cleared derivatives.

85. The draft technical standards currently undergo the review by the European Commission. Given the envisaged timeline for implementation of 18 months since the publication in the Official Journal, the technical standards are expected to become applicable in Q3 2023 (subject to any further delay in the approval process).

4 Recent market developments

4.1 Evolution of carbon market price and volatility

86. The EU ETS represents the world's largest market for emission allowances based on turnover.[44] According to ESMA's latest Opinion on ancillary activity calculations, the annual double-sided value of trading in EU emission allowances was EUR 687bn in 2020.[45]

87. The following section relies on commercial data obtained from Refinitiv Eikon and Datastream as well as from the International Carbon Action Partnership (ICAP)[46], focusing on major events and price development in the most liquid EUA spot and futures markets until October 2021.[47]

4.1.1 Spot prices[48]

88. Secondary trading in EUAs and derivatives today concentrates on ICE Endex, although some trading also takes place on EEX. Comparing daily settlement prices from both operators (Figure 1), no major differences can be observed and spreads usually remain below 0.01 EUR/tCO2 – suggesting the absence of arbitrage opportunities.

[44] See https://www.refinitiv.com/content/dam/marketing/en_us/documents/reports/carbon-market-year-in-review-2020.pdf
[45] See https://www.esma.europa.eu/press-news/esma-news/esma-updates-its-opinion-ancillary-activity-calculations-2
[46] https://icapcarbonaction.com/en/
[47] Primary market (auctions) as well as options trading are not covered in this section.
[48] In this section 'spot' prices refer to contracts with a daily expiry (see also Table 2 p.7).

89. Especially since 2018, EUAs experienced a price increase which was originally driven by its market reform but turned into a surge following the covid market turmoil in March 2020, mostly driven by economic fundamentals and political decisions.

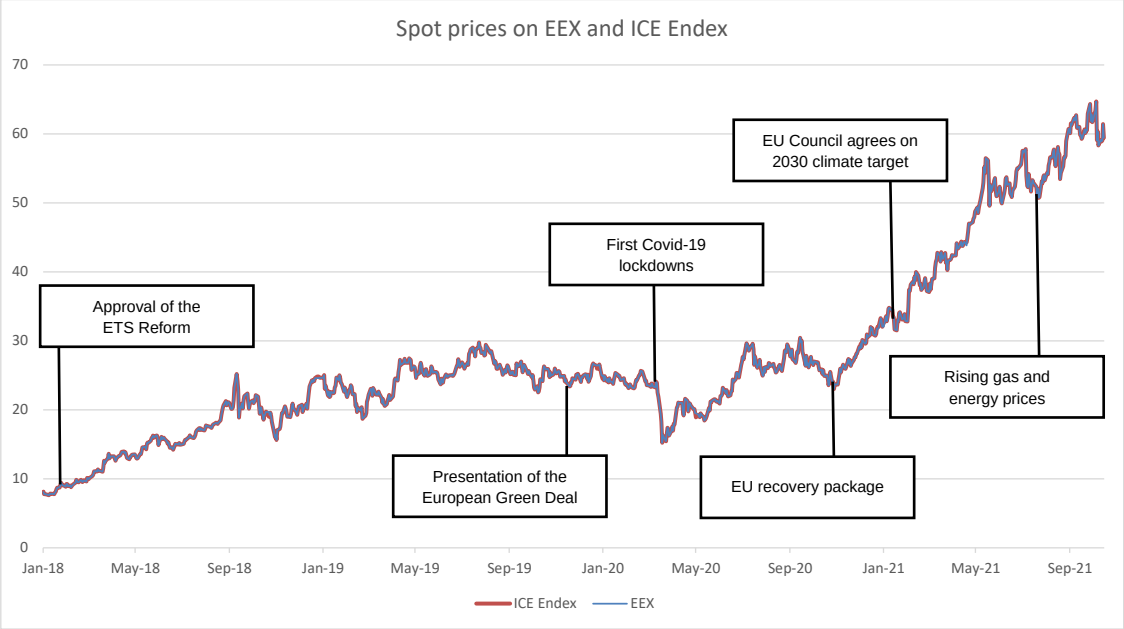

Figure 1: Spot prices in continuous trading at EEX and ICE ENDEX, in EUR per tonne of CO2. Source: Refinitiv.

90. Since the launch of the EU ETS in 2005, several other jurisdictions have introduced cap and trade systems in order to try and reduce regional greenhouse gas emissions.

91. Figure 2 compares the price development of several initiatives since 2016. Different systems were pricing emissions relatively similarly five years ago (~10 EUR/tCO2) and were for several years following the same upward trend (until March 2020). European carbon prices lagged behind prices in several other regions, reflecting a surplus of EU emission allowances, until they started to increase in 2018 in anticipation of the impact of the EU Market Stability Reserve (MSR) and other underlying factors[49].

92. When the COVID pandemic hit Europe and triggered a market sell-off, EU carbon markets were affected as well, reflecting the sharp slowdown in European economic activity and the expected decline in global energy demand. EU ETS prices plummeted from 23 to 15 EUR/tCO2 in just a few days, a much steeper decline compared to other emission trading systems. However, prices in the EU started climbing again soon, supported by the MSR and fiscal stimuli. New EU-wide emissions reduction targets announced in late 2020 provided a further boost to the market.

93. With the EU's economy back on track in 2021, another disruptive factor set in. Heightened utility demand and rising gas and power prices [50] gradually increased the relative attractiveness of coal as a substitute for energy production. However, being a more

[49] See IFRI (2018), Booming Prices on the European Emission Trading System: From Market Oversupply to Carbon Bubble?, October.
[50] https://www.ft.com/content/c1595f64-5a31-4e7b-bf98-9f5fcbb4e970 & https://www.bloomberg.com/news/articles/2021-09-27/europe-s-energy-crisis-is-about-to-go-global-as-gas-prices-soar

polluting source of energy, coal also requires the purchase of additional EUAs, further driving carbon prices up. Nevertheless, compared to the price of power this still seems to allow a profitable coal-based power generation.

94. The combination of a faster-than-expected reduction in allowances and increased demand led to a sharp increase in EUA prices, which at 60 EUR/tCO2 are now multiples of the prices in other jurisdictions (except the UK, Figure 2).

