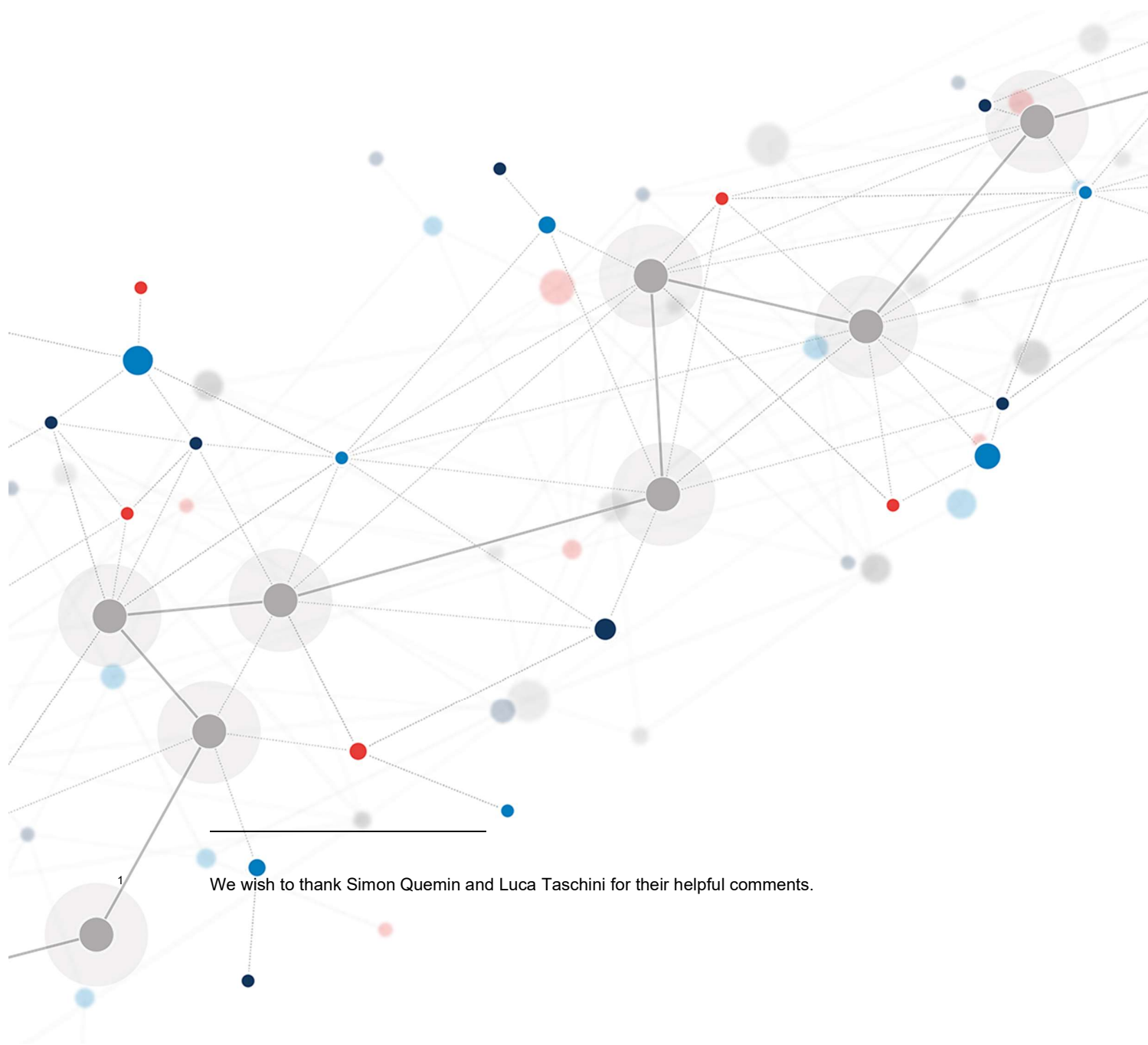

Impact of financial actors on the European carbon market and potential measures to stabilise prices

A policy report for Polska Grupa Energetyczna S.A.

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Non-Confidential



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1 Introduction and main conclusions

The price of European Union allowances (“EUAs”) reached an all-time high this winter, with a record high close to 100 €/tCO₂ in February 2022.² This is combined with an increase in EUA prices volatility, culminating with price variation of more than €30/tCO₂ in early March within a few days.

This surge in EUA prices level and volatility occurs in the context of a crisis in European energy markets, with a sharp increase in commodities prices, and in a context of uncertainty about the scope and the ambition of the on-going reform of the EU Emission Trading Scheme (“ETS”).

These recent market developments have raised questions regarding speculative trading in the EU ETS market. Indeed, the growing activity of financial actors sparked a debate about the role and potential impact of speculation in the EU ETS market,³ whether and to what extent the participation of financial actors should be constrained, and if so, what would be the best mechanism to do so.⁴ More fundamentally, it has revived the debate on the potential measures to stabilise EUA prices, as Europe’s ambition to fast track the decarbonisation of its economy requires a strong and predictable carbon price signal.⁵

In this context, this report aims to:

- Assess the recent increase in EUA prices level and volatility in the light of the evolution of fundamental drivers of supply and demand in the EU ETS market;
- Assess the role and potential impact of speculation and of financial actors in the EU ETS market, both on short-term EUA prices volatility and long-term price signal for decarbonisation;
- Map the possible measures to stabilise EUA prices and limit the potential short-term and long-term adverse effects of speculation in the EU ETS market.

We conclude that the increase in EUA prices level and volatility over the past years seem to have been (at least in part) driven by the evolution of market fundamentals. We also highlight the complementary positions of regulated entities and financial actors in the EU ETS market, and the role of financial speculation to notably support liquidity in the market.

However, though difficult to evidence empirically with publicly available data, some indicators suggest that the increase in financial trading could also have contributed to some extent to the current increase in volatility and instability of EUA prices, eventually leading EUA prices to overreact to changes in market fundamentals, especially in periods of high uncertainty. For instance, the

² <https://www.reuters.com/business/energy/europes-carbon-price-nears-100-euro-milestone-2022-02-04/>

³ “EU ministers to discuss ETS speculation on Wednesday”, October 2021, Montel News,

<https://www.montelnews.com/news/1261181/eu-ministers-to-discuss-ets-speculation-on-wednesday>

⁴ “Poland calls on EU to remove ‘speculators’ from its carbon market”, February 2022, Reuters, <https://www.reuters.com/business/energy/poland-calls-eu-remove-speculators-its-carbon-market-2022-02-15/>

⁵ F. Roques (2020), “Carbon Pricing: Main Achievements in Europe and Options for Deep Decarbonisation”, <https://www.fundacionnaturgy.org/en/product/carbon-pricing-main-achievements-in-europe-and-options-for-deep-decarbonisation/>

massive EUA prices drop in March 2022 that followed Russia's invasion of Ukraine was attributed by some market analysts to the role of banks and speculators.

Moreover, some characteristics of the EU ETS market could favour the development of further speculation in the future with potentially harmful consequences on short- and long-term price stability. These include the inelastic supply of EUAs, the lack of long-term policy commitment to achieving climate targets and the regulatory uncertainty about the scope and the ambition of the on-going reform of the EU ETS market, as well as the vulnerability of the market design to speculative attack, in particular due to the current Market Stability Reserve ("MSR") mechanism.

EUA prices instability and lack of predictability could have significant short- and long-term consequences on the EU policy objective to fast-track decarbonisation, including higher compliance costs for regulated entities and higher decarbonisation costs. This suggests a possible need for a review and potential regulation of the role of financial trading in the EU ETS market and more fundamentally addressing some of the structural issues with the EU ETS market and MSR design that induce price instability.

We have identified a **toolkit of measures** that could prove helpful **to mitigate the risk of excessive speculation and more fundamentally to improve the ability of the EU ETS market to provide a predictable and efficient price signal for decarbonisation:**

- **Measures to improve monitoring and market oversight** are a "no regret" option. Such measures could consist in the creation of a dedicated regulatory body for improving the supervision and adequacy assessment of allowance and derivatives trading as well as favouring the development of an integrated regulation, jointly considering environmental and financial aspects.
- **Measures to limit or regulate financial trading** could also be considered to limit short-term EUA prices swings, particularly in periods (such as currently) of substantial policy or regulatory uncertainty. Such measures could consist in taxes on certain transactions (to limit the value of speculative trading), minimum holding period (to limit value of short-term speculative trades), limits on financial positions (to limit the volume of speculative trades).
- More fundamentally, in order to provide a more predictable EUA price signal, **measures to resolve long-term policy and regulatory uncertainty** could disincentivise speculative trading and bring substantial benefits to optimize decarbonisation costs. Such measures could range from the introduction of carbon contracts for difference at different points in time in the future, to delegating regulatory power over the EU ETS market to an independent entity with a mandate to meeting climate objectives (e.g., a central bank of carbon).
- In addition, **structural measures to improve EUA prices stabilisation** could be implemented to reduce short-term volatility, thereby disincentivising short-term speculative trading. Such measures could consist in the introduction of volatility limits, the introduction of a cap/floor mechanism, the introduction of substitute charge, and the revision of Article 29.a. Another important reform could consist in a revision of the current parameters of the MSR and more fundamentally the revision of activation conditions, i.e., to move from a volume-based activation mechanism to a price-based activation mechanism. Indeed, a price-based flexibility mechanism could prove more appropriate in a market with growing financial trading (and speculation). The price of EUAs is likely to be a more reliable indicator of expected scarcity changes than the number of allowances in circulation (which could reflect the building-up up open speculative positions, not scarcity in the market). Conditioning supply directly on prices would then hold the potential to mitigate risks of excessive speculation, and ultimately reduce short-term price volatility.

- **Measures to compensate regulated entities** could be considered to mitigate the increase in compliance costs, without altering the functioning of EU ETS market. Such measures could consist in a tax levied on market turnovers for entities that are not companies under compliance obligations, or that do not trade on their behalf.

The costs and benefits of interventions on financial trading limits should be further analysed, and the case for temporary interventions during specific periods of high uncertainty may be stronger than as a permanent structural feature. Indeed, during periods of reform of the EU ETS market or change in climate targets, direct measures to limit speculation could have greater benefits given the high uncertainty over price anticipations. In these periods, the potential negative impact of reducing financial trading on price discovery could be offset by the benefits of stabilising prices.

Structural measures to resolve long-term policy uncertainty and measures to stabilise prices are promising as they have the potential of both strengthening long-term price signals and stabilising short-term prices, without giving away the benefits of financial trading. These measures should however be carefully designed and calibrated to protect regulated entities from excessive compliance costs, while allowing EUA prices to smoothly respond to changes in market fundamentals. In addition, targeted compensation measures could be used to protect regulated entities without distorting the EUA price signal. These compensation measures for compliance entities would need to be compatible with the EU State aid framework.

