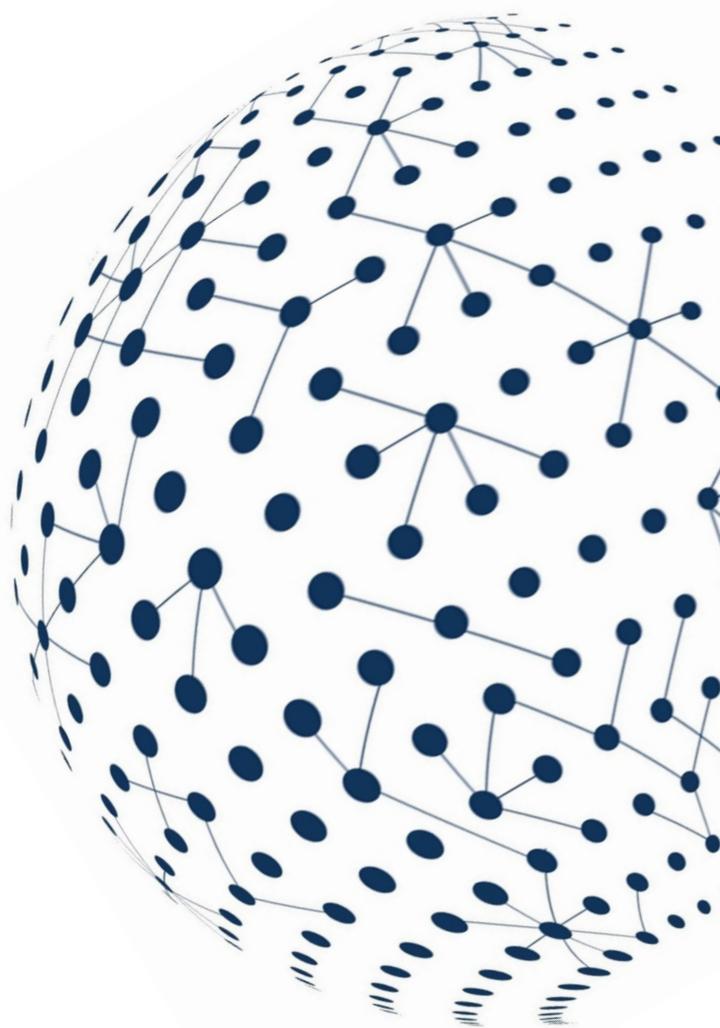


The Financial Stability Aspects of Commodities Markets

20 February 2023



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Table of Contents

Executive summary	1
1. Introduction	3
2. Overview of market structure and vulnerabilities	4
2.1. Structure of commodities markets	4
2.2. Participants in commodities markets	6
2.3. Mapping commodities derivatives markets	8
2.4. Venues for commodities derivatives trading	9
2.5. Commodities derivatives market concentration	9
3. Adaptation to shocks and channels of contagion	13
3.1. Market liquidity, volatility and margin calls	13
3.2. Credit exposures	19
3.3. Recent shifts in commodities derivatives activity	21
4. Conclusions and policy implications	25
Abbreviations	28

Executive summary

The commodities ecosystem involves a large number of non-financial and financial sector participants across a range of physical and derivatives markets. These markets tend to be quite heterogeneous in terms of market structure and practices. In contrast to the structure in many other financial markets, a small number of non-financial commodities traders – some of which are highly leveraged – play an important role. These non-financial firms are connected with core financial sector participants and some rely on banks for short-term funding.

Banks are key providers of credit and funding liquidity, as well as clearing services, to commodities firms and the underlying markets. This creates a link between the commodities ecosystem and the core financial system. Bank credit exposures to commodities traders appear manageable in aggregate. There is, however, significant variation across individual banks, some of which have materially higher exposures.

The COVID-19 event, subsequent supply chain bottlenecks, and the Russian invasion of Ukraine in February 2022 led to a surge in the price of key commodities and extreme volatility in some commodities and related derivatives markets. This induced a spike in margin calls, resulting in an increased demand for liquidity by commodities firms and other market participants to meet those calls, and the emergence of liquidity strains in some markets. Market intelligence suggests that, in some cases, commodities traders were able to meet their demand for liquidity by increasing their use of bank credit facilities or by borrowing additional funds. The commodities ecosystem as a whole was largely able to absorb the shock. There were no major disruptions to market functioning – with the exception of the London Metal Exchange (LME) nickel market – and there was a limited impact on the rest of the financial system.

Commodities market participants adapted to the volatility shock by trying to reduce their funding liquidity risk, while taking on more credit and market risk in the process. Evidence suggests that in Europe there has been migration of activity in some segments from centrally cleared exchange-traded derivatives (ETD) markets to largely uncleared over-the-counter (OTC) markets in order to reduce the funding liquidity risks associated with sudden increases in margin calls. However, such a move has also increased counterparty credit risks in the commodities ecosystem. There are also indications that certain players in European commodities markets may have reduced their hedging of commodities prices due to the increased margin calls. While this again reduces funding liquidity risks, it raises commodities firms' market risks.

This report focuses on the mechanisms through which any further stresses in commodities markets could propagate more broadly through the financial system. The report, however, does not discuss the broader macroeconomic implications of the surge in commodities prices. It also does not explore the potential for indirect impacts on financial stability from an adverse, commodity-related shock to the economic outlook. The commodities ecosystem has several key financial vulnerabilities. First, it is concentrated in a number of ways, including: the share of trading and derivatives activity in a few large commodities firms; the banks that provide credit to commodities traders, who rely on short-term funding to finance their activities; the banks that provide clearing services to link commodities firms and central counterparties (CCPs); the CCPs that are used to clear commodities derivatives; and the proportion of electronic trades intermediated by principal trading firms (PTFs). To assess the degree of concentration, this

report uses the example of the European natural gas derivatives market, largely using trade repository (TR) data for the EU and UK.