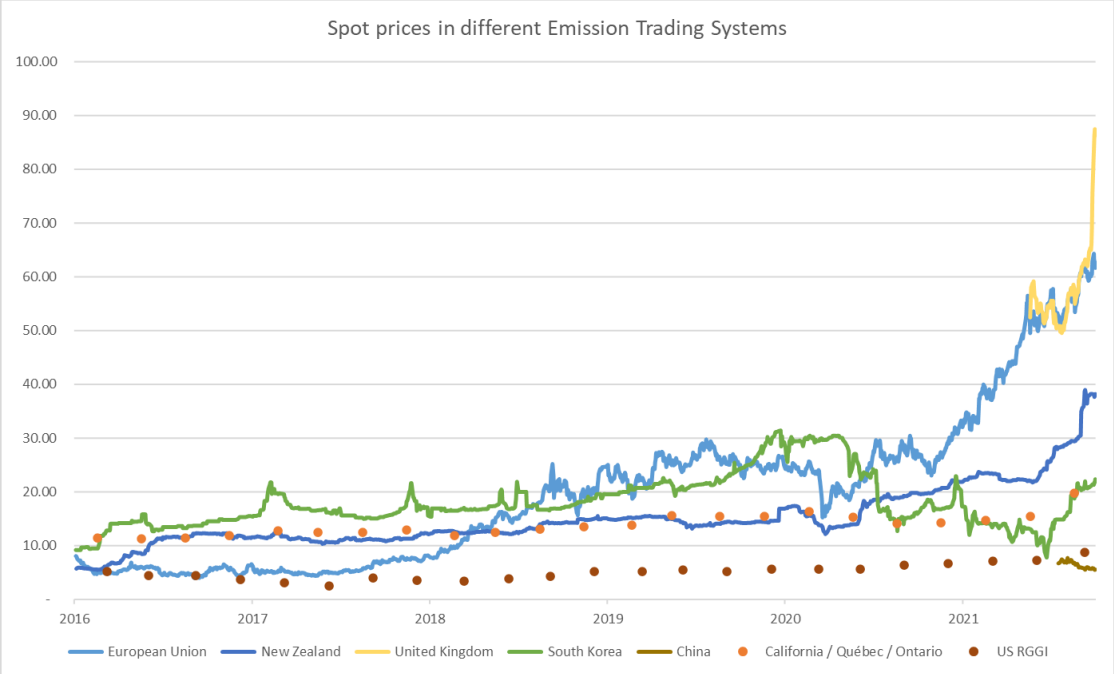

Figure 2: Monthly spot prices (EUR/tCO2) of emission allowances across different ETS, data through September 2021. Source: ICAP. Note: US RGGI stands for the "US Regional Greenhouse Gas Initiative" comprising Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, 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. The UK ETS started trading in May 2021, with the December 2021 future traded on ICE Futures Europe (Refinitiv data) used as proxy for spot price.

95. The recent price surge was topped by the UK's trading scheme which, after its launch in May 2021, moved along the EUA price until it spiked by more than 30% in September 2021 and only recently re-converged to the EU's level (Figure 3). Possible explanations for this divergence include the UK's low gas storage capacity and insufficient supply of UK emission allowances as utilities switched over from the EU to the UK system.[51]

[51] See https://www.theguardian.com/business/2021/sep/28/uk-wholesale-gas-prices-highs-winter-energy-crisis-suppliers and https://www.ft.com/content/c1595f64-5a31-4e7b-bf98-9f5fcbb4e970

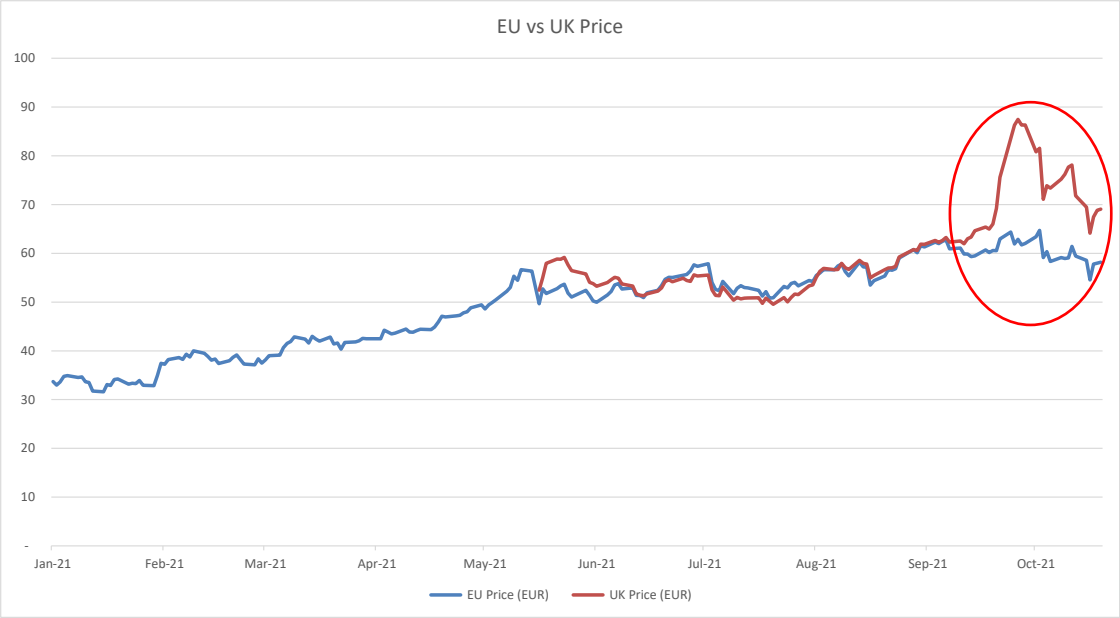

Figure 3: Prices of December 2021 Futures – EU and UK emission allowances traded at ICE Futures Europe and ICE ENDEX, in EUR per metric tonne of CO2. Source: Refinitiv. Note: The UK ETS started trading in May 2021.

4.1.2 Forward curve

96. The difference between spot and futures EU emission allowance prices is small. Figure 4 below illustrates this by displaying prices for December futures (the most traded contracts) from 2021 through 2025. Spot and futures prices have increased in tandem, reflecting expectations that prices are unlikely to come down significantly in the long term.

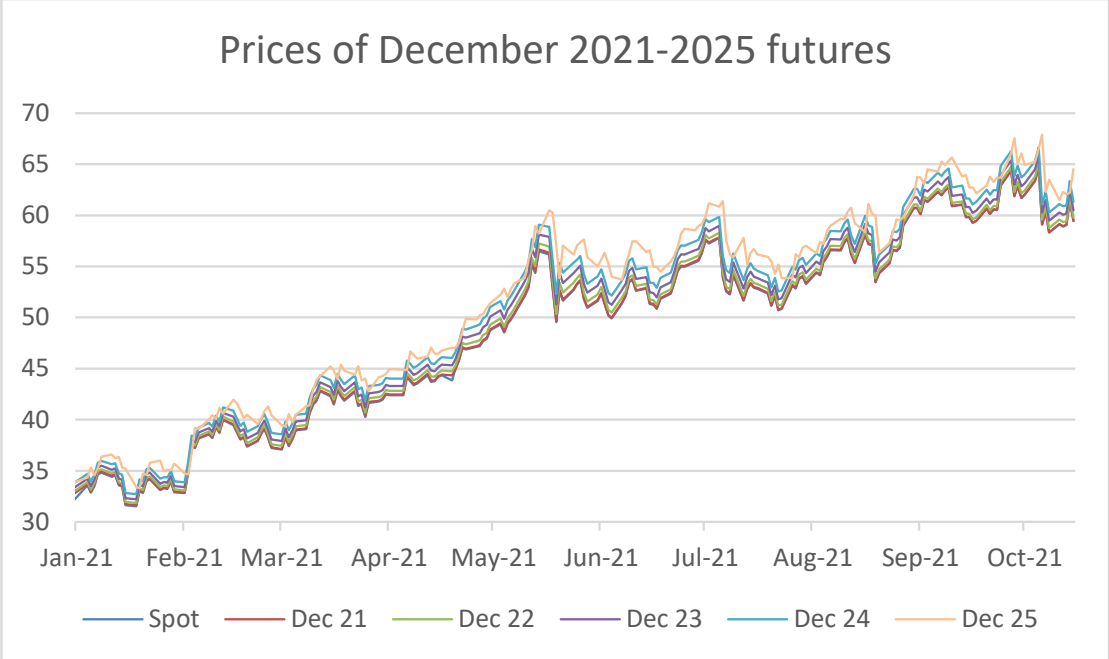

Figure 4: Daily prices in EUR per metric tonne of CO2 of December EUA futures contracts (from 2021 to 2025) traded on ICE ENDEX since January 2021. Source: Refinitiv