This report is organised as follow. Section 2 briefly presents the fundamentals of the EU ETS market. Section 3 reviews recent empirical evidence in relation to the contribution of speculation to the recent increase in EUA prices level and volatility. Section 4 identifies the features of the EU ETS market that could contribute to the risk of excessive speculation and price destabilisation. Section 5 discusses possible impacts of excessive speculation on the functioning of the EU ETS market, and on the cost of decarbonisation. Section 6 identifies measures that could be taken to mitigate the risk of excessive speculation, and more fundamentally to stabilise EUA prices and improve the EU ETS market functioning.

2 A brief reminder on the fundamentals of the EU ETS market

2.1 A cap-and-trade system

The EU ETS market is a cap-and-trade market covering emissions of power production and industries in the EU 27 plus Norway, Liechtenstein and Iceland. European policymakers set an emission reduction target for each multi-year trading phase, which translates in a cap on the EUAs made available each year of the trading phase.

Within the cap, EUAs are either auctioned or allocated for free to qualifying facilities (so called free allowances). Each year, companies under compliance obligation receive their free allowances for the on-going year by 28 February. They must report their level of verified emission for the previous year by 31 March and surrender the required amount of EUAs by 30 April. If a company emitted more than covered by its EUAs, it must pay a fine in addition to having to buy the additional EUAs required to comply. EUAs have an unlimited lifetime so market participants can bank them to cover future needs or sell them to other companies.

2.2 Primary and secondary markets for EUAs

The primary market for EUAs corresponds to the daily centralised auctions where physical EUAs are released on account of all or some Member States, according to a predetermined calendar.⁶ Auctions take place from January to December of a given year. Any party that meets the admission requirements can participate in the auction. This includes companies under compliance obligation, any undertaking associated with them and financial actors trading on behalf of their clients or on their own.⁷

In practice, trades happen in the secondary markets, where EUA derivatives (futures, options, swaps) are traded continuously during market opening hours. The futures market allows to buy or sell contracts for the delivery of EUAs in the future with daily (spot), weekly, monthly and yearly expiry. Those contracts can be traded on all exchange platforms offering the service and products, currently these are EEX, ICE Endex and Nasdaq Oslo.⁸

2.3 Market participants and trading activities

⁶ Allowances for Poland and Germany are auctioned Wednesdays and Fridays respectively, other working days are for all-EU Member States except Poland. Calendar available at the current Centralised Auction Platform service provider, EEX, <https://www.eex.com/en/markets/trading-ressources/calendar>

⁷ As per Articles 18 and 19 of the EU Auctioning Regulation 1031/20102.

⁸ The proportion of Over-The-Counter ("OTC") trading activity is marginal. Hence, as opposed to other derivatives markets, the carbon secondary market is almost entirely traded on regulated markets and cleared in central counterparties. ESMA (2022), "Final report Emission Allowances and derivatives thereof", para. 12, <https://www.esma.europa.eu/press-news/esma-news/esma-publishes-its-final-report-eu-carbon-market>

Several types of market participants are active in the secondary markets. Table 1 below sets out the types of market participants and describes their typical trading activities.

Table 1: Types of market participants in the EU ETS market

COT type	Company type	Trading activities
Compliance operators and other non-financials COT type 4 & 5	Utilities	<ul style="list-style-type: none"> • Buyers of EUAs to match verified emissions related to energy generation • Hedging strategy typically coordinated with forward sales of electricity
	Industrials	<ul style="list-style-type: none"> • Buyers of EUAs to match direct emissions (some sectors receive free EUAs) • Potentially also affected indirectly by cost of EUAs through power prices • Hedging strategy varies depending on sector, risk aversion and financial situation
Financial actors COT type 1, 2 & 3	Intermediaries (banks, credit institutions, brokers, investment firms)	<ul style="list-style-type: none"> • Market-making and liquidity-providing role • Act as counterparties to compliance entities' hedging or futures purchases by taking complementary short positions in carry trades • May also engage in proprietary trading
	Investment Funds (hedge/pension funds, trusts, retail investors)	<ul style="list-style-type: none"> • New market actors performing proprietary trades • Strategies can be long-term (e.g., buy-and-hold strategy, one-way bet) or betting on short-term price variations

Notes: ESMA categorizes traders into five Commitment of Traders ("COT") trader types: (1) Investment firms or credit institutions regulated under the Markets in Financial Instruments Directive (MiFID); (2) Investment funds; (3) Other financial institutions; (4) Commercial undertakings; (5) Compliance operators covered by the ETS Directive.

Source: Compass Lexecon adapted from Quemin, S. and Pahle, M. (2022), 'Financials threaten to undermine the functioning of emissions markets', Working Paper, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3985079.

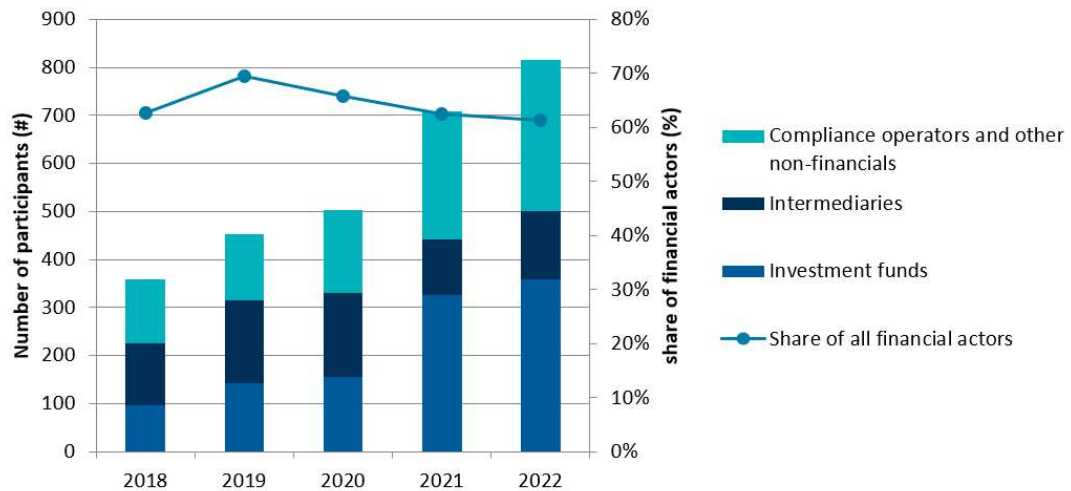
Utilities and industrials often seek to buy EUAs via the futures market to hedge their exposure to EUA prices and to ensure that they have enough EUAs to cover anticipated emissions. They may also short EUA futures if they have emitted less than planned in the previous year. Financial intermediaries are natural counterparties for the hedging needs of compliance entities. They typically seek to trade EUA futures with a view to providing liquidity for their clients and/or market access when some compliance companies ask a financial institution to trade on its behalf.⁹ Finally, investment funds may buy EUA futures to gain targeted exposure to EUA prices. That being said, in practice the delimitation between the various type of financial actors is a bit blurry.¹⁰

Figure 1 below sets out the number of entities for each type of market participants, at the end of each year over the period 2018-2022.

⁹ This would typically be the case if they find it too complex or expensive to buy EUAs or EUA futures directly via the auction or the orderbook of an exchange.

¹⁰ 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 its report, ESMA "had been made aware of possible difficulties and inconsistencies in the classification of counterparties in the weekly position reports", which impact the results presented in this report and that would require further investigated. ESMA (2022), para. 52.

Figure 1: Number of participants in the EU ETS futures markets



Notes: (i) End of February for 2022. (ii) We use the last available weekly report of each year with the number of participants in each CoT category of participants.

Source: Compass Lexecon analysis based on data from ESMA

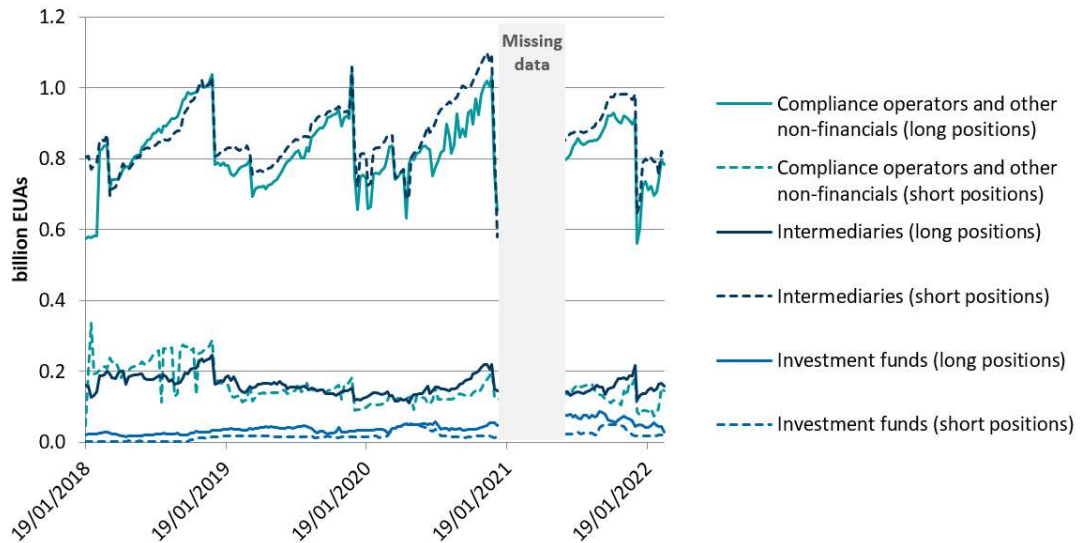
Figure 1 shows that the number of market participants in the secondary market has more than doubled since 2018. The growing number of market participants appears in line with the observed expansion of the EU ETS market. Indeed, the number of market participants has increased in all categories of participants and in relatively homogeneous proportions. Grouping participants into financial actors on the one hand, and non-financial actors on the other, the proportions would have been stable with an average of 65% of participants registered as financial actors.¹¹

Figure 2 sets out the weekly volumes of open positions for each type of market participants and per type of positions, i.e., either long (receiving EUAs in the future) or short (delivering EUAs in the future).

¹¹

As mentioned, there are possible difficulties and inconsistencies in the counterparty classification.