Second, there is a widespread use of leverage in the commodities sector – either through borrowing of short-term funds by commodities traders, or exposure to the synthetic leverage embedded in derivatives trading. The use of leverage can lead to liquidity stress in the event of margin calls on derivatives positions and collateral calls on short-term borrowing. Finally, there is opacity in some areas of the commodities sector, including OTC derivatives markets where it is difficult to obtain a full picture of the size or network of exposures across jurisdictions.

Continued geopolitical tensions and heightened macroeconomic uncertainty in an environment of tightening financial conditions raise the risk of further significant volatility in commodities markets. In the event that this happens, several important channels of contagion could become salient. CCPs and clearing members would need to make further margin calls, banks may choose to limit their credit exposures, and market participants might cut back their trading in both cleared and non-cleared markets. While these actions would be part of prudent risk management, they could also exacerbate liquidity mismatches in markets, thereby propagating shocks in commodities markets and perhaps the financial system more broadly. This all suggests the need for the FSB and its member authorities to continue monitoring developments in commodities markets and the preparedness of commodities firms – working with CCPs and clearing members – to manage sudden increases in margin on derivatives positions, but also to assess and address any risks these firms may pose for the financial system in times of stress.

The report also identifies a number of data gaps that hamper the assessment of vulnerabilities in the commodities sector and make it difficult to quantify the financial stability transmission channels. For example, there have been difficulties in obtaining cross-border exposures in OTC markets, or data on the network of exposures to assess the build-up of concentrated positions. Information on the trading behaviour and funding needs of commodities traders is also limited. These data gaps reflect both information that is not currently available to authorities (e.g. because the relevant entities are outside the regulatory perimeter), but also challenges in using and sharing available information effectively (e.g. TR data). Relevant authorities should consider ways to make better use of existing data and to address the opacity of activities across physical and derivatives commodities markets, to facilitate vulnerabilities assessments.

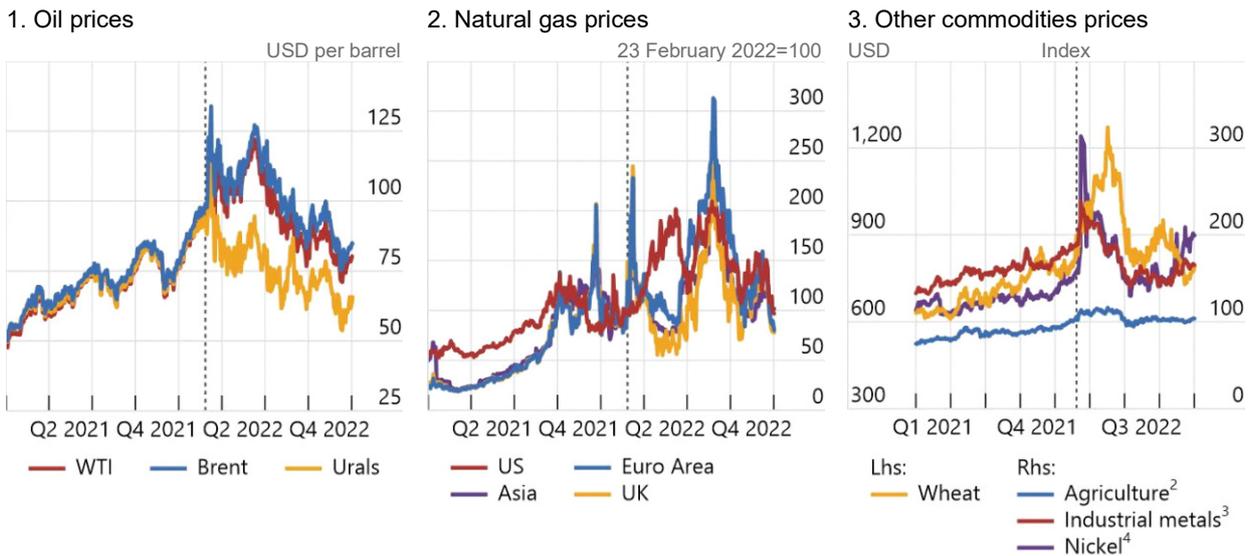
Finally, a number of the vulnerabilities and channels of contagion discussed in this report – including leverage, impact of large margin calls on liquidity demand and market opacity – are not unique to commodities markets. Many of these issues are being addressed in the FSB's work programme to enhance the resilience of non-bank financial intermediation (NBFI).

1. Introduction

Russia’s invasion of Ukraine in February 2022 added stress to previously tight commodities markets and caused dislocations in several of these markets as prices surged and became significantly more volatile. The shock affected a broad range of commodities, with the price of European natural gas and industrial metals doubling, oil prices surging by more than 30% and wheat prices also rising sharply, albeit a few months later (Graph 1).

Selected commodities prices¹

Graph 1



¹ The dashed vertical line indicates 24 February 2022 (start of war in Ukraine). ² Comprises coffee, corn, cotton, lean hogs, live cattle, soybeans, sugar and wheat. ³ Comprises aluminium, copper, nickel and zinc. ⁴ Nickel price is indexed to 100 on 2 Jan 2020.

Sources: Bloomberg; FSB calculations.

This volatility led to a spike in margin calls on commodities derivatives contracts, particularly in Europe, resulting in an increased demand for liquidity to meet those calls. These events exposed the complex linkages between commodities markets and the financial system that involve a heterogeneous array of commodities traders and producers, financial intermediaries and end-users.

Commodities markets can be very heterogeneous, with many differences across jurisdictions, so this report focuses on markets for a few globally traded commodities that are of particular economic importance at the current juncture (crude oil, natural gas, and wheat).¹ The report examines the mechanisms through which any further stresses in commodities markets could propagate more broadly through the financial system. However, it does not discuss the broader macroeconomic implications of the surge in commodities prices, nor does it explore the potential for indirect impacts on financial stability from an adverse, commodity-related shock to the economic outlook.