97. The spread between the December 2025 and the December 2021 futures has remained positive since these contracts started trading (i.e. the forward curve is upward sloping), also known as *contango*, and range-bound between 0 and 5 EUR. Increases in the spread broadly correspond to upswing phases in spot prices in 2018 and in 2021, but the stability of the spread in relative terms (i.e. in % of spot prices) suggests that the latest increase also reflects that EU emission allowances are trading at higher price levels.

Figure 5: Daily spread in EUR per metric tonne of CO2 (left axis) and % of spot prices (right axis) between December 2025 and December 2021 EUA futures contracts traded on ICE ENDEX. Source: Refinitiv.

98. As a result, the share of the EUA future curve has remained broadly stable, and recent increases in spot prices have led to an upward shift in the future curve without any meaningful steepening. According to the ECB, 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 prices.[52]

[52] ECB (2021), "EU emissions allowance prices in the context of the ECB's climate change action plan", ECB Economic Bulletin 6/2021.

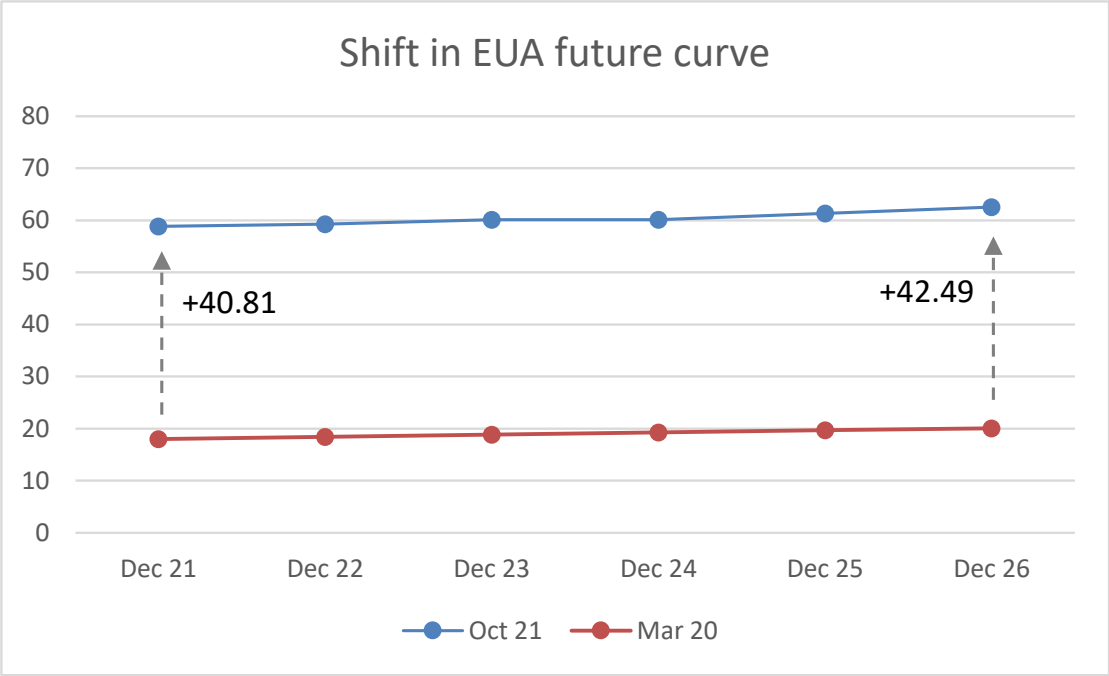

Figure 6: Future curve of December EUA contracts on ICE ENDEX, October 2021 vs. March 2020, in EUR per metric tonne of CO2. Source: Refinitiv.

4.1.3 Volatility

99. The application of the MSR[53] in January 2019 addressed the oversupply issue leading to tightening market expectations.[54] The surplus of allowances decreased from 1.65 billion in 2018 to around 1.39 billion allowances the following year and the 2020 MSR surplus indicator showed a 35% decrease in auction volumes, i.e. around 375 million allowances.[55] The resulting increase in prices was accompanied by relatively limited volatility until the COVID-19 pandemic hit. From the end of March 2020, the volatility of EUA started to increase sharply.

100. We use three measures of volatility to assess the dispersion of prices for EU ETS from end of 2018 to 2020 (for additional details on these volatility measures, see Annex 1). The analysis is performed using daily price data from Refinitiv for the two European exchanges where these instruments are traded, namely ICE ENDEX and EEX. The three measures show increased volatility from the introduction of the first lockdown measures in several European countries (Table 2).

Measure	Historical volatility	Intraday volatility	RS volatility
Before March 2020	47%	0.07	0.0132
Since March 2020	73%	0.17	0.0220

[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” (2020)

Table 2: Volatility measures of daily prices averaged before and after March 2020. For a description of the measures, see Annex 1**.**

101. Figure 7 shows the historical volatility (calculated as rolling 5-day standard deviations) of EU ETS closing daily spot prices on EEX. The graph shows that during March 2020 and thereafter extreme values occur more frequently. Reflecting this, the number of daily price changes greater than 5% has increased from 1.4 per month before March 2020, to almost twice per month since.

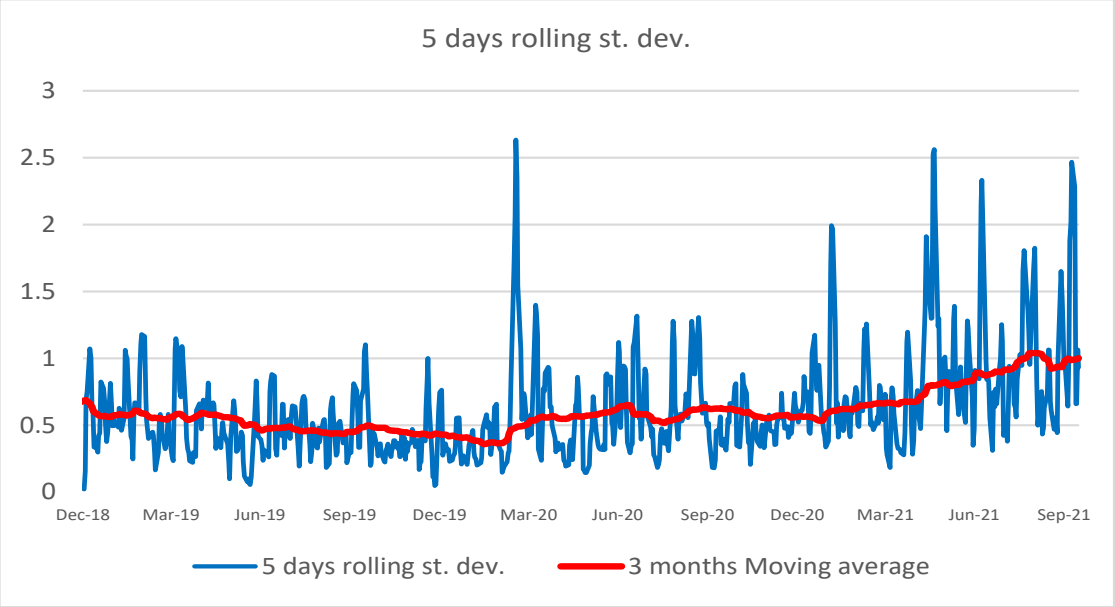

Figure 7: Historical volatility of daily returns in continuous trading at EEX, calculated as standard deviations over 5 trading days, in %. Source: Refinitiv.