Figure 2: Relative importance of each type of market participants in terms of position, 2018-2022 (billion EUAs)



Notes: In 2021, the EU carbon secondary market on ICE migrated in full from the UK trading venue ICE Futures Europe to the Dutch entity ICE Index in June, which could explain missing data in ESMA's CoT.
Source: Compass Lexecon analysis based on data from ESMA

Figure 2 shows that that compliance operators and other non-financials tend to hold long positions (plain green), while intermediaries tend to hold short positions (dashed dark blue). This 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. Although the magnitude of positions held by all firm types follows an annual cycle, corresponding in part to a gradual hedging of EUAs needs by compliance companies, the overall magnitude of positions has remained broadly stable over the period.

2.4 Market supervision

An important particularity of the EU ETS market compared to other commodities market is the existence of two major regulatory bodies.

On the one hand, the European Commission ("EC") is responsible for the rules and market design of the overall cap-and-trade system that shapes the EU ETS market, i.e., the actual cap, the auctioning schedules, the MSR, free allowances, international credits, authorised traders, compliance cycle, etc.

On the other hand, the continuous trading of EUAs and EUAs derivatives is governed by a series of European financial regulations such as European regulation on financial instruments such as the Markets in Financial Instruments Directive and Regulation ("MiFID II" and "MiFIR"), the EU Market Abuse Regime ("MAR") and the European Market Infrastructure Regulation ("EMIR"). The

European Securities and Markets Authority (“ESMA”) supervises the EUAs and EUAs derivatives markets, with the same rules applicable to other financial markets.¹²

Financial and environmental regulations of the EU ETS remain therefore siloed. This may limit ESMA’s ability to monitor and oversight the EU ETS market. This could create problems in the future, as already experienced with the design of the MSR, which could invite speculation and ultimately blur market outcome and price predictability.¹³

¹² These rules include prohibition of market manipulation, prohibition of insider trading, transparency and simple access to information, and anti-money laundering safeguards. Adapted from European Commission’s website, Ensuring the integrity of the European carbon market, accessed March 2022, https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/ensuring-integrity-european-carbon-market_en

¹³ Perino, G., Willner, M., Quemin, S. & Pahle, M. (2021). The Market Stability Reserve in the EU ETS: Firefighter or Fanning the Flames? Review of Environmental Economics & Policy, forthcoming.

3 What is the role of speculation in the recent surge in EUA prices level and volatility?

Financial trading played and is still playing an important role in the EU ETS market by:¹⁴

- contributing to price discovery by making sure that all information about supply and demand and possible future evolutions in supply and demand become quickly reflected in EUA prices, which in turn corrects the price signal for all market participants.
- facilitating risk transfer and increasing liquidity. Financial actors provide liquidity to the regulated entities looking for counterparts to hedge their exposure to EUA prices. Without financial actors, regulated entities would only be able to transact with each other. This would ultimately limit possibly of hedging or/and make hedging far less economical. It would inevitably cause the EU ETS market to be far more volatile and lead to higher EUA prices.¹⁵

However, when speculation becomes excessive, it can lead to short-term volatility and/or long-term price destabilisation, with prices being disconnected from market fundamentals.¹⁶ In that sense, it is legitimate to question the role of speculation in the current rise of the EUA prices and volatility.

In response to the mounting debate in Europe in 2021, the EC asked ESMA to examine the patterns of trading behaviour in the EU ETS market and the potential need for targeted actions.¹⁷ In March 2022, ESMA's Final Report concluded that there was no evidence that EUA prices were not aligned

¹⁴ See for example, Kaldor, N. (1987). Spéculation et stabilité économique (1939). *Revue française d'économie*, 2(3), 115-164. Newbery, D. M. (1981). The theory of commodity price stabilization: a study in the economics of risk. Schopp, A., & Neuhoﬀ, K. (2013). The role of hedging in carbon markets. Cludius, J., & Betz, R. (2020). The role of banks in EU emissions trading. *The Energy Journal*, 41(2). Daskalakis, G., & Markellos, R. N. (2008). Are the European carbon markets efficient. *Review of futures markets*, 17(2), 103-128.

¹⁵ The Relationship Between Commodity Futures Trading and Physical Commodity Prices, Lecture given by Dr. Henry G. Jarecki on 5 April 2011, <http://www.futuresmag.com/Issues/2011/May-2011/Documents/Jarecki-Lecture-Commodity.pdf>

¹⁶ See for example, Bohl, M., & Stephan, P., (2013), Does Futures Speculation Destabilize Spot Prices? ; Groot, T., (2012), The impact of speculation in commodity markets; Haase, M., Zimmermann, Y., (2016), The Impact of Speculation on Commodity Futures.

¹⁷ Commission (2021), Communication on Energy Prices "Tackling rising energy prices: a toolbox for action and support", <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0660>

with market fundamentals, i.e., that there would be excessive speculation in the EU ETS market.^{18,19} ESMA however observed that *“the emergence of new participants [investment funds, some located outside EU] with buy-and-hold strategies warrants future monitoring to the extent that they may lead to a reduction in the supply of physical emission allowances available for trading”*.²⁰ As already indicated in its Preliminary Report, ESMA also mentioned *“the challenges of having a comprehensive view of this market and an in-depth understanding of its developments”* and stressed that future research *“will be essential to deepen ESMA’s understanding of the emission allowance market structure”*.

As further discussed in the remainder of this section, we indeed observe that the increase in EUA prices level and volatility over the past years seems to have at least in part been driven by the evolution of market fundamentals. However, though difficult to evidence empirically with publicly available data, some indicators suggest that the growing importance of financial trading could also have contributed (and could further contribute in the future) to the volatility and instability of EUA prices.

3.1 The increase in prices level and volatility seems to have been at least in part driven by the evolution of market fundamentals

In theory, EUA prices should reflect current and expected cost of carbon emission abatement, that is the additional costs induced by the production of power and industrial goods covered by the EU ETS using decarbonized alternatives. This cost is referred to as the marginal abatement costs of CO₂ emissions (or MAC curves).

So far, evidence suggests that the power sector contributed to the bulk of emission reduction historically in the EU ETS.²¹ As the decarbonisation of the power sector progresses, and its cap is tightened, EUA prices will be increasingly correlated to abatements cost of the other industrial sectors covered.²² As with the power sector, most industrial processes rely on fossil fuels for heat production, therefore abatement costs for the industry depend on total investment costs to switch to a decarbonised technology which include prices of fossil commodities such as gas, oil and coal.

¹⁸ ESMA published its Final Report in March 2022, where it concluded that *“the data analysis performed by ESMA evidences the specificities and unique characteristics of the EU carbon market, as well as the challenges of having a comprehensive view of this market and an in-depth understanding of its developments. Overall, ESMA considers that the data analysis has not unearthed any major abnormality or fundamental issue in the functioning of the EU carbon market from a financial supervisory perspective. The observed evolution of carbon prices and volatility seem to have followed market fundamentals”*. ESMA (2022), p6.

¹⁹ A report analysing preliminary ESMA’s conclusions by CAKE/KOBIZE pointed out possible improvements required to ensure the robustness of the analysis, such as increased involvement of ESMA in monitoring activities, extension of the analysis period to before 2018, a clearer distinction between trading activities for hedging and speculation by intermediaries, and an in-depth look at the changes in money flows due to the increased participation of investment funds in the ETS.

See CAKE/KOBIZE, February 2022, Analysis of ESMA’s Preliminary Report on the existence of potential speculative activities in the EU ETS. <https://www.linkedin.com/pulse/analysis-esmas-preliminary-report-existence-/?trackingId=ZOi6Spgy7Z7qZJVn%2FxCiZQ%3D%3D>

²⁰ ESMA (2022), p6.

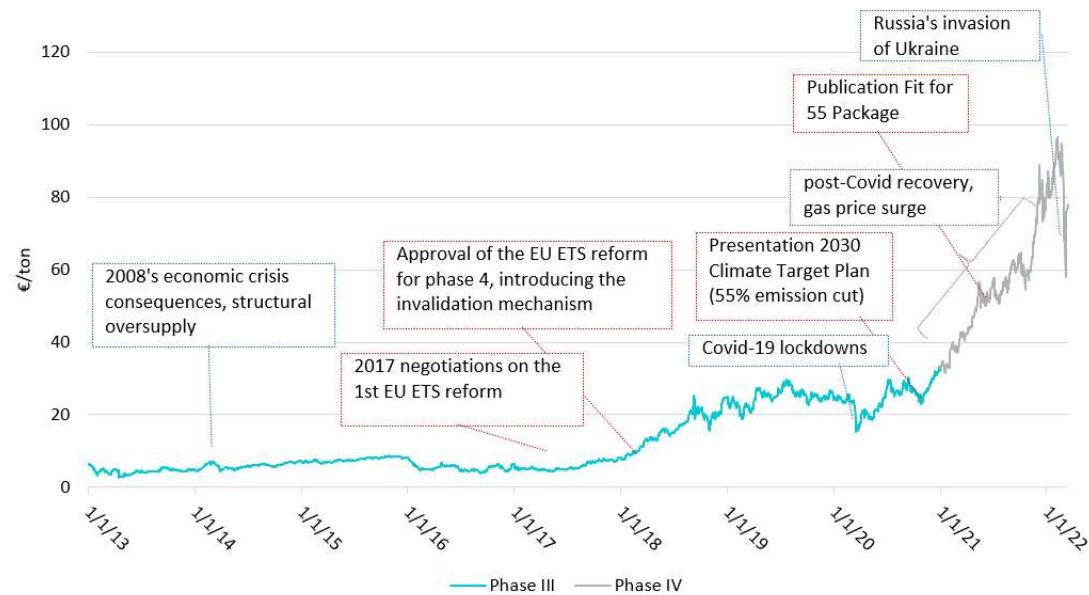
²¹ Roques, F. et al. (2016), “Wake up! Reforming the EU ETS: Comparative evaluation of the different options”, https://www.businesseurope.eu/sites/buseur/files/media/reports_and_studies/2017-07-05_fit-cl_eu_ets_reform_study_-_full_report_0.pdf

²² This considers that the extension of the EU ETS market proposed in the Fit for 55 Package will implement two separate markets for power and industry on one side and building and transport on the other.

The literature identifies major price drivers for EUAs as being²³ gas, coal and oil prices, economic growth, and the expected evolution of the ETS cap and market design affecting the expected supply of EUAs.²⁴

In this context, Figure 3 shows the evolution of the EUA prices since the beginning of the Phase III of the EU ETS market in relation to events regarding either the commodity prices, the overall European economic environment, and the EU ETS market design reforms.