The rest of this report is structured as follows: Section 2 presents an overview of commodities markets and their vulnerabilities; Section 3 discusses channels of contagion in commodities

¹ The report does not cover electricity markets as these tend to be more domestically orientated.

markets and explains how the ecosystem has adapted to the February 2022 shock; Section 4 concludes and discusses the main policy implications of the analysis in this report.

2. Overview of market structure and vulnerabilities

2.1. Structure of commodities markets

Commodities markets involve a large number of interconnected non-financial and financial participants, as illustrated by Figure 1 and Table 1. There is also a range of different markets, in particular: (1) the spot market for the immediate delivery of physical commodities; (2) derivatives traded on exchanges (ETD); and (3) OTC derivatives markets.²

Table 1. Key participants in oil, natural gas and wheat markets

	Oil	Natural gas	Wheat
Commodities producers	Saudi Aramco, PetroChina, Rosneft, Exxon, BP, Total Energies	Saudi Aramco, Royal Dutch Shell, BP, Exxon, Total, Gazprom	Farming sector
Commodities traders	Trafigura, Glencore, Vitol, Gunvor, Mercuria		Archer Daniels Midland, Wilmar, Bunge, Cargill, Louis Dreyfus, Olam
Commodities consumers	Refineries, airlines, petrochemical industry, transport sector	Electricity generating companies, retail gas suppliers, chemical industry	Milling companies, food industry
Banks, brokers and dealers	Goldman Sachs, JPMorgan, BNP Paribas, Morgan Stanley, Société Générale, Marex, ADM Investor Services		
Exchanges	ICE (UK, US, Endex), CME (NYMEX)	ICE, CME, EEX	Euronext, ICE, CME (CBOT)
CCPs	ICE Clear (Europe, US), CME Clearing, ECC		ICE Clear Europe, CME Clearing, LCH SA

Note: Some commodities traders are also producers and vice versa. ICE operates futures exchanges in a range of jurisdictions such as ICE UK for oil and UK gas, ICE Endex (Netherlands) for natural gas. CME Group operates several derivatives exchanges including the Chicago Board of Trade (CBOT) and the New York Mercantile Exchange (NYMEX) that trade different products, as well as CME Clearing that clears contracts traded on these exchanges.

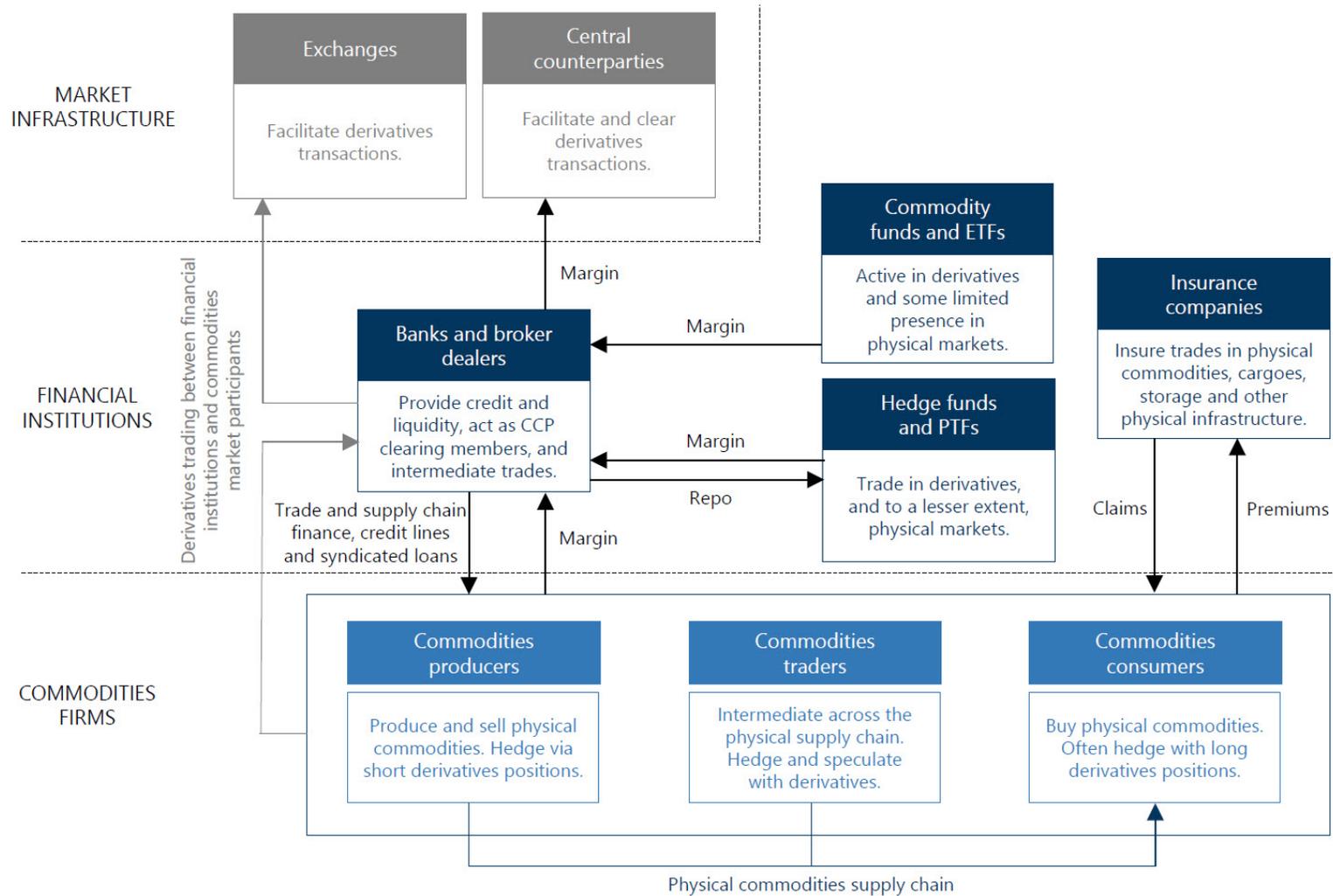
Source: National authorities.