102. ESMA uses two additional measures of volatility. Intraday volatility[56] is considered more reliable than historical volatility since the former accounts for within-day information on high and low prices.[57] Figure 8 displays a rising dispersion from the mean which reached a peak in March 2020 and remained structurally higher from that point in time.

[56] 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

[57] 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

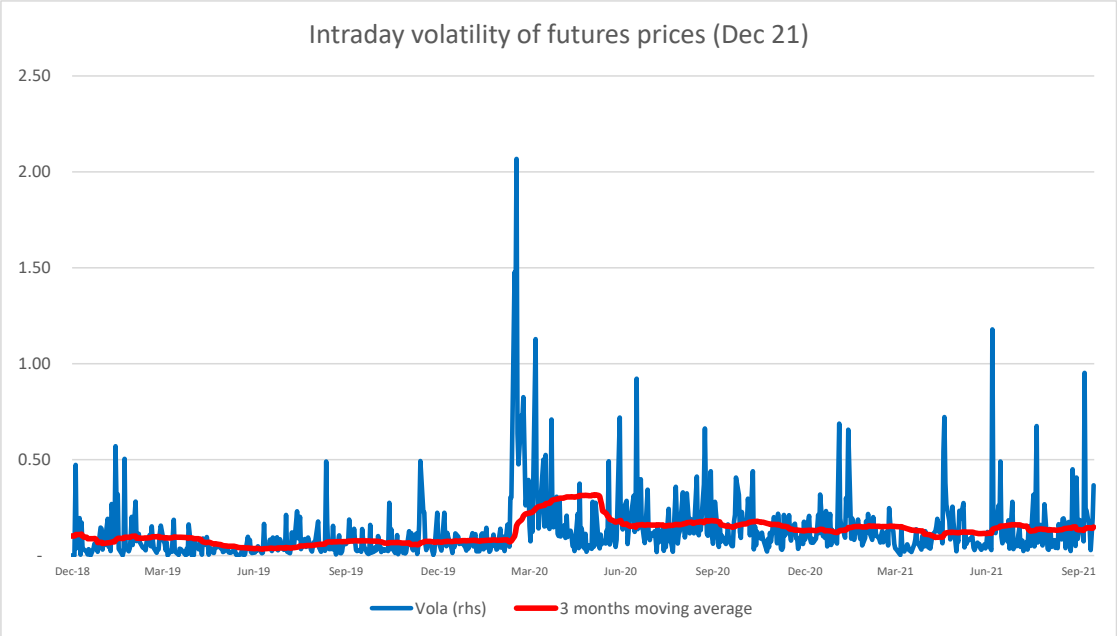

Figure 8: Intraday volatility of futures using high and low daily prices at ICE ENDEX, Parkinson method. Source: Refinitiv.

103. As a robustness check, we also compute the Rogers and Satchell[58] volatility measure which produces a better evaluation when the underlying time series include a trend, i.e. when they are non-stationary. Figure 9 confirms the findings of the previous two volatility measures.

[58] 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

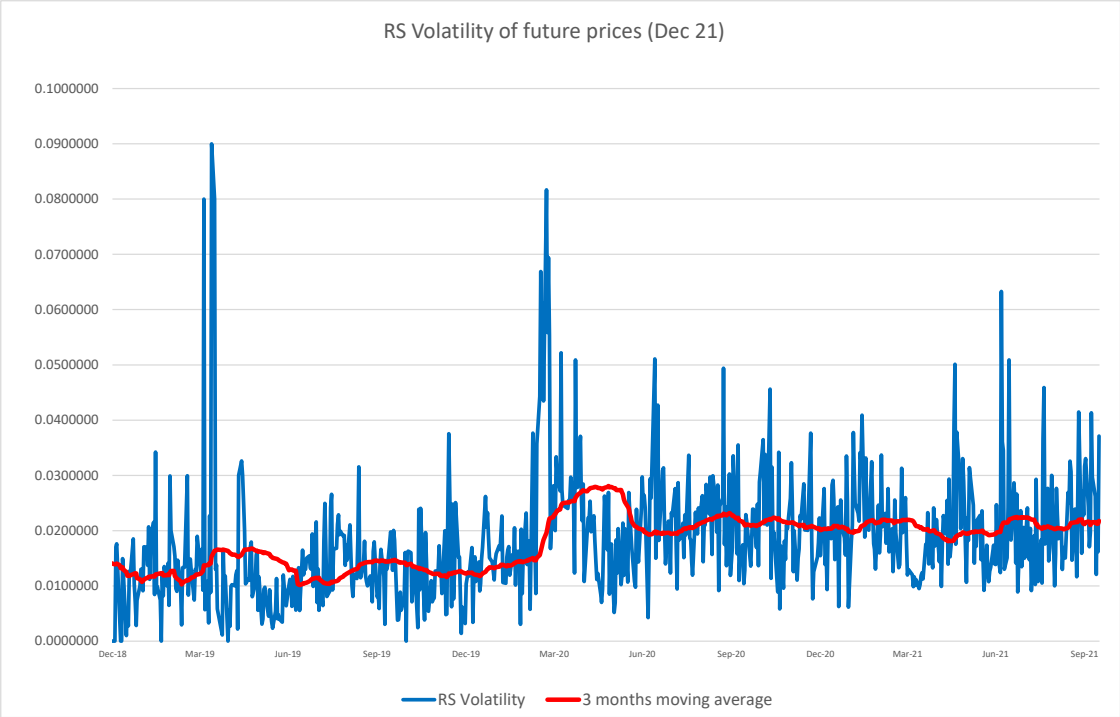

Figure 9: Intraday volatility of futures high, low, opening and closing daily prices at ICE ENDEX, Roger-Satchell method. Source: Refinitiv.

4.1.4 Comparison with other assets

104. The historical volatility of EUA prices (computed using standard deviation of daily returns since 1 January 2019) is 2.8%, compared with 1.2% for equities and less than 0.3% for bonds (Table 3) – which firmly puts EUAs in the 'risk assets' category from a portfolio investment perspective. However, as a financial asset, EU emission allowances have more in common with energy commodities than other traditional asset classes.