Figure 3: Evolution of EUA prices, 2013-2022 (€/tCO₂)



Notes: Red boxes refer to market design reforms, blue boxes refer to global and European economic parameters, grey boxes refer to commodity prices

Source: Compass Lexecon analysis based on data from EnergyMarketPrice

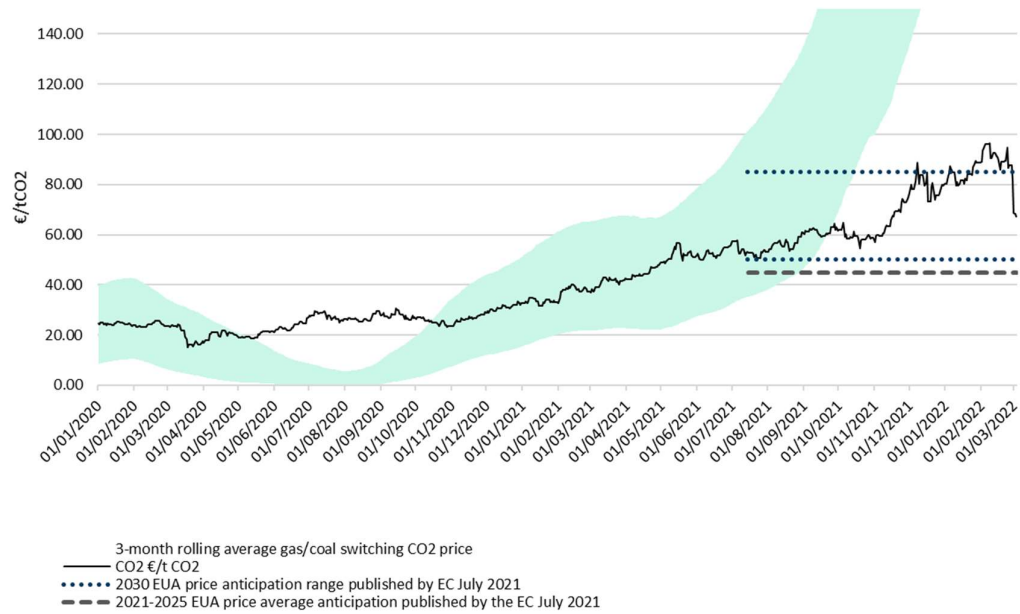
The recent rise in the EUA prices could be at least in part attributed to the high gas prices (relative to coal) triggering a switch from gas-fired to coal-fired generation leading to greater emissions from the power sector, the growth in demand for energy driven by COVID-19 economic recovery, and the planned EU ETS policy reform aimed at achieving a progressively tighter cap on GHG emissions. It remains that recent EUA prices swings are somewhat difficult to fully reconcile with changes in market fundamentals without further investigation.

Figure 4 zooms in on the relation between recent evolutions in EUA prices and the gas/coal switching carbon price, the abatement costs for the industry and the EUA prices published by the EC in the Impact Assessment of the Fit for 55 Package.

²³ Lovcha, Y., Perez-Laborda, A., and Sikora, I. (2021). The determinants of CO₂ prices in the EU emission trading system; Friedrich, M., Fries, S., Pahle, M. & Edenhofer, O. (2020). Rules vs. Discretion in Cap-and-Trade Programs: Evidence from the EU Emission Trading System. Working Paper 8637, CESifo.

²⁴ As further explained below, the MSR is affecting the volume of EUAs in circulation in the market and ultimately has also an (indirect) impact on prices.

Figure 4: Evolution of EUA prices, 3-month rolling average of the gas/coal switching CO₂ price, and EUA prices range published by the EU, 2020-2022 (€/tCO₂)



Notes: The gas/coal switching CO₂ price is computed as the CO₂ price that equalizes the marginal production cost of a gas-fired power plant and a coal-fired power plant. We used normative values for the efficiencies of plants (51-55% for gas; 35-38% for coal) and emission factors of the combustion of gas (0.183 t/MWh) and coal (0.336t/MWh).

Source: Compass Lexecon analysis based on data from EnergyMarketPrice

Figure 4 illustrates the recent strong increase of the implied gas/coal switching carbon price following the gas price surge that began at the end of 2020. EUA prices overshoot the 2021-2025 EUA price average anticipated in the Fit for 55 Package Impact Assessment. EUA prices have actually already reached the upper bound of the 2030 EUA prices range consistent with the Fit for 55 Package Impact Assessment (between 60 and 85€/tCO₂)²⁵, expected after the implementation of the reform.²⁶

In summary, different factors seem to have contributed to the recent rise in EUA prices, including the expectation of a tighter ETS cap associated with the higher EU decarbonisation ambition and EU ETS market reform, the strong macroeconomic recovery as Europe emerges from the initial impact of the COVID-19 pandemic, and the strong increase in gas and coal prices. However, the speed of the increase has raised questions about the potential impact of speculation. Indeed, some

²⁵ Indicative abatement costs in industry are expected to range from 69 to 250€/tCO₂, suggesting that EUA prices would likely further increase to 2050 as the ETS cap tightens. See General Commission for Sustainable Development (2016), Low-carbon transition pathways at the lowest cost, Théma, Climat, Appendices, Table 5.

²⁶ European Commission, SWD(2021) 601 final, Part 1/4, IMPACT ASSESSMENT REPORT Accompanying the document DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757, page 35.

market commentators observed that EUA prices had already reached the 2030 level required to achieve long-term decarbonisation objectives.²⁷

3.2 The growing importance of financial trading could also have contributed (and could further contribute in the future) to the volatility and instability of EUA prices

Though difficult to evidence empirically, some indicators suggest that financial players could have had a growing impact on the EU ETS market, and that this could have contributed to amplifying some of the recent changes in market fundamentals:

- a. The growing number of investment funds is correlated with the increase in the EUA prices;
- b. Open positions in excess of hedging needs have grown between 2018 and 2020;
- c. Price volatility and price trends observed at times of acute regulatory uncertainty and market design reforms could be interpreted as building up of speculative positions;
- d. The massive price drop of about 30€/tCO₂ has followed Russia's invasion of Ukraine, which has been attributed by some market analysts to the liquidation of speculative positions.

We detail further these points below.

First, there is a growing number of investment funds holding positions in the EU ETS market. The number of active investments funds has increased from 100 in 2018 to more than 300 in 2022, as shown in Figure 1. Concomitantly, the share of auctioned allowances purchased by investment funds increased from 37% in 2018 to 44% in 2020.²⁸ Similarly, investment funds' long positions in the future market increased from about 20 million allowances in 2018 to between 30 and 50 million allowances in 2022.

Importantly, the growing participation of investment funds could exacerbate hedging pressure of other regulated entities triggering a vicious circle, and ultimately putting upward pressure on EUA prices. Although investment funds scale is so far limited to a small share of all EUAs (5% of the total long positions held in the market), this type of speculation could still affect prices given the tightness of the market and could prefigure further financial trading in the future driven by the emergence of new financial products or investment vehicles.²⁹

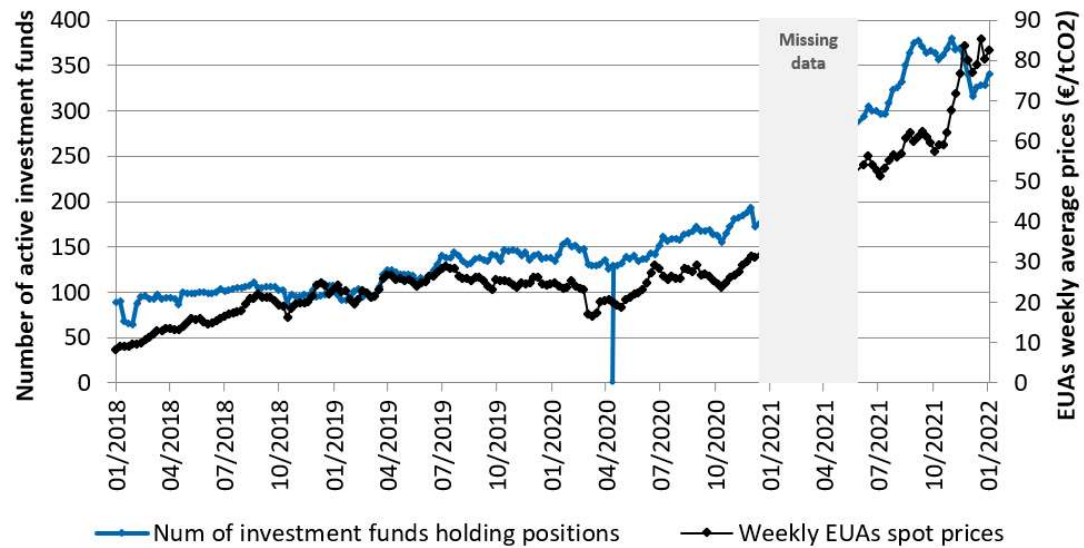
There is indeed a correlation (which does not necessarily imply not causality) between the number of investment funds active in the EU ETS market and the EUA prices. In this respect, Figure 5 compares the number of active investment funds in the futures market and the EUA prices over the period from 2018 to 2022. Figure 5 shows that EUA prices and the number of active investment funds, as per the category of the Commitment of Traders reports, have increased in correlated manners.

²⁷ Carbon Pulse Daily, "POLL: Big boost for EU carbon price forecasts as several analysts", April 2021; ERCST, Wegener Center, BloombergNEF and Ecoact (2021), 2021 State of the EU ETS Report; ICIS, "European carbon market to shift gear", February 2021; Euractiv, "Analyst: EU carbon price on track to reach €90 by 2030", July 2021. All these publications use nominal carbon prices (not deflated).

²⁸ World Bank (2021), State and trends of carbon pricing 2021, page 38.

²⁹ Quemin, S. and Pahle, M. (2022), 'Financials threaten to undermine the functioning of emissions markets', Working Paper. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3985079

Figure 5: Evolution of participation by investment funds and EUA prices 2018 - 2022



Note: The gap in data in 2021 corresponds to a gap in data in ESMA's CoT reports.

Source: Compass Lexecon analysis based on data from ESMA's Commitment of Traders reports and EnergyMarketPrice.