The main role of these commodities markets is to facilitate the transportation, transformation and storage of key raw materials on their journey from commodities producers to the commodities-consuming firms that need them, and finally to individuals in the economy. Commodities are real economy goods with a finite supply and so issues with their supply have a direct impact on prices, particularly in view of often inelastic demand in the short term. There are additional costs and constraints associated with trading physical commodities as they need to be stored and their quality needs to be checked at settlement facilities. Commodities prices tend to be particularly sensitive to geopolitical events in the countries where they are sourced or grown.

² Derivatives markets can be split further into those that are settled with a physical delivery of commodities and those that have only or also a financial settlement.

Stylised interlinkages in exchange-traded commodity markets

Figure 1



Note: The diagram is stylised and so may not fully reflect the structure in all jurisdictions. ETFs = exchange-traded funds. PTFs = principal trading firms.

Source: FSB.

The supply of physical commodities to the economy is facilitated by derivatives markets (both OTC and ETD) that allow commodities firms to hedge their physical positions. Commodities producers and consumers hedge against changes in physical commodity prices (e.g. a producer would hedge against a price decline with short commodity futures positions) and changes in various bases and spreads (e.g. calendar spreads, product spreads and location spreads). Commodities traders have both long and short positions to hedge their activity in physical markets along a given commodity's forward curve, as well as the various spreads between products and different locations. Some of these traders use derivatives to speculate on changes in commodity prices. Commodities derivative contracts can be settled with cash or physical delivery, and as their settlement date approaches, their price tends to converge with the spot physical price, although in practice a spread (difference between spot physical and derivatives prices) might also arise for a temporary period.

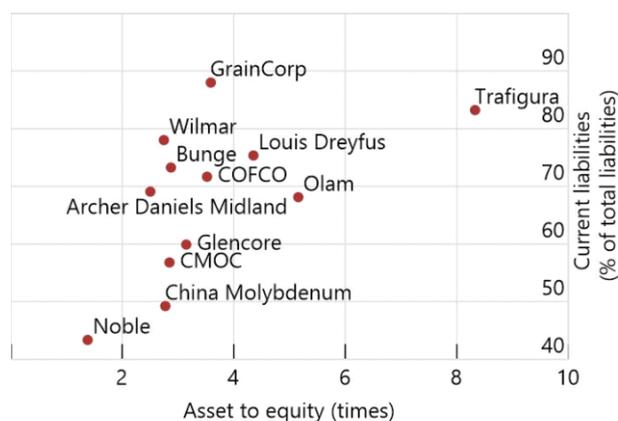
2.2. Participants in commodities markets

Commodities traders intermediate the supply chain linking commodities producers to consumers. They may also engage in arbitrage trades related to differences in prices of commodities in different locations, or between grades of the same commodity. Physical commodities trading is often dominated by a relatively small group of firms, who – in some jurisdictions – are subject to little or no financial regulation. Some commodities traders are also active in commodities production and have trading arms that hold physical positions as part of their strategy.

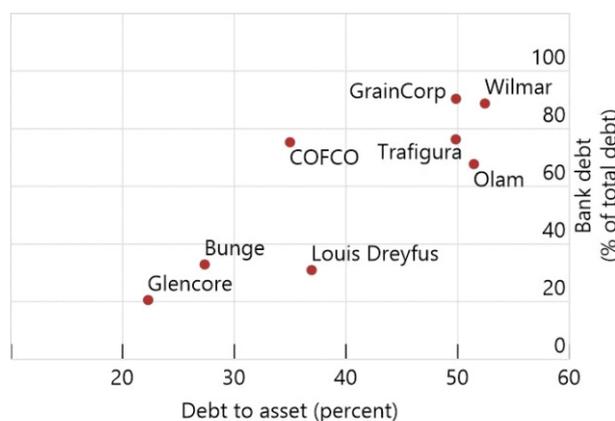
Commodities traders' financial leverage and funding, 2022¹

Graph 2

1. Leverage and current liabilities



2. Debt-to-assets and borrowing from banks



¹ The graph uses the latest available data for a sample of large commodities traders. Current liabilities includes short-term debt and the portion of long-term debt (i.e. with an original maturity of more than one year) coming due in the next 12 months.

Sources: Bloomberg; CapitalIQ; FSB calculations.

Commodities traders are linked to the core financial system through a range of physical and derivatives markets. As they are often non-financial companies, they are typically subject to less oversight than financial firms with only their subsidiaries/affiliates active in financial markets being typically subject to regulation. While physical commodity trading is a balance sheet intensive activity, commodities traders often choose to keep little liquidity, hence these firms have a potential need for credit. This means that commodities traders can be leveraged, with a

combination of financial leverage – to meet day-to-day liquidity demands – and synthetic leverage from their use of commodities derivatives. On average, large commodities traders' assets are around 3.5 times equity, though financial leverage can be significantly higher in some cases (Graph 2, panel 1).

In addition, some of the most highly leveraged commodities traders rely heavily on current liabilities (i.e. liabilities due in the next 12 months). This means that some commodities traders not only have significant amounts of leverage, but also face rollover risks on their funding. Commodities traders with the highest amount of debt also tend to source their financing from banks (Graph 2, panel 2).³ Some of that debt takes the form of trade credit to finance the acquisition of a commodity and this debt (which is collateralised) should be repaid at the time of sale. Typically the remainder of debt would either be in the form of bonds or other private funding.