EU ETS	Equities	Corporate bonds	Government bonds	Crude oil	Natural gas	Coal	Gold
2.8%	1.2%	0.2%	0.3%	3.2%	4.7%	2.2%	1.0%

Table 3: Average 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), coal (ICE Coal Rotterdam Continuous trading), and gold (S&P GSCI Gold Spot), since 1 January 2019. Source: Refinitiv.

105. The price increase that EUAs have experienced since March 2020 (+290%) is comparable with that of crude oil (+211%) or coal (+322%) – although the price recovery started later for energy commodities – while natural gas prices have soared 1,000% over that period. 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.

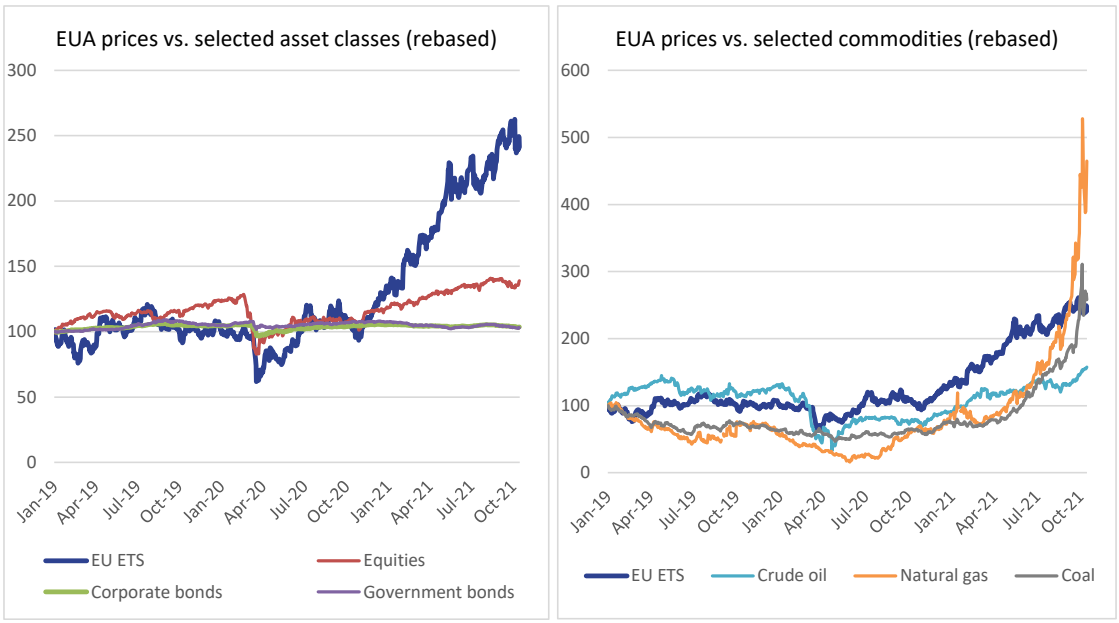

Figure 10: Prices of EU Emission allowances (EEX-EUA Continuous trading), equities (STOXX Europe 600 index), corporate bonds (ICE BofA Euro Corporate index), sovereign bonds (ICE BofA Euro Sovereign index), crude oil (Brent 1-month future price), natural gas (NYMEX Dutch TTF Natural Gas Calendar Month), 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.

106. The tables below display correlations across several asset classes and commodities. EU emission allowances are somewhat correlated with equity, oil and coal prices, but the correlation remains below 50%. These correlation coefficients vary only marginally before and after the March 2020 market turmoil.

From 1 January 2019 to 18 March 2020

	EU ETS	Equities	Corporate bonds	Government bonds	Crude oil	Natural gas	Coal
Equities	32%						
Corporate bonds	33%	42%					
Government bonds	*10%*	*20%*	69%				
Crude oil	38%	60%	43%	*10%*			
Natural gas	20%	*12%*	*4%*	*0%*	23%		
Coal	27%	15%	*-13%*	*-12%*	15%	*11%*	
Gold	*0%*	*10%*	39%	45%	*10%*	*-2%*	*-8%*

From 19 March 2020 to 15 October 2021

	EU ETS	Equities	Corporate bonds	Government bonds	Crude oil	Natural gas	Coal
Equities	42%						
Corporate bonds	-15%	3%					
Government bonds	-10%	-7%	62%				
Crude oil	24%	25%	-11%	-5%			
Natural gas	10%	9%	-12%	-7%	10%		
Coal	34%	11%	-14%	-11%	20%	16%	
Gold	13%	0%	4%	20%	7%	6%	1%

Table 4: Correlation of daily returns from 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 (Dutch TTF Natural Gas Calendar), goal (ICE Coal Rotterdam Continuous trading), and gold (S&P GSCI Gold Spot). Underlined numbers are statistically significant at the 1% level. Source: Refinitiv.

107. 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 2021, in contrast with the EUA future curve where no backwardation can be observed. In other words, there is no inverted future curve for EUA futures and therefore no expectation in the market about future prices reverting to their long-term mean.

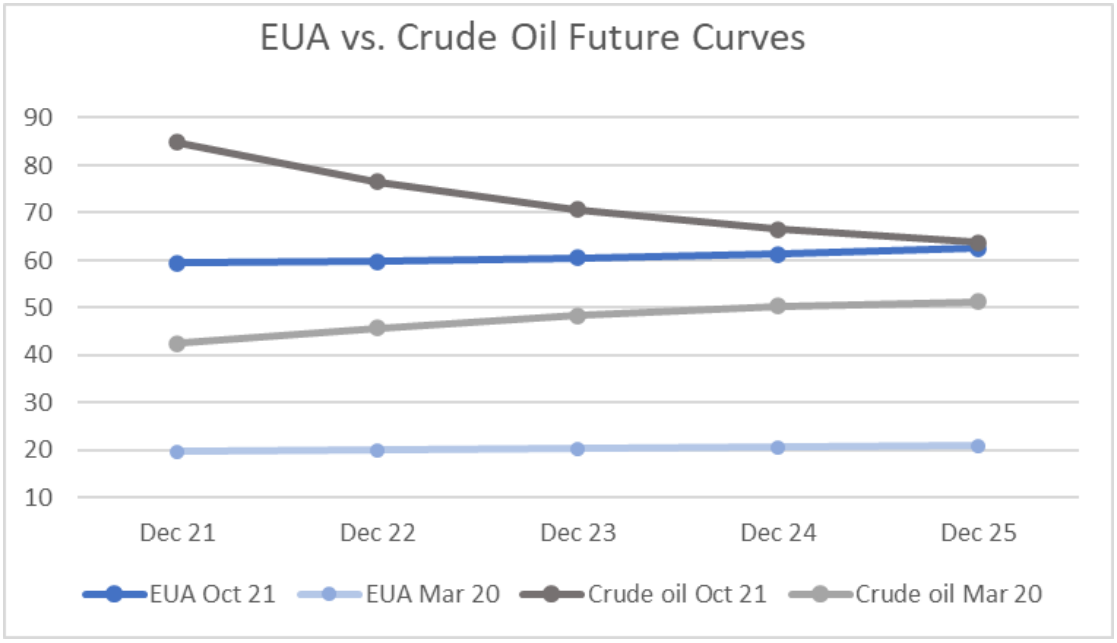

Figure 11: Future curves of Brent crude oil (in USD per barrel) and EU emission allowances (in EUR per metric tonne of CO2) in March 2020 and October 2021. Source: Refinitiv.