Second, the increasing participation of financials seems to have been simultaneous with the building-up of speculative positions for non-hedging purposes, with a growth in the share of financial trading over hedging needs during the period from 2018 to 2020, increasing from 50% in 2018 to more than 90% of total hedging needs in early 2020, followed by fluctuations between 70% and 90% afterward.³⁰ That said, some speculation is economically necessary to have a liquid, well-functioning futures market, which makes it difficult to form a clear judgment about the adequacy of speculation. This would require an in-depth investigation into who holds those excess speculative positions and to what end, a task that current data availability and transparency rules prevent from doing. ESMA indeed explained that it has faced “significant challenges when trying to identify the origins of market participants which makes it complex to obtain a clear picture of who trades and from where”.³¹

Third, some recent econometric studies aim to assess the potential impact of speculation in the EU ETS market. Although additional empirical work would be needed to confirm and investigate further these issues, a recent econometric study by Friedrich et al. (2021) concludes that the current uncertainty associated with the redefinition of long-term objectives (as it is currently the case) is likely to favour the development of speculation and to destabilize market prices. Indeed, they show

³⁰ To evidence this phenomenon, Quemin et al. (2022) suggest computing a simple measure of the size of speculative trading, i.e., position held by financials in excess of hedging needs. In the EU ETS market, market participants are taking hedging positions to reduce their exposure to increase in EUA prices. Other positions in excess of risk-reducing positions can be considered as superfluous in balancing hedging needs. Normalizing this by total risk-reducing positions, they defined a measure of (excessive) speculation called the Working T-index. They have shown that the weekly T-Index of all market participants grew from around 50% in 2018 to 90% of total hedging needs early 2020, followed by fluctuations between 70% and 90% afterward. They conclude by highlighting that the T-Index is particularly volatile in the ETS which could be interpreted as indicative of excessive speculation. They however stress that there is “important limitations that impede clear interpretation and judgment about speculation adequacy”, but explain that “yet, the above analysis is the most one can tease out from the current data granularity and reporting categorization regimes”.

³¹ ESMA (2022), p7.

that the implementation of the reform of the EU ETS market in 2018 was associated with the formation of a price bubble, which they define as a period of price overreaction relative to market fundamentals associated to an increase in the probability of price collapse in later periods.³²

This is corroborated by Quemin et al. (2021) who analysed the evolution of weekly open interest for end of year futures with short-term maturity (front-year) and longer-term maturity (longer-dated). They show that the trading patterns for the front-year product, which is the most liquid and therefore speculation-prone, drastically changed several times since 2018. The most sizable deviation occurred in 2018, concurrently with the adoption of the market reform and subsequent first price rally, which, as a first pass estimate, piled about 350 million tons of speculative positions – or roughly a quarter of yearly emissions. Similar anomalies occurred in 2017, 2020, 2021 and 2022.³³ As further explained in the next section, accumulation of excessive speculative volumes could have had important negative consequences on the functioning of the EU ETS market.

Finally, the massive price drop that followed Russia's invasion of Ukraine in March 2022 was attributed by some market analysts to the role of banks and speculators. According to such analysts, speculators would have liquidated positions for fear that the sanctions on Russia would impede them to do so in the future, and in order to raise cash to cover losses in skyrocketing energy markets.³⁴ ³⁵ We observe an important increase in the (non-risk reducing) short positions held by commercial undertakings concomitantly to Russia's invasion of Ukraine (from 9.7 billion EUAs in the end of February 2022 to 14.3 billion EUAs in the first week of March 2022, or a 49% increase in short positions). It is however not possible to reach definitive conclusions as to the reason for these trades.

In a nutshell, the growing importance of financial trading seems to also have contributed to the recent EUA price increase and could further contribute in the future to the short-term volatility and

³² Friedrich, M., Fries, S., Pahle, M. & Edenhofer, O. (2020). Rules vs. Discretion in Cap-and-Trade Programs: Evidence from the EU Emission Trading System. Working Paper 8637, CESifo. *"First, during the price run-up period demand-side fundamentals have neither gained importance as price determinants nor do they show the same explosive behaviour as allowance prices. Second, the onset of the explosive period is time-stamped to March 2018, which is the month in which the reform was adopted. Third, the estimated crash odds of the explosive period after October 2018 are quite high, suggesting a likely price collapse within a year. All three results suggest that the reform triggered market participants into speculation about its price impacts, which likely led to an overreaction that destabilized the market."*

³³ See Quemin et al. (2021), Figure 3b, page 13. In a revised version of their paper, the authors mentioned that these results could hinge on the underlying open interest metric and open the avenue for further work to detect and eventually confirm anomalies.

³⁴ Carbon Pulse, 4 March 2022, *"Not all doom and gloom": Bloomberg analysts see EU carbon price rebound* ; Carbon Pulse, 2 March 2022, *"Euro Markets: EUAs claw back 20% price plunge to end slightly lower as energy markets rocket"* ; Montel News, 2 March 2022, *"Carbon dives to 19-week low of EUR 55/t": "Carbon prices have lost as much as 42%, or some EUR 40, in the past five sessions as economic pressure resulting from Russia's invasion of Ukraine has ignited a speculative selling spree. Non-compliance entities have sought to contain their losses and cover margin calls in their positions in other energy markets."* (emphasis added)

³⁵ ESMA's Final Report from does not provide definitive explanations at this stage. ESMA explained that *"as far as the impact of the war on the carbon price is concerned, further analysis will be necessary in the future to determine the precise transmission channels"*. Quoting a Bloomberg article, ESMA indicated that *"there are indications that the decline in the carbon price may be associated with concerns around possible gas supply disruptions or import bans leading to a reduced need for EUAs, combined with general assumptions concerning an economic downswing and EU countries exiting fossil fuels at an earlier point in time. A more immediate reason for the decline may have also been market participants closing positions in EUAs to meet elevated margin calls, for instance, for gas contracts"*. ESMA (2022), p38.

long-term instability of EUA prices, especially in periods of high uncertainty. This raises questions about the impact of the growing participation of financial actors in the EU ETS market, whether and to what extent the participation of financial actors should be constrained, and if so, what would be the best mechanism to do so. We address these questions in the remaining of this report.

4 What are the specific features of the EU ETS that favour price destabilisation and require attention to limit potential harmful speculation?

Some structural characteristics of the EU ETS market could favour speculative trading in with potentially harmful consequences. This section analyses those characteristics which include:

- an inelastic supply conducive to high price volatility;
- the impact of uncertainties over long-term commitments to reduce emissions, the reform of the EU ETS and the associated mix of policies; and
- the vulnerability of the market design to potential speculative attacks.

4.1 An inelastic supply conducive to high price volatility

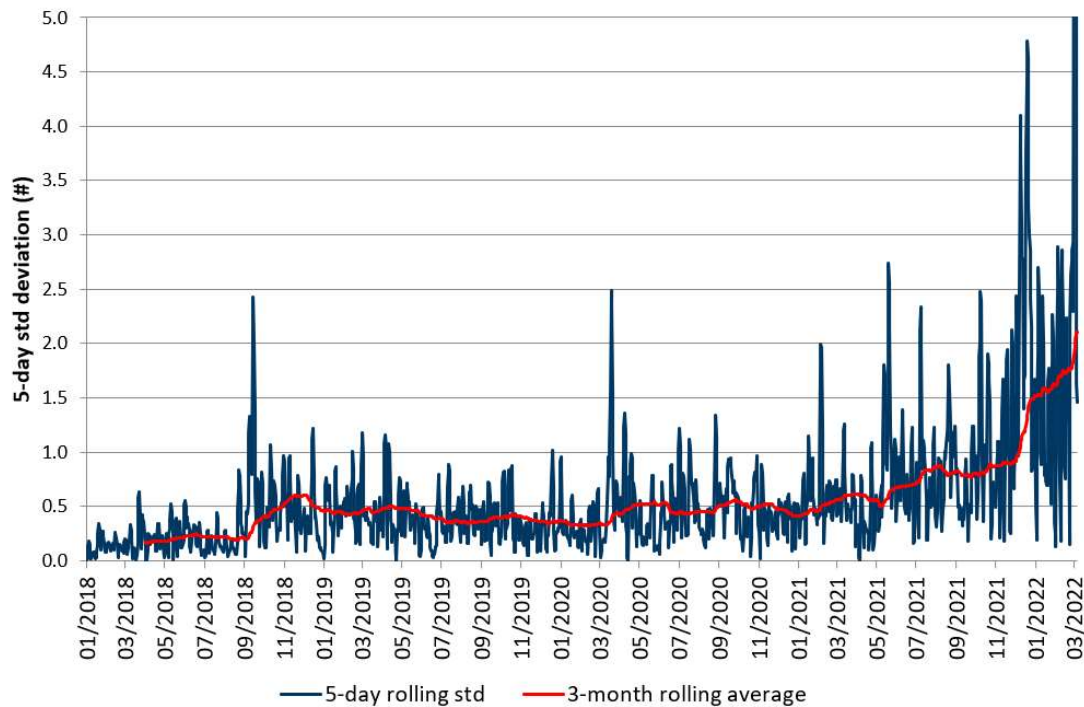
In the EU ETS market, by contrast to other commodity markets, the number of EUAs offered in auction and ultimately in circulation (either in the market or banked) is determined per period of several years and known *ex ante* when the EC chooses the EUA cap.

Before the MSR was introduced, the supply of EUAs did not respond to market conditions and changes in fundamentals fully translated into EUA price changes. At its core, the MSR aims to adjust the supply of EUAs to stabilize and ensure an orderly functioning of the allowance market. It does so based on the total number of allowances in circulation ("TNAC"). The TNAC is the number of allowances banked by firms from one year to the next for future use. The higher the TNAC, the fewer allowances the MSR makes available in future auctions and vice versa. The TNAC is thus used as a measure of allowance scarcity. In practice, the MSR is exclusively triggered by specific levels of TNAC, i.e., 833 million for the absorption and 400 million for the release of EUAs. Absorption and release of EUAs are performed over a year by auctioning less or more than the previously planned annual cap.

Nonetheless, since the amount to be absorbed or released is determined once a year to adjust the auction volumes, this implies that supply remains largely inelastic within a given year. Accordingly, between annual revisions of the TNAC, the impact of any unexpected exogenous shock or anticipation of shock on the demand for EUAs will translate into EUAs price volatility.

In this respect, Figure 6 below sets out the evolution of EUAs price volatility over the period from 2018 to 2022. The volatility of the EUA prices has increased both with regulatory changes such as the 2018 EU ETS reform, and external shocks such as the Covid-19 crisis in 2020, and the subsequent economic recovery, gas price surge and finally with the Ukrainian conflict in 2022. This increase in prices volatility favours the development of speculation.

Figure 6: Evolution of volatility in spot prices, 2018-2022



Notes: This analysis replicates the volatility assessment of ESMA's preliminary report but extends the period of analysis both to the period preceding the first EU ETS reform and to the latest market developments in 2022.

Source: Compass Lexecon analysis based on spot prices data from EnergyMarketPrice and Commitment of Traders reports from ESMA

4.2 The impact of uncertainty over long-term commitments to reduce emissions, the reform of the ETS and the associated mix of policies

The value of EUAs crucially hinges on market design rules, political support, and the credibility of the scheme.³⁶ Put simply, EUAs prices are shaped by expectations about policy commitments to emission reductions, the importance of the ETS as a mean to achieve those reductions, its market design, and the overlap with other policies addressing the demand for EUAs through direct incentives to perform decarbonisation investments.