Banks have a crucial role in the broader commodities ecosystem. Banks are not only a major source of credit and funding liquidity for commodities traders – as just discussed – but also provide funding for other commodities firms (e.g. commodities producers and consumers) as well as financial institutions (e.g. hedge funds) in the commodities ecosystem. Furthermore, banks provide important clearing services, intermediating between commodities firms and CCPs to pass margin through the financial system (Figure 1). They also undertake OTC derivatives trades with non-financial counterparties, and often hedge these positions using ETDs in cases where they cannot match their book.

Principal trading firms (PTFs) also participate in commodities markets, typically by providing liquidity in ETD markets. They may also pursue trading strategies that focus on the relative value of related commodities or between different points on the forward curve for the same commodity. In some commodity derivatives markets, they represent a significant proportion of trading volume and may carry meaningful intraday exposures, but PTFs do not usually hold large overnight positions.

A number of different types of funds are also part of the commodities landscape. Hedge funds speculate in commodity derivatives, such as by trading spreads between derivatives and physical prices, spreads across maturities and locations, and sometimes physical commodities. Commodity funds, which provide investors with an opportunity to trade in commodity markets, also tend to use derivatives, though a few do take physical positions.⁴

Insurance companies also have a role in commodities markets, where they provide insurance on various aspects of the commodities trade, such as the infrastructure associated with storage, refining, production or transportation, or other aspects such as environmental risks, piracy or cyber-attacks.

³ Six of the commodities traders – where the information on bank borrowing was available – rely on banks to finance 65% or more of their total debt, with two commodities traders relying on banks for 90% of their debt finance.

⁴ Commodity funds are specialist investment funds that can be open-ended mutual funds, closed-end funds or exchange-traded funds.

2.3. Mapping commodities derivatives markets

TR data can be used to map the market players in some parts of commodities derivatives markets.⁵ The TR data suggest that non-financial companies – which includes commodities producers, consumers and traders – are significant derivatives market players, representing almost 20% of outstanding positions in European oil derivatives markets and about 40% of positions in European natural gas markets (Graph 3, panel 1).

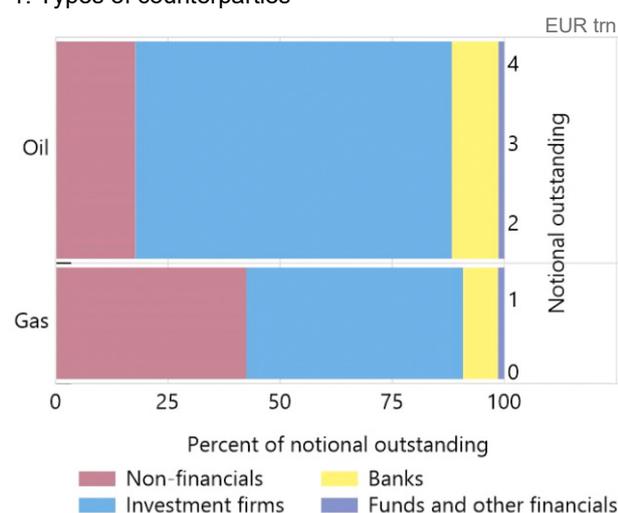
Investment firms have an even larger presence in European oil and gas markets (Graph 3, panel 1). This group includes a mix of different types of companies, including the derivatives dealers and wholesale brokers who make markets in derivatives and intermediate trades for clients, some of whom are part of big banking groups (Figure 1). Some commodities traders with specialist financial arms may also be captured as investment firms in the TR data, as well as some principal trading firms.

The European TR data suggest a less significant role for funds than might be expected, but this could be because some funds are located outside the jurisdictions covered by the TR data.

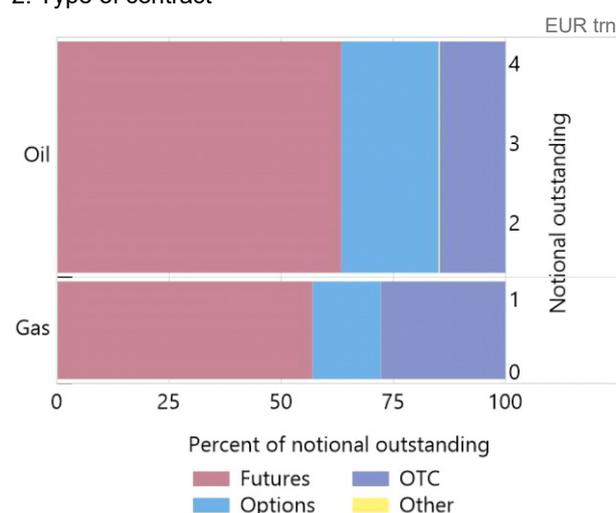
European oil and natural gas derivatives market structure, 2022¹

Graph 3

1. Types of counterparties



2. Type of contract



¹ The graph shows latest available aggregated TR data for gross notional exposure in the oil and natural gas derivatives markets in the European Economic Area (EEA) and the UK. OTC = over-the-counter. Investment firms encompass a range of financial institutions, including broker-dealers and principal trading firms. Gross notional value can be inflated by positions in the intermediation chains between the execution and clearing of transactions. This may also impact the comparison of ETD and OTC markets, as the OTC segment is characterised by shorter intermediation chains.

Sources: ESMA; FCA; FSB calculations.