4.2 Evolution of open positions and counterparties in the EU carbon market based on weekly position reports

4.2.1 Data availability

108. As explained in Section 3.1.3, weekly position reports are available on the most liquid contracts, i.e. those with at least 20 market participants (and an absolute amount of the gross long or short volume of total open interest of at least 10,000 lots for commodity derivatives). For the EU carbon markets, weekly position reports are available for (1) EUA futures traded on EEX (since the beginning of the reporting regime, i.e. January 2018); (2) EUA futures traded on ICE Futures Europe, until the beginning of June 2021; and (3) EUA futures traded on ICE Endex since mid-June 2021.

109. This means in particular that weekly position reports are not available on derivatives on EUAA, daily futures on EUA and options on EUA futures. They are also not available on the EUA futures traded on Nasdaq Oslo.

4.2.2 Classification of counterparties

110. Weekly position reports provide aggregate figures on the number of position holders on a specific contract. Those figures are broken down into five broad categories of counterparties: investment firms or credit institutions (i.e. mainly banks, and thereafter "investment firms"), investment funds, other financial institutions, operators with compliance obligations under the ETS Directive (thereafter "compliance entities") and commercial undertakings (i.e. non-financial counterparties other than those with compliance obligations under the ETS Directive).

111. The analysis provided below relies on the classification of counterparties as submitted by the trading venues when reporting their weekly position reports to ESMA. Indeed, those reports are provided to ESMA in aggregated form as specified in Commission Implementing Regulation (EU) 2017/1093[59] (ITS 4) and ESMA does not perform the classification of counterparties on behalf of trading venues. The classification of counterparties has been further clarified in an ESMA Q&A[60].

112. The counterparty classification is initially based on a self-assessment by the counterparties themselves, which is then subject to controls by the trading venue. In the course of the preparation of this report, ESMA has been made aware of possible difficulties and inconsistencies in the counterparty classification, which impact the results presented below and that will be further investigated. In particular, ESMA is aware that before 2021:

- Some counterparties misclassified themselves as "compliance entities" where they belong to the category "commercial undertakings"; and

[59] Commission Implementing Regulation (EU) 2017/1093 of 20 June 2017 laying down implementing technical standards with regard to the format of position reports by investment firms and market operators

[60] Question 22 of the section Position Reporting of ESMA Questions and Answers on MiFID II and MiFIR commodity derivatives topics (ESMA70-872942901-36)

— Some counterparties misclassified themselves as “other financial institutions” where they belong to the category “investment funds”;

113. Some of those counterparties proceeded with a reclassification in 2021, causing inconsistencies and jumps in the breakdown per categories of counterparties in the weekly position reports from 2021. To adequately reflect this data quality issue, in the analysis below ESMA has comingled the two categories “compliance entities” and “commercial undertakings”; and has comingled the two categories “other financial institutions” and “investment funds”.

4.2.3 Analysis

Evolution of the number of counterparties

114. The number of counterparties holding a position on EUA futures has tended to increase since 2018, in all categories of counterparties, on both EEX and ICE (see Table 5 for EEX and Table 6 for ICE). The scale of the increase in the number of position holders is the same on both venues: on EEX, the yearly average number of position holders increased by 93% between 2018 and 2021, while on ICE the yearly average number of position holders increased by 87% over the same period. It is important to note that the observed increase of the number of position holders shall be seen in conjunction with the positions held (as discussed in the following section).

115. There are approximately 8 times more counterparties holding a position on EUA futures on ICE compared to EEX, which also translates into fewer categories of counterparties being present on the EEX market (mainly investment firms and commercial undertakings). On the EEX, since 2018, the number of position holders on EUA futures increased more rapidly in the category of investment firms (+122%) compared to the category of compliance entities and other non-financials (+82%).

116. In comparison, all categories of counterparties are present on ICE. When the number of position holders are averaged over a one-year period, the distribution of position holders between the different categories remained relatively stable, from 2018 to 2021: there was an increase of 133% in the number of investment firms, an increase of 89% in the number of compliance entities and other non-financials, and an increase of 77% in the number of investment funds and other financials.

117. On ICE, the increase in the number of position holders has accelerated since the beginning of 2021 in the category “Compliance entities and other non-financials” (+63.7% between the average 2020 and the average 2021) and in the category “Investment Firms” (+113.7% between the average 2020 and the average 2021). In the same period, the category “Funds and other financials” is the one that has increased the least (+31.3%).

118. The growing number of market participants appears in line with the observed expansion of the EU ETS market. Indeed, the number of market participants has increased in all categories of participants, on both venues, and in relatively homogeneous proportions. The increase in the number of market participants by itself cannot be taken as proof for any patterns of disorderly trading or abusive behaviour present in the carbon market. ESMA will nonetheless further analyse these trends in its next report.

EEX	Compliance Entities and Other Non-Financials	Funds and Other Financials	Investment Firms	Total
2018	38	0	10	48
2019	46	0	16	62
2020	59	0	17	75
2021*	68	5	23	92
Increase between average 2018 and average 2021*	82.3%	N/A	122.4%	92.8%
Increase between average 2020 and average 2021*	16.9%	N/A	36.4%	22.4%

(*) For ICE: 2021 is from Jan to Oct. For EEX: 2021 is from Jan to Aug.

Table 5: 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*	265	366	89	719
Increase between average 2018 and average 2021*	89.3%	77.3%	132.9%	87.2%
Increase between average 2020 and average 2021*	63.7%	31.3%	113.7%	49.3%

(*) For ICE: 2021 is from Jan to Oct. For EEX: 2021 is from Jan to Aug.

Table 6: Average number of position holders on EUA futures, per category of counterparties, on ICE (source: weekly position reports of ICE Futures Europe and ICE Endex. Weekly reports of 11 and 18 June 2021 are not available)

Evolution of the number of open positions

119. The evolution of the number and categories of counterparties has to be considered together with the evolution of open positions. When both long and short positions are aggregated, the breakdown of open positions in EUA futures is broadly split in two: around half of the positions are held by non-financial counterparties (both compliance entities and other non-financials) and the other half is held by financial counterparties (investment firms, investment funds and other financials) – see Figure 12.

120. Open positions are mainly in the hands of investments firms (40% to 47% depending on the time period considered) and non-financial counterparties (45% to 50%). The remaining percentage of open positions held by investment funds and other financials (non-banks) on EUA futures has tended to increase since 2018 but remains at a low level (from around 6% in early 2018 to around 8% in 2021Q3). As a comparison, the percentage

of open positions held by investment funds and other financials (non-banks) on the most liquid natural gas contract (Dutch TTF) was generally higher (around 20%). Another possible comparison could be made with electricity contracts, where the percentage of open positions held by investment funds and other financials (non-banks) was similar to the levels observed on EUA futures.