It follows that changes of policies, market design and perceived commitment to achieving climate targets will translate into diverse price anticipations by market participants. This long-term uncertainty associated with the relatively low volumes of EUAs (and even lower in the future as the cap tightens) favours self-realised expectations, whereby speculators try to anticipate other speculators' strategies instead of relying on market fundamentals to form expectations. The same reasons suggest that these specific characteristics of the ETS could lead to price patterns characterised by substantial swings if some market participants with sufficiently large positions change their expectations.

Thus, this combination of speculation and regulatory uncertainty, especially in periods of market design reform or revised green ambitions, can prompt a destabilization of EUA prices. This risk is

³⁶

Lewis, M. (2020), 'Deep decarbonisation: green hydrogen, net zero and the future of the EU-ETS', BNP Paribas, https://www.icef.go.jp/pdf/2020/program/plenary_session/MarkChristopherLewis_P.pdf

particularly high at the moment with the Green Deal agenda and the discussions around the Fit for 55 Package.^{37, 38}

In this respect, the impact of policy uncertainty on EUA prices was recently investigated by Friedrich et al. (2020), who analysed EU ETS policy changes. Specifically, they looked at the development of the MSR in 2018 to test its impact on the stability of carbon prices while also accounting for changes in other fundamental price drivers. They concluded that *“the recent EU-ETS reform triggered market participants into speculation, which likely led to an overreaction that destabilized the market”* (emphasis added).³⁹ Going further, a specific focus is needed on the possibility for speculation (and eventually market manipulations) though self-realised expectations during periods of relatively high policy and regulatory uncertainty.

4.3 The vulnerability of the MSR to speculative attack

In the context of the rise in financial trading and speculation in the EU ETS, some features of the design of the MSR could eventually contradict its fundamental goal to stabilise prices, and favour price destabilisation or even market manipulation.

In preamble, it is important to draw a distinction between speculation and market manipulation. Market manipulation is illegal and unambiguously impairs market functioning. The EU Market Abuse Regulation (‘MAR’) prohibits insider dealing, unlawful disclosures of insider information and market manipulation.⁴⁰

Nonetheless, even without proven manipulation, the design of the MSR is vulnerable to speculative attacks. This is because conditioning the release and cancelation of EUAs on the TNAC can lead to an unintended and possibly undesirable market outcome. For instance, if anticipated scarcity was to increase, firms could react by banking more allowances to re-establish the balance between current and future abatement costs (eventually further reducing emission in the short-term), hedge

³⁷ Most importantly, vast changes to the structure of demand could stem from the gradual phasing-out of free allowances which would expose industrials to fully cover their emissions with allowances from the market. As this phasing-out is conditional to the implementation of the carbon border adjustment mechanism (CBAM) whose complexity and competitive impacts on EU industrials make it one of the most contentious issues of the proposed reforms, uncertainty ensues. See Carbon Pulse, March 2022, “France’s attempted deal on CBAM narrows as ‘hot potato’ issues sidelined”.

https://carbon-pulse.com/152885/?utm_source=CP+Daily&utm_campaign=030352babd-CPdaily07032022&utm_medium=email&utm_term=0_a9d8834f72-030352babd-110365270

³⁸ European Commission (2021), ‘Proposal for a Directive of the European Parliament and the Council amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757’, COM(2021) 551 final, 14 July.

https://ec.europa.eu/info/sites/default/files/revision-eu-ets_withannex_en_0.pdf.

European Commission (2021), ‘Proposal for a Decision of the European Parliament and the Council amending Decision (EU) 2015/1814 as regards the amount of allowances to be placed in the market stability reserve for the Union greenhouse gas emission trading scheme until 2030’, COM(2021) 571, 14 July.

https://ec.europa.eu/info/sites/default/files/revision-market-stability-reserve_withannex_en.pdf.

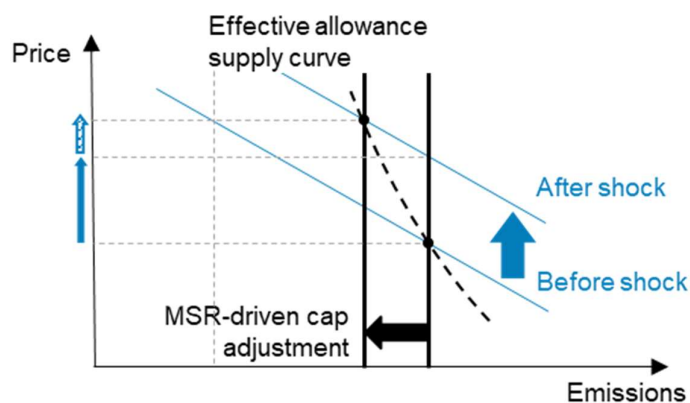
³⁹ Friedrich, M., Fries, S., Pahle, M. and Edenhofer, O. (2020), ‘Rules vs. Discretion in Cap and-Trade Programs: Evidence from the EU Emission Trading System’, Working Paper.

⁴⁰ Regulation (EU) No 596/2014 of the European Parliament and of the Council on market abuse (market abuse regulation), <https://eurlex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0596&from=EN>

future price increases or in expectation of a profit. Because more allowances would be banked they would continue to be counted in the TNAC, therefore the MSR would respond by absorbing more allowances, thereby actually further increasing scarcity. In such case, the MSR-induced flexibility would become counterproductive as it would increase rather than dampen the price impact of anticipated shocks.⁴¹

This is illustrated by Figure 7 below. An anticipated scarcity further to an exogenous shock could increase hedging needs and therefore demand for EUAs to be banked. This would mechanically translate into an upward shift in the demand for EUAs (blue line) and an increase in the TNAC. In response to the increase in the TNAC, the MSR could decrease the number of EUAs auctioned, leading to a shift in the supply of EUAs (black vertical line). This would ultimately further increase anticipated scarcity (and EUA prices) in a vicious circle.

Figure 7: Potential MSR destabilising adjustment, stylised example.



Source: Compass Lexecon based on Perino, G. et al. (2021).

The current MSR design could thus favour self-realised expectations and speculation. Indeed, if speculators were to bank large volumes of EUAs in anticipation of higher future scarcity prices, they would increase the TNAC for non-compliance purposes. In turn, this may trigger the activation of the MSR, and therefore lead to the expected increase in scarcity and EUA prices.

In summary, the current context raises questions regarding whether the TNAC is still the right metric to appreciate scarcity in the EU ETS market and trigger the activation of the MSR. Given the growing role of financial players potentially holding long / short speculative positions, we suggest that additional analysis should be carried out to evaluate the consequences of using this metric on the resilience of the MSR to speculation, and more broadly the stability of EUA prices.

41

Perino, G., Willner, M., Quemin, S. & Pahle, M. (2021). The Market Stability Reserve in the EU ETS: Firefighter or Fanning the Flames? Review of Environmental Economics & Policy, forthcoming.

5 What are the potential costs and benefits of speculation in the EU ETS and the trade-offs in designing a market providing a robust price signal?

Financial trading, and speculation in particular, played and is still playing an important role in the EU ETS market to the benefit of the participants. However, when speculation becomes excessive, it can lead to harmful short-term volatility or long-term price destabilisation. In this section we discuss the trade-off regarding those costs and benefits and relate this to the current situation of the EU ETS market with substantial temporary uncertainty on the evolution of the market.

5.1 Financial trading, and speculation in particular, plays an important role in the EU ETS market to the benefit of market participants

As discussed briefly in Section 3, financial trading, and speculation in particular, played and is still playing an important role in the EU ETS market to the benefit of market participants. In the short term, financial trading increases the liquidity in the market, allowing participants to easily find counterparties to trade and hedge their EUA price exposure. This increase in liquidity translates into a reduction of the transaction costs, as measured by the bid-ask spread. The bid-ask spread is the difference between the highest buy offer and the lowest sell offer. It measures the implicit cost of making transactions without delay. A higher liquidity is typically associated with a narrower bid-ask spread which increases the likelihood of execution and decreases transaction costs for market participants.

In the long term, financial trading is expected to favour price discovery. Price discovery helps providing a signal that is robust, i.e., revealing of expected evolution of market fundamentals in the future. This key information allows other market participants to devise the most adapted strategies to react to the market's expectations regarding future interplay between demand and supply, external shocks, and ultimately EUA prices.

5.2 However, when speculation becomes excessive, it can increase the costs of trading and hedging for obliged entities

The participation of financial actors can however in certain circumstances increase compliance costs for obliged entities and decarbonisation costs, which ultimately could undermine the expected benefits discussed above.

In the short term, excessive speculation may increase EUA price volatility and increase the costs of trading and hedging position for obliged entities.⁴² In fact, ESMA's Preliminary Report already uncovered a structural increase in price volatility since early 2020, though in part due to the pandemic outbreak (see Figure 6). Also, excessive EUA price volatility may render short-term price signal ineffective to affect operational decisions.

In the longer term, EUA prices play a central role in driving investments in clean technologies and alternative energy sources required to mitigate the impact of climate change; and to deliver the commitments of many governments and companies to reduce carbon emissions to net zero. Therefore, an excessive speculation that would result in excessive volatility and a destabilisation of EUA prices signal would increase decarbonisation costs, disincentive investments and ultimately could be harmful for decarbonisation.

Indeed, the lack of predictability of the carbon price signal could undermine investment and lead to technology lock-in for fossil fuel technologies and the risk of stranded assets and inefficient investment signals in renewables and low carbon technologies. For instance, the EUA price risks affect investment decisions in renewable technology by increasing the cost of capital and ultimately business case for investment in renewable projects. To the contrary, a number of studies have demonstrated that a predictable EUA price trajectory would support more efficient intertemporal investments, and improve the dynamic efficiency of the market, which is particularly important for the next decade when the European economy will need substantial investments to decarbonise.⁴³

In addition, as explained above, allowance markets could quickly be overrun by large capital influx from non-compliance actors, as the market size is small relative to other commodity markets such as oil and allowance supply is set to shrink over time. It could become easier to amass sufficient positions to unduly influence EUA prices formation. Price formation may become increasingly influenced by purely trading-oriented indicators and algorithmic programs.

5.3 Conclusion on the costs and benefits associated with financial speculation

In conclusion, it is important to note that the level of financial participation which is acceptable or optimal depends on the degree of maturity of the market and therefore may evolve in time.

In the inception phase of the EU ETS market, it was important to foster liquidity and thus allowing broad and unlimited participation made sense. In the current context, the trade-off related to the costs and benefits associated with financial speculation may need to be revisited as the market is more mature and developed and having a predictable EUA price signal is critical in driving long term investment decisions towards decarbonisation in end use sectors. There is a significant benefit in having a predictable price signal for obliged entities at the moment when they are about to make long term investment decisions.