⁵ A TR is an entity that maintains a centralised electronic record of financial transaction data. Here data on transactions in commodities derivatives are used. There are, however, several caveats to be aware of when using this information. The data in this note only cover two markets in Europe and this may not be representative of the structure on other commodities derivatives markets or the same markets in other jurisdictions. By construction, domestic TR data might be incomplete; for example, under the European Market Infrastructure Regulation (EMIR) only EEA counterparties report information, hence for example if a non-EEA counterparty stops trading with EEA banks and chooses a non-EEA bank instead, EMIR data will show a decline in activity. Combining domestic data from different jurisdictions – as is done in this note – may also lead to some overlaps with trades reported twice if they include counterparties from two of the jurisdictions collecting the data. The TR data also do not cover some wholesale physical energy products (e.g. on natural gas) traded on an organised trading facility as they are not considered as a financial instrument and hence are not reported to TRs.

2.4. Venues for commodities derivatives trading

A large volume of commodities derivatives trading for the markets covered in this report takes place on exchanges. Commodity exchange trading is dominated by futures (Graph 3, panel 2). Derivatives trades that take place on exchanges are cleared through CCPs. The CCPs manage counterparty credit risk, largely by interposing themselves between counterparties and collecting initial and variation margin from them on a daily, or sometimes intraday, basis. The use of CCPs also allows trades to be netted, limiting the size of gross exposures. Commodities clearing is concentrated in a handful of CCPs (Table 1).

The TR data suggest that European reportable OTC derivatives represent almost a quarter of natural gas trading but only around 15% of total amounts outstanding in oil markets (Graph 3, panel 2). Although aggregate data collected by the BIS suggests that commodities OTC markets have a relatively limited notional amount outstanding (\$3 trillion in H1:2022) relative to other OTC markets – including interest rate swaps (\$503 trillion), foreign exchange derivatives (\$110 trillion) and credit derivatives (\$10 trillion) – their share of the underlying risk can be much bigger due to significantly higher volatility (e.g. in the euro area, commodities derivatives typically represent only around 1-2% of the total gross notional outstanding across all derivatives, but contribute to around 15-20% of initial margins).⁶

OTC trading tends to be organised by brokers on electronic platforms or bilaterally between banks and their clients. When not centrally cleared, there tends to be more residual counterparty credit risk because the scope for multilateral netting is more limited and margin is not always required or is in some cases lower than at exchanges. In cases where there is less netting in OTC trades, overall gross notional exposures can also be larger and are often with multiple counterparties. OTC trading, however, allows for more flexibility to accommodate the needs of clients in the terms of contracts (size, delivery, quality) as well as margining terms (including the type of collateral accepted). Banks and other market participants can find it difficult to fully assess the risk of participating in these markets; for example, it is hard to assess the aggregate exposures of counterparties or the build-up of concentrated positions. Furthermore, it can often be difficult for a single regulator to get a complete picture of the OTC market due to, among other things, difficulties in sharing data across national boundaries.

2.5. Commodities derivatives market concentration

To measure the degree of concentration in commodities derivatives markets, this section focuses on the European natural gas derivatives market, largely using TR data for the EU and UK. ETD trading in the EU natural gas market occurs on ICE-Endex – domiciled in the Netherlands with clearing in the UK (ICE Clear Europe) – and EEX, a German exchange that uses an EU CCP (ECC).⁷ In the UK, ETD natural gas trading occurs on ICE Futures Europe (with clearing at ICE Clear Europe). The TR data encompasses the ETD and OTC markets, but

⁶ The data on notional amounts outstanding are from the [BIS OTC derivatives statistics](#). The information on commodities derivatives outstanding and margin in the euro area is from ECB (2022), [Financial stability risks from energy derivatives markets](#), Financial Stability Review (November).

⁷ For information on these trading venues, see <https://www.theice.com/endex>, <https://www.theice.com/clear-europe>; <https://www.eex.com/en/> and <https://www.ecc.de/en/>.

does not cover part of the physically-settled energy market.⁸ In addition, the TR dataset is based on the location of the counterparty and so only includes one side of cross-border trades. While these data gaps make it challenging to get a complete picture of the network, the TR data can help produce a detailed mapping of interlinkages.⁹

A few banks play a central role in natural gas derivatives markets as clearing members for energy firms. The EEA and UK natural gas derivatives networks – developed for the largest entities – are characterised by the outsized role played by a few banks as clearing members. As shown in Graph 4 (panels 1 and 2), a few banks (denoted by blue triangles) account for most of the clearing activity (the thick blue links between these banks and CCPs, denoted by yellow circles). Graph 4 uses TR data for November 2022, but a similar analysis was performed using data for January and July 2022 and the networks did not change significantly.