121. The breakdown of open positions between the various categories of counterparties does not appear to have significantly changed since 2018 and is broadly in line with the expected functioning of the market whereby non-financial entities buy EUA futures to hedge their carbon price exposure while financial counterparties act as intermediaries to facilitate trading and provide liquidity to the market.

122. Simply put, non-financial counterparties can build a long hedging position on the futures market thereby saving the capital costs that would otherwise be incurred by purchasing the allowances directly in the primary market. To allow non-financial counterparties to build this long hedging position, financial counterparties buy the allowances in the primary market and hold short positions in the futures market. This feature can be observed in Figure 13, where the long positions of non-financials, and the short positions of banks, follow a similar evolution in time.

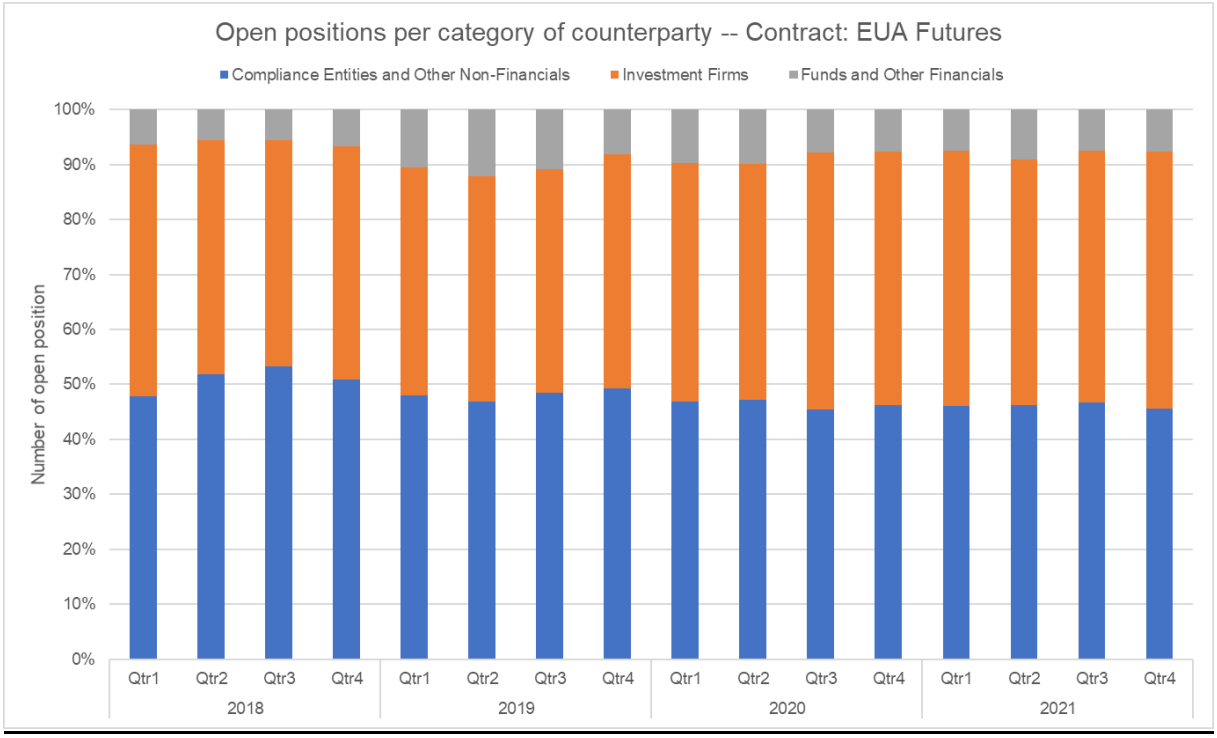

Figure 12: Open positions on EUA futures, per category of counterparties, on ICE and EEX (source: ICE and EEX weekly position reports[61]). Weekly reports of 11, 18 and 25 June 2021 excluded or not available.

[61] The weekly position reports of EEX are affected by a change in the methodology in the reporting of the number of positions held, which took place in January 2020. Due to this change, it is likely that the number of positions on EEX are underestimated since January 2020.

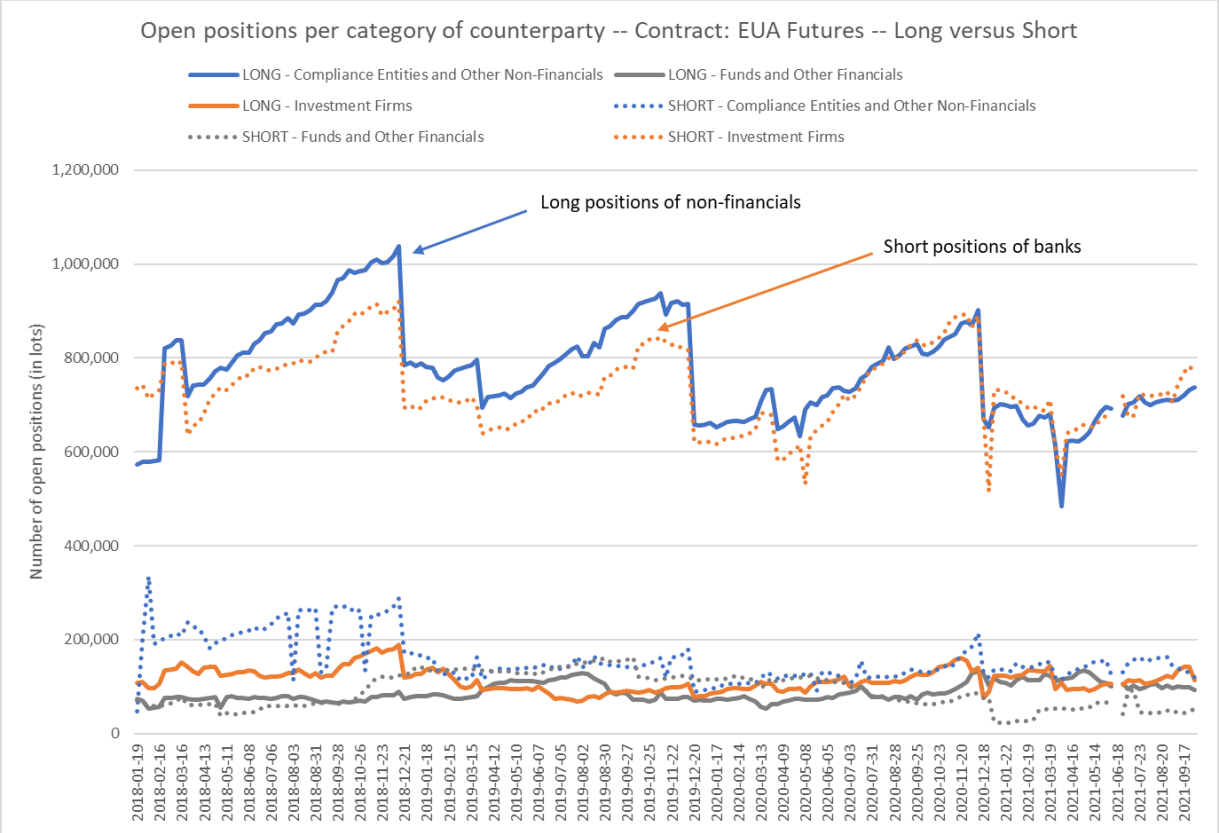

Figure 13: Long versus short open positions on EUA futures, per category of counterparties, on ICE and EEX (source: ICE and EEX weekly position reports[62]). Weekly reports of 11, 18 and 25 June 2021 excluded or not available.