⁴² Friedrich, M., Mauer, E.-M., Pahle, M. & Tietjen, O. (2020). From Fundamentals to Financial Assets: The Evolution of Understanding Price Formation in the EU ETS. Working Paper, ZBW – Leibniz Information Centre for Economics.

⁴³ Roques, F. et al. (2018), "A climate and socio-economic study of a multi-member state carbon price floor for the power sector", <https://www.fticonsulting.com/insights/articles/study-carbon-price-floor-european-countries>, F. Roques (2018), "Study on the Impact of a Carbon Price Floor on the European Power Markets", http://www.ceem-dauphine.org/assets/dropbox/FTI-CL_Energy_-_CEEM_Seminar_Carbon_Price_Floor%2C_Paris_Dauphine_08Nov18.pdf

This suggests that the potential benefits of price stabilisation have increased compared to the initial phases of the EU ETS.

In addition, the trade-off on the costs and benefits of allowing speculation are different depending on whether the ETS is:

- in a stable state, i.e., within a trading phase, once the rules have been set and structural uncertainty regarding demand have been moderated; or
- in a transition phase, i.e., when the emission reduction ambition and/or the market rules are in discussion and thus the structural uncertainty shaping expectations of supply is high (such as the current situation).

In such a transition phase, the price discovery benefits of speculation could be more limited and instead the specific features of the EU ETS described before could lead to potential large price movements and/or market manipulation such that limiting or/and closely monitoring financial trading may be warranted.

6 Which measures could be considered to limit the risk of excessive speculation and stabilise EUA prices in the EU ETS market?

The short-term and long-term negative impacts of excessive speculation could call for limiting or disincentivising speculation in the EU ETS market.⁴⁴ In this respect, this section aims to contribute to the debate and describe a toolkit of measures that could be mobilised to mitigate negative impacts of potential excessive speculation and more fundamentally to improve the EU ETS market functioning and provide a more predictable carbon price:

- Measures to improve monitoring and market oversight are a no regret option;
- Measures to limit or regulate financial trading could also be considered to limit short-term EUA prices swings, especially in periods of high regulatory uncertainty;
- More fundamentally, in order to provide a more predictable EUA price signal, measures to address long-term policy and regulatory uncertainty could disincentivise long-term speculative trading and bring substantial benefits to optimize decarbonisation costs;
- In addition, structural measures to improve EUA prices stabilisation could be implemented to reduce short-term volatility, thereby disincentivising short-term speculative trading;
- Finally, measures to compensate obliged entities could be considered to mitigate the increase in compliance costs, without altering the functioning of EU ETS market.

We discuss the merits and limitations of these measures in the following.

6.1 Measures to improve monitoring and market oversight are a no regret option

The growing participation of financials in the markets for EUAs and EUAs derivatives may warrant the creation of a dedicated regulatory body. As stated above, the EUAs derivatives markets are governed by a series of EU financial regulations such as the MiFID and supervised by ESMA. However, financial and environmental regulations remain siloed although they increasingly overlap.

The mandate of this dedicated regulatory body could be twofold. First, it could be tasked with the joint perspective on supervision and adequacy assessment of allowance and derivatives trading, in particular enhancing transparency in the market. Second, it could collaborate closely with policymakers to ensure that regulation is truly integrated, i.e., jointly considers the environmental and financial aspects. Beyond managing allowance supply over time, a joint perspective on market

⁴⁴ Carbon Pulse (2022), 'Key EU lawmaker plans to propose steps to curb carbon market "manipulation"', 14 January. <https://www.bloomberg.com/news/articles/2022-01-14/key-eu-lawmaker-plans-measures-to-curb-carbon-price-manipulation>

development and design would be particularly useful in addressing the issue of whether speculation curbs, such as position limits, are needed and how best to design them.

These measures to increase market transparency and integration echo to some extent the series of policy recommendations identified by ESMA to contribute to improving the transparency and the monitoring of the EU carbon market. ESMA believes that such measures *“would provide more information to market participants and the public at large about the carbon market and they would help in maintaining orderly markets going forward thereby contributing to the continued adequate functioning of the EU carbon market which plays an important role for the Union’s green transition”*.⁴⁵

6.2 Measures to limit financial trading

Direct measures to limit or ban speculation could be envisaged, such as:

- The introduction of taxes on certain transactions could limit the value of speculative trading and ultimately limit short-term EUA prices volatility.⁴⁶ For instance, taxes could only apply to pure financial transactions, i.e., transactions which would not involve compliant entities or financial institutions acting on the behalf of compliant entities. The implementation of such measure would however require having a comprehensive classification of the various market participants and also for financial institutions to clearly identify trading activities on the behalf of compliant entities and on their behalf.
- The introduction of a minimum holding period (for financial institutions not acting on behalf of compliant entities) could limit the possibilities of taking speculative positions to benefit from short-lived EUA price variations. In practice a given actor would not be allowed to undertake buy and sell trades within the same short time period. This would limit activities of high-frequency trading or/and algorithmic trading firms, limit short-term speculative trading, and ultimately limit in part the potential overreaction of EUA prices to changes in market fundamentals.
- The introduction of limits on financial positions could reduce the volume of speculative trades and potential price destabilisation effects arising from speculation. This could be implemented by limiting the number of positions hold in aggregate and individually by financial institutions (not acting on the behalf of compliance entities). In practice a given buyer would not be allowed to buy more than a certain percentage of the offered allowances in a single auction and, in the event of exceeding the aggregate limit, all buyers from the group of financial institutions may not buy further allowances at auction. Limits could also be imposed in the secondary market. In this later case, position limits could be limited to non-hedging positions. For instance, limits could be set by reference to the total allowances in circulation held by financial institutions.
- The introduction of rules to limit financial trading to transactions involving compliant entities and/or financial institutions acting on the behalf of compliant entities.

These measures would not address the source of the excessive speculation (see Section 4); but would directly constrain or limit the value of (and ultimately disincentivize) financial trading.

It is worth noticing that fully banning of financial trading is not suitable, given the important role of financial trading for liquidity and price discovery. More generally, though reducing financial trading

⁴⁵ ESMA (2022), p8.

⁴⁶ Financial Transaction Taxes are widely used in Europe. <https://taxfoundation.org/financial-transaction-taxes-europe-2021/>

could limit price volatility and the formation of price bubbles, it could also limit price discovery, risk transfer, and liquidity to the detriment of the well-functioning of the market. Actually, in South Korea and China, regulators opened their national emissions allowance markets to (licensed) non-compliance actors to alleviate ongoing illiquidity issues.^{47,48} Nevertheless, China's ETS market remains prohibited for foreign investors, the Korean ETS market includes limits on the share of auctioned allowances a single trading account can purchase.

In practice, the costs and benefits of such measures should be further analysed, and the case for temporary interventions during specific periods of high uncertainty may be stronger than as a permanent structural feature. Indeed, during periods of reform of the EU ETS market or change in climate targets (such as currently), direct measures to limit speculation could lead to higher benefits given the high uncertainty over price anticipations. In these periods, the potential negative impact of reducing financial trading on price discovery could be offset by the benefits of stabilising prices.

6.3 Measures to address policy and regulatory uncertainty

More fundamentally, measures that would reduce long-term uncertainties on political commitments to decarbonisation, the ETS design, and policy overlaps (i.e., other policies giving emission reductions) should be considered.

Measures to enhance the credibility of the policy commitment to reduce emission and to ensure that the EU ETS would be resilient and adapt to various types of shocks could range from the introduction of carbon contracts for difference ("CCfD") which would be commitments to a predetermined EUA price in the future; and go up to the delegation of regulatory power over the EU ETS to an independent entity with a mandate to meeting climate objectives (e.g., central bank of carbon). We detail these potential approaches in turn below.

First, the introduction of CCfDs would offer assurance about the future carbon prices in the form of a fixed price for certain emissions reductions at different points in time in the future.⁴⁹ CCfDs would provide a hedge against EUA prices to certain regulated entities. Concretely, companies holding CCfDs would be compensated if they pay for EUAs more than the predetermined EUA price and will need to pay additional money if they pay for EUAs less than the predetermined EUA prices. CCfDs could therefore reduce costs of investing in clean technologies and ultimately trigger decarbonisation initiatives which too-low and/or volatile EUA prices would not have otherwise

⁴⁷ Carbon Pulse (2021). China Carbon Futures Trading Likely to Go Ahead After Government Nod. November 8, 2021. Carbon Pulse (2021). South Korea to Open ETS to Financials this Month. December 1, 2021.

⁴⁸ In South Korea, in Phase 1 (2015-2017) of the Korean ETS, only liable entities were able to participate, in Phase 2 (2018–2020) only liable entities and a selection of market makers were allowed to trade, in Phase 3 (2021-2030), participation will be widened to individuals and financial companies. Sungwoo Lee, Kyeongah Ahn, and Younghyun Lee from the Greenhouse Gas Inventory and Research Center of Korea (GIR) declared to ICAP: "As the introduction of market makers helped revitalize the K-ETS and improve market functioning in Phase 2, we expect similar effects from the introduction of derivative products and third-party transactions in Phase 3. The participation of securities companies and individuals in financial institutions other than the covered entities will be allowed. Within a certain limit, financial institutions will be able to trade themselves, while individuals will be allowed to trade on consignment. In addition, by introducing futures trading, the aim is to enhance price discovery and expand the predictability of the market." See. ICAP. (2021). Emissions Trading Worldwide: Status Report 2021, Berlin: International Carbon Action Partnership, Page 18.

⁴⁹ In particular, CCfDs cover the difference between a variable reference price (the price of EUAs) and a fixed competitive strike price. When the allowance price falls below the strike price, the CCfD is triggered, resulting in a payment from the contracting party (typically a national government) to the beneficiary.

triggered. EUA prices set in CCfDs could anchor crossing points in 2030 and beyond consistent with the Fit for 55 Package Impact Assessment.

That said, CCfDs would need to be designed and calibrated carefully so as to interact efficiently with the EU ETS. Eligible obliged entities would also need to be identified, which could be based on specific criteria. For instance, CCfDs may be granted to certain obliged entities in order to allow them to anticipate long term investments. Their design and allocation should however be analysed further to avoid potential side effects and distortions to the EU ETS, as e.g. such CCfDs could increase supply of EUAs in the market (if excess of allowances is not cancelled directly or indirectly through the MSR), lead to a decrease in EUA prices. This would in turn potentially lead other obliged entities (not under CCfDs) to delay their emissions reduction and could be counterproductive.