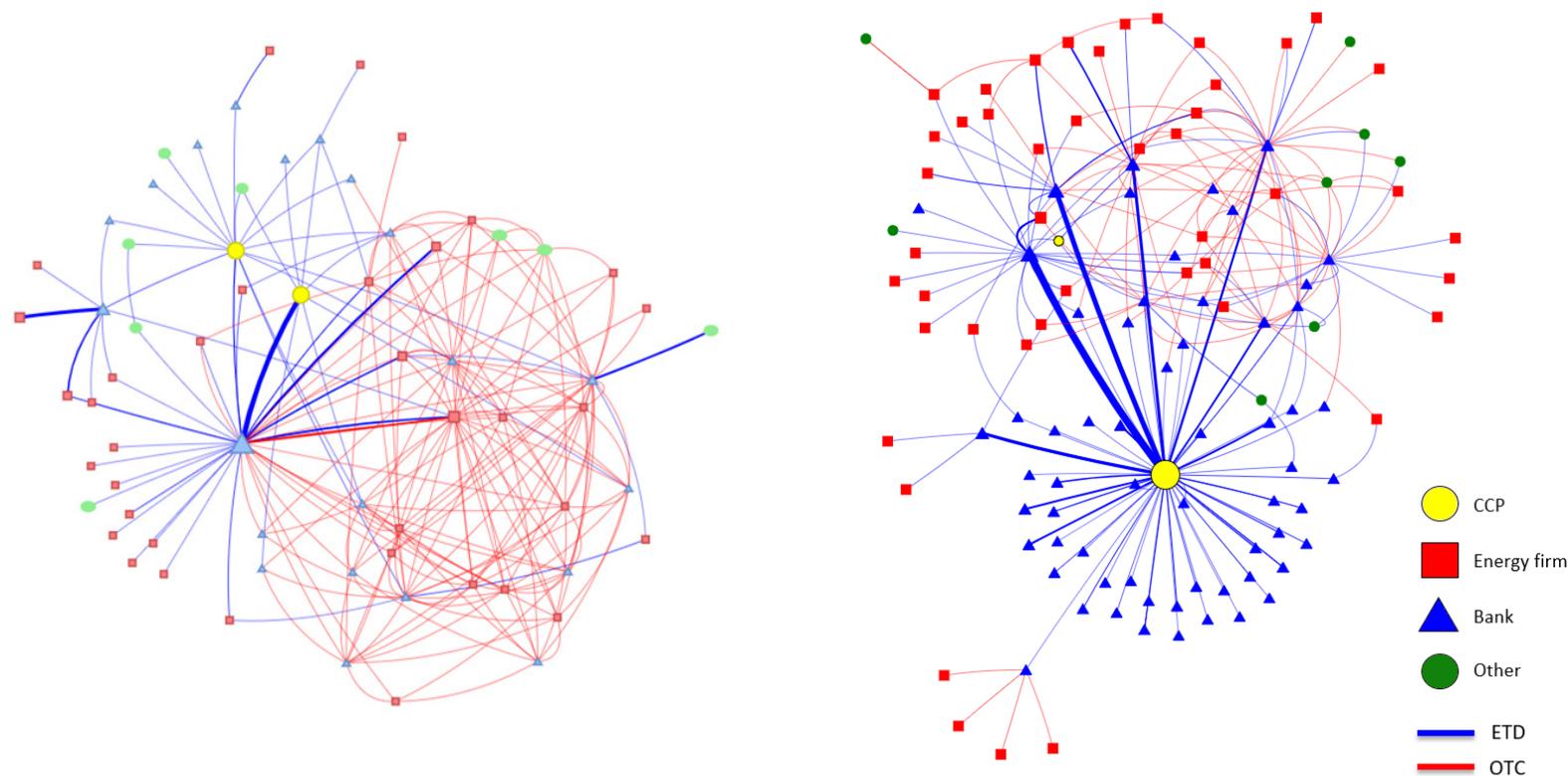
Most clients of clearing members are energy firms (usually utilities, shown by the red squares), with a more marginal role played by financial institutions. Derivatives exposures across energy firms vary widely. Some energy firms only engage in ETD derivatives (blue part of Graph 4) with a small number of clearing members, while others exclusively use OTC markets (red part of the Graph 4), including direct trades with other energy firms. Some banks are active in OTC markets.

⁸ Commodities derivatives traded on organised trading facilities (OTFs) with physical settlement are not considered financial instruments under the EU Markets in Financial Instruments Directive (MiFID) (the “C6 carve-out”) and therefore are not subject to EMIR requirements. Instead, they are reported to energy regulators in the EU (ACER) and UK (OfGem) under the Regulation on Wholesale Energy Market Integrity and Transparency (REMIT). These products constitute a significant portion of energy firms’ non-cleared hedging activity.

⁹ The EU ETD data refers to natural gas traded on ICE Endex which covers exclusively EU natural gas (Dutch TTF mainly but also Austrian, Italian and German natural gas derivatives).

1. European Economic Area

2. United Kingdom



CCP=central counterparty; ETD=exchange-traded derivatives; OTC=over-the-counter market.

¹ The graph looks at the connections of the 30 largest entities in the EEA and the 60 largest non-bank entities in the UK. The graphs are based on TR data. This dataset captures a partial view of natural gas markets as it does not include derivatives traded on OTFs that have a physical delivery. The TR dataset is also based on the location of the counterparty and so when there is cross-border activity (in this case between an EEA jurisdiction and a non-EEA jurisdiction, or between the UK and another country) only one side of the trades will be captured. The size of the nodes and the width of the lines are proportional to gross notional exposure (normalised by the highest exposures between entities). It might be difficult to compare panels 1 and 2 directly – especially for OTC markets – as panel 1 is based on several jurisdictions in the EEA, while panel 2 is based on UK reporting entities only.

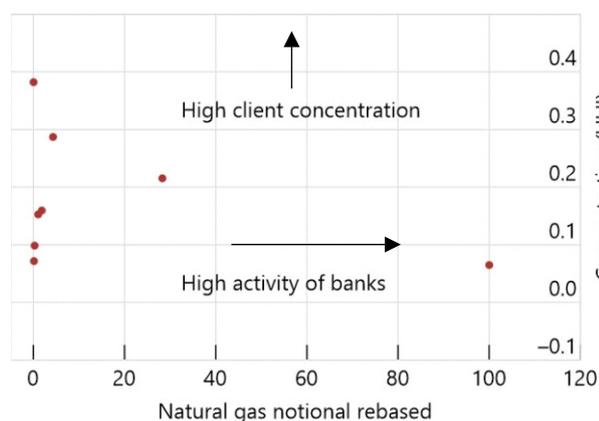
Sources: BoE; ESMA.

Further analysis confirms the concentration of EEA clearing activity in a few banks. Graph 5, panel 1 shows that the bank with the largest amount of clearing activity has a large number of clients (low concentration ratio), while banks with a low amount of activity tend to have a small number of clients (high concentration). Many energy firms also use a small number of clearing banks (high concentration), though this is not the case for all companies (Graph 5, panel 2).

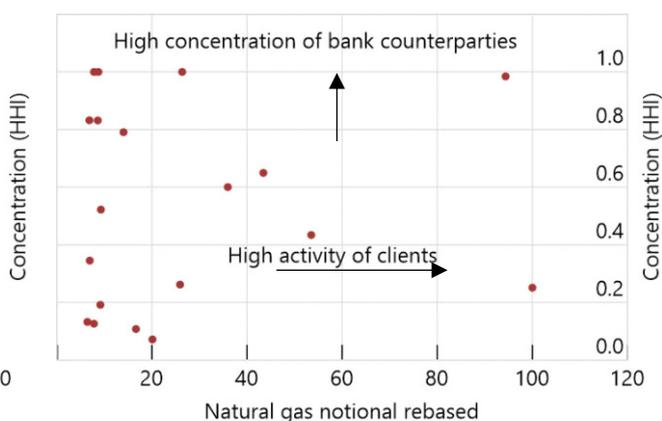
Concentration in EU natural gas derivatives markets, November 2022¹

Graph 5

1. Bank clearing member activity with end-clients



2. Energy firm activity with clearing banks

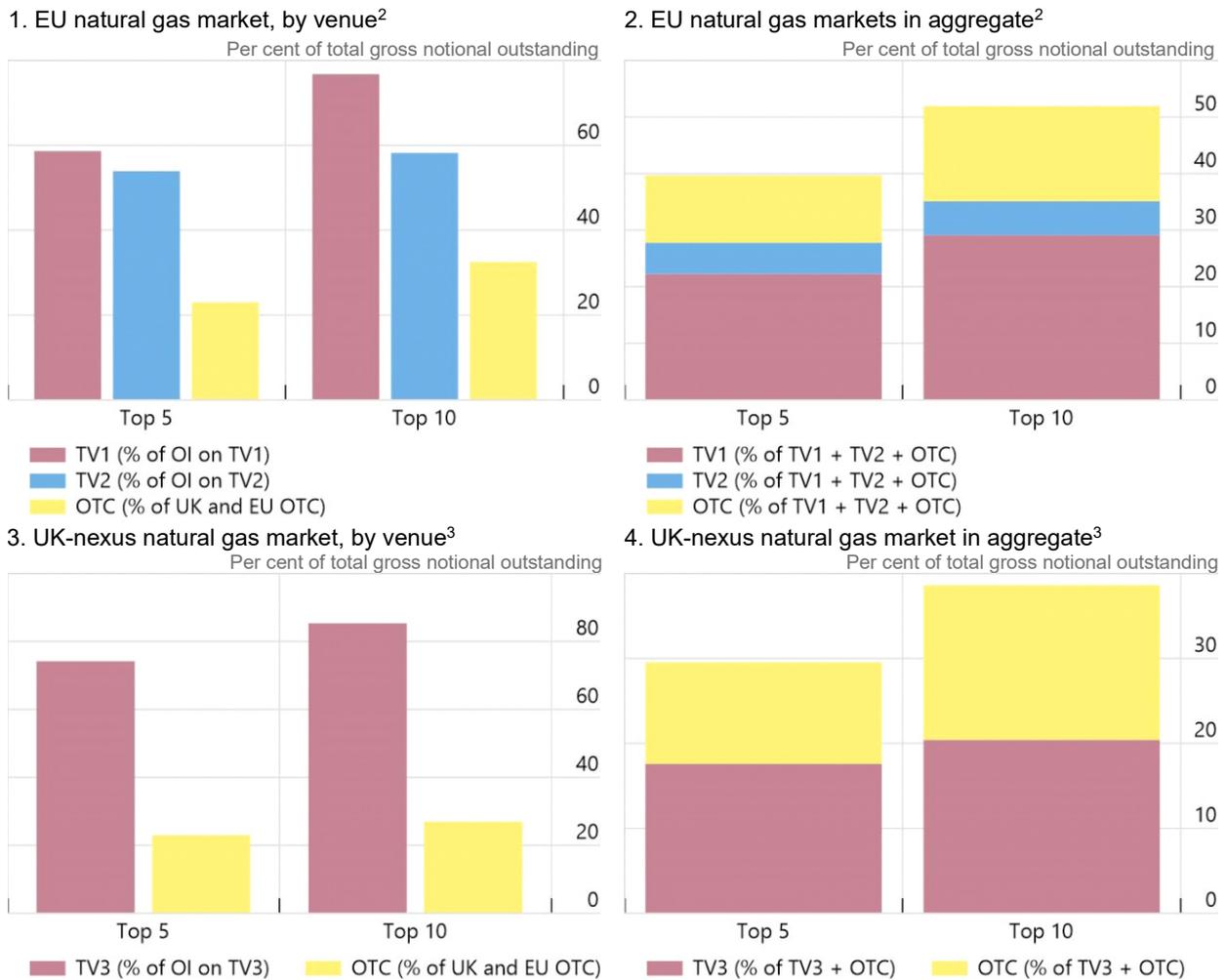


¹ The graphs shows the Herfindahl-Hirschmann (HHI) concentration index on the vertical axis and the gross notional of derivatives on the horizontal axis, rebased to 100 for the largest clearing member (for panel 1) or energy firm (for panel 2).

Source: ESMA.

The European natural gas derivatives markets are concentrated in other aspects as well, with the market share of some of the larger energy firms significant across venues and trading types. For example, EU data reveal that the largest 5 firms account for 20-60% of gross notional client exposures in a single venue (Graph 6, panel 1) and 40% of the total natural gas derivatives market (Graph 6, panel 2). In the UK, the top 5 firms have a slightly lower share of the overall market (about 30%) but a more than 70% share in one trading venue (Graph 6, panels 3 and 4). Some of these energy firms can be clearing members as well.

Market footprint of largest companies in natural gas markets, November 2022¹ Graph 6



¹ Panels 1-4 are based on TR data and so, as discussed above, only covers part of the OTC market. ² Panels 1 and 2 show the market share of natural gas by venue as a per cent of reported gross notional amounts outstanding, excluding CCPs and clearing members