Hedging activity by non-financial entities

123. The weekly position reports include a breakdown between hedging and non-hedging activity, for compliance entities and other non-financial entities. The respective percentages of positions held in EUA futures by those two categories of counterparties, in hedging versus non-hedging positions, appear to have changed over time since the beginning of the reporting regime (see Figure 14).

124. Overall, compliance entities and other non-financial entities are predominantly trading EUA futures for hedging purposes. However, the percentage of open positions held for hedging purposes has tended to gradually decrease over time, reaching a minimum level around 40-50% in the 2020Q3, after which it has increased again to a level closer to the long-term average (around 65%).

125. In the final report to be submitted to the European Commission in 2022, ESMA will further investigate this pattern with the objective of determining whether (1) it is affected by significant data quality issues; (2) there is a connection with the time of the year at which

[62] The weekly position reports of EEX are affected by a change in the methodology in the reporting of the number of positions held, which took place in January 2020. Due to this change, it is likely that the number of positions on EEX are underestimated since January 2020.

compliance entities are required to surrender their allowances (April of the calendar year); (3) other factors are contributing to this evolution.

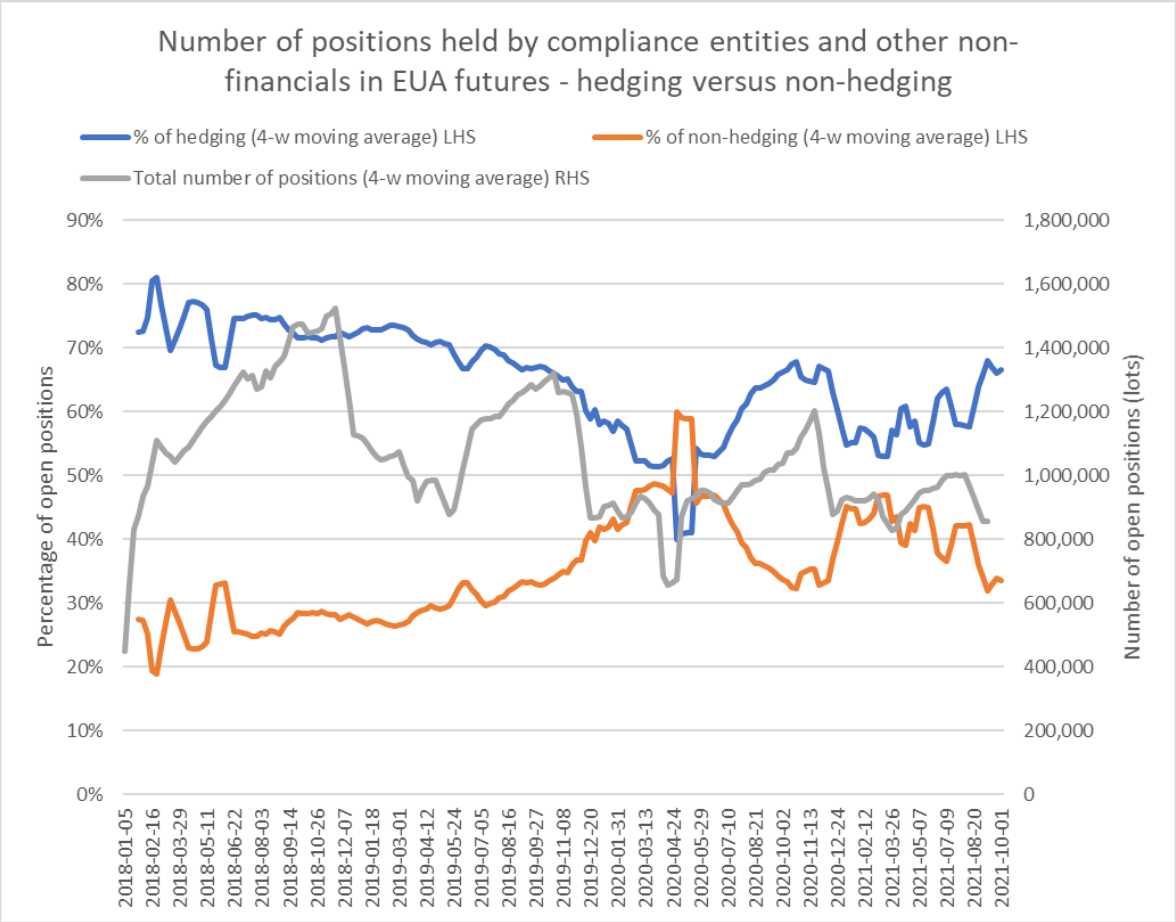

Figure 14: Number of open positions on EUA futures held by compliance entities and other non-financials, on ICE and EEX (source: ICE and EEX weekly position reports[63]). Weekly reports of 11, 18 and 25 June 2021 excluded or not available.

5 Next steps

126. This preliminary report has been prepared following the publication on 13 October 2021 by the Commission of its Communication on the price of energy. In the short timespan between the publication of that communication and the finalisation of this report, ESMA has focused on providing a factual description of the market based on the data available to it without drawing final conclusions yet on the state of the EUA market or any regulatory action that could be considered.

127. Other than the time constraints it has faced, ESMA has also worked with some data limitations due to existing regulatory requirements as some derivatives on EUAs are not subject to weekly position reporting.

[63] The weekly position reports of EEX are affected by a change in the methodology in the reporting of the number of positions held, which took place in January 2020. Due to this change, it is likely that the number of positions on EEX are underestimated since January 2020.

128. In order to allow the Commission to “assess whether certain trading behaviours would require further regulatory actions”, ESMA is also requested to complete this preliminary assessment with a report on the trading of emission allowances by early 2022. In order to do so, ESMA will deepen its analysis of the situation in this market based on a more comprehensive data analysis and an overall more in-depth look into recent developments. It is to be noted though that ESMA works with the regulatory data available according to the current applicable requirements in MiFID II and EMIR. Issues linked to the absence of data due to Brexit and to the data quality of reporting might further impact the feasibility of performing certain analyses by ESMA for the next report.

6 Annexes

6.1 Annex 1

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.

$$Intraday\ Volatility_{st} = \sqrt{\frac{1}{4\ ln\ 2}\left(\ln\left(\frac{High\ Price_{st}}{Low\ Price_{st}}\right)^2\right)^2}$$

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

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*.

$$RS\ Volatility_{st} = \left|\sqrt{\ln\left(\frac{H_{st}}{O_{st}}\right)\left(\ln\left(\frac{\mathrm{H_{st}}}{\mathrm{O_{st}}}\right) - \ln\left(\frac{C_{st}}{O_{st}}\right)\right) + \ln\left(\frac{L_{st}}{O_{st}}\right)\left(\ln\left(\frac{L_{st}}{O_{st}}\right) - \ln\left(\frac{C_{st}}{O_{st}}\right)\right)}\right|$$