Another approach to reduce uncertainty induced by policy changes could consist in the delegation of regulatory power over the EU ETS to an independent entity with a mandate to meet climate objectives with a clear set of targets. This would represent a fundamental move from the current organisation and would address one of the root causes of long-term price stability in the EU ETS market, i.e., the uncertainty around political commitment, and could indirectly induce a decrease in harmful consequences of excessive speculation.

However, the effectiveness of such delegation of power would ultimately depend on the credibility of the independency of this entity and its precise mandate. Drawing the parallel with the role of central banks for the management of monetary policy, some experts have explored the key issues associated with such potential carbon central bank. In relation to the role of speculation and price stabilisation, a fundamental issue is whether the mandate of this central bank of carbon would be limited to ensuring that the EU is on track to its emission targets, or whether managing the market to ensure that the carbon price stays within certain limits would be part of its mandate (similar to the debate as to whether central banks mandate should be limited to inflation or should include other criteria such as economic growth).⁵⁰

6.4 Permanent structural measures to improve price stabilisation in the EU ETS

In addition, further price stability mechanisms could be introduced in the EU ETS, which could be price-based to directly stabilize EUA prices or volume-based to indirectly stabilize prices by adjusting the supply of EUAs. By stabilising EUAs prices, these measures would improve the resilience of the market and reduce EUA prices volatility. This would in turn limit opportunities for excessive speculation.

Actually, carbon markets across the world are increasingly adopting price stabilisation measures to improve market functioning, manage unexpected shocks and address excessive price volatility. A recent review analysed the measures proposed or implemented in eight global jurisdictions, namely the EU, South Korea, California-Quebec, the North-eastern US states in the Regional Greenhouse Gas Initiative, Australia, New Zealand, Chinese regional carbon markets, and Tokyo-Saitama's city-level carbon market. The review shows that all ETS markets include a price stabilisation mechanism and that they are mostly price-based.⁵¹

⁵⁰ Grosjean, G., Acworth, W., Flachsland, C. & Marschinski, R. (2014). After Monetary Policy, Climate Policy: Is Delegation the Key to EU ETS Reform?, Mercator Research Institute on Global Commons and Climate Change, MCC Working paper 1/2014, May 2014.

⁵¹ Vivid Economics, Market Stability Measures, Design, operation and implications for the linking of emissions trading systems, February 2020, https://ec.europa.eu/clima/system/files/2020-06/study_market_stability_measures_en.pdf

Among the most common price stability mechanisms, we identify:

- The introduction of volatility limits (or more precisely limit in daily price swings) and even circuit breaker could be considered to limit daily volatility.⁵² This measure would not improve the overall functioning of the market but would only limit trading in case of severe short-lived crisis (i.e., during panic event). This measure is already implemented in many stock exchanges (e.g., future contracts on the New York Stock Exchange are subject to volatility limits).⁵³
- The introduction of a price floor (with a gradual increase over time) could help diminishing the short-term volatility of EUA prices and ensuring more predictability price signal for investors and compliant companies and stimulate investment in clean technologies.⁵⁴ Conversely, the introduction of a price ceiling (with a gradual increase over time) could help preventing short-term excessive compliance costs for regulated entities.⁵⁵ The introduction of a cap and/or floor would require defining the level for the cap and/or floor prices and ultimately the extent to which the resulting corridor would constrain more or less EUA prices level and volatility. For instance, the floor price could be based on EUA prices consistent the Fit for 55 Package Impact Assessment to strengthen long-term price signal or at much lower level to only act as an insurance against too low EUA prices. Another possible option is to introduce a substitute charge, which would depend on the cost of developing new technologies. This could be based on the current design of the EU ETS Directive which provides for a financial penalty mechanism in case a regulated entity does not surrender enough EUAs to cover its emissions (€100/tCO₂ of unaccounted-for emissions plus the inflation rate in addition for surrendering the missing EUAs). The penalty could be replaced by a substitute charge. Such a substitute charge would likely have an impact similar to the introduction of a price cap and could therefore limit short-term price volatility. However, it could also dry up liquidity if market participants decide not to trade in the market and to pay the substitute charge instead.
- The revision of the MSR could improve the resilience of the EU ETS market and help stabilizing prices.⁵⁶ Such revision could entail the modification of the current parameters of the MSR (e.g., in-take rate, invalidation mechanism, frequency of activation, etc.) and more fundamentally the revision of the activation conditions, i.e., to move from a TNAC-based activation mechanism to a price-based activation mechanism. The MSR would then release or withdraw EUAs depending on the level of the EUA price. The volume of EUAs to be released or withdrawn would also vary with the level of the EUA price, i.e., the higher the price the higher the volume of EUAs to be released. Specially and discussed earlier, the MSR currently adjusts the supply of EUAs based on an ill-suited indicator of scarcity, the TNAC. TNAC-based supply adjustment could destabilize the carbon market and could be subject to speculative attack as explained *supra*. We argue that

⁵² Hache, F., (2021). 2021: a carbon market odyssey, Policy report on the EU ETS review. Volatility limits would limit trading within price bands, e.g, +/- 10% of the opening price, and circuit breakers would halt trading for a given time period in case of excess volatility according to a given threshold.

⁵³ <https://www.nyse.com/markets/nyse/trading-info#luld>

⁵⁴ https://www.greens-efa.eu/files/assets/docs/positionpaperets_print_4.pdf

⁵⁵ Typically, auctions are cancelled until the carbon value reaches the floor and corresponding allowances are transferred to a dedicated reserve (the "Price Corridor Reserve (PCR)"). Allowances are released from the PCR when the carbon value is higher than the ceiling.

⁵⁶ See for instance, proposition in Perino, G., Willner, M., Quemin, S. & Pahle, M. (2021). The Market Stability Reserve in the EU ETS: Firefighter or Fanning the Flames? Review of Environmental Economics & Policy, forthcoming. Centre for Climate and Energy Analyses (2022), "Reform of the market stability reserve in the Fit for 55 package", https://climatecake.ios.edu.pl/wp-content/uploads/2022/01/CAKE_MSR_Report_31-01-2022.pdf

a price-based flexibility mechanism could be more appropriate in a market with growing financial trading and speculation. The price of EUAs is indeed likely to be a more reliable indicator of expected scarcity changes than the TNAC (which could reflect the building-up up open speculative positions, rather than scarcity in the market). Conditioning supply on prices would then hold the potential to mitigate risks of excessive speculation, and ultimately reduce short-term price volatility. Note that such revision of the MSR would have a limited impact on the long-term price signals as the MSR does not alter supply and demand balance in the long term when surplus has been cleared (but if coupled with an invalidation mechanism).

- The revision of Article 29a of the EU ETS Directive could allow for a quicker response in case of fast price increase.⁵⁷ The Article 29a has never been used so far and with its current activation condition (if for more than six consecutive months, the EUA price is more than three times the average price of allowances during the two preceding years) is likely to be met only in extreme circumstances. To make it effective as a price stabilisation mechanism, the Article 29a could be conditional on the achievement of EUA prices thresholds and not on the realisation of the above-mentioned price increase multipliers. The interplay with the MSR would however need to be carefully considered such that, for instance, EUAs released under Article 29a would not trigger the activation of the MSR. To the extent that it would be accompanied by a reform of the MSR or/and the introduction of price-based mechanism, the Article 29a would have to continue being a last resort lever, to intervene only in case severe disruption of the market. In the case in which there would be no reform of the activation of the MSR or/and the introduction of a price-based mechanism, the Article 29a could however be used to adjust EUAs in circulation based on the level of scarcity in the market, as measured by the EUA prices (as opposed to the TNAC for the MSR).

6.5 Measures to compensate obliged entities

Measures to compensate and/or redistribute some of the financial participants revenues to non-financial participants could also be considered. Mitigating costs induced by excessive speculation could be done through the imposition of a tax levied on market turnovers (tax on exchange transactions) for entities that are not companies under compliance obligations, or that do not trade on their behalf.

Note that such measure would not resolve the underlying root causes of the market malfunctioning but would allow compensating non-financial market participants for the increase in trading costs resulting from excessive speculation. Moreover, such compensation measures for compliance entities would require to be compliant under the EU State aid framework.⁵⁸

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Art 29a of the EU ETS Directive was included in Directive 2009/29/EC to address excessive price fluctuations. Under Article 29, if, for more than six consecutive months, the allowance price is more than three times the average price of allowances during the two preceding years, the EC shall convene a meeting of the Climate Change Committee. This is just a first condition for the Art29a to be triggered. As a second condition, the EC Climate Change Committee has to determine that the excessive price fluctuations do not correspond to market fundamentals, while no definition of market fundamentals is given by the legislator. Only if both conditions are met, the Article 29a is triggered. If this is the case, there are two tools available to Member States: (1) a measure which allows to bring forward the auctioning of a part of the quantity of allowances to be auctioned; (2) a measure which allows to auction up to 25% of the remaining allowances in the New Entrants Reserve. So far, the Article 29a has never been triggered.

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Jeszke, R., & Lizak, S., (2021). Reflections on the Mechanisms to Protect Against Formation of Price Bubble in the EU ETS Market, Institute of Environmental Protection, Sciendo Vol. 32 No 2(88): 8-17.

6.6 Conclusion

The recent increase of the EUA prices level and volatility has raised questions regarding the role of speculative trading. More generally, it has revived the debate on the potential measures to stabilise EUA prices, as Europe's ambition to fast track the decarbonisation of its economy requires a strong and predictable carbon price signal. EUA prices instability and lack of predictability could have significant short- and long-term consequences on the EU decarbonisation, including higher compliance costs for obliged entities and higher decarbonisation costs. This calls for a review and potential regulation of the role of financial trading in the EU ETS market as well as addressing some of the structural issues with the EU ETS market and MSR design that contribute to price instability. In this respect, we identified no regret measures to improve monitoring and market oversight. Moreover, measures to address long-term policy and regulatory uncertainty could address some of the root causes and enhance the EUA price signal predictability, thereby bringing substantial benefits to optimize decarbonisation costs.

These measures could be complemented with more structural measures within the EU ETS to improve EUA prices stabilisation and reduce excessive short-term volatility. These measures should however be carefully designed and calibrated to protect obliged entities from excessive compliance costs, while allowing EUA prices to smoothly respond to changes in market fundamentals.

We also identified possible short-term targeted measures to limit financial trading, at least during specific periods of high uncertainty. The costs and benefits of interventions on trading limits should however be further analysed, and the case for temporary interventions during specific periods of high uncertainty such as now until the ETS reform is clarified may be stronger than as a permanent structural feature. In addition, temporary targeted compensation measures could be used to protect obliged entities without distorting the EUA price signal.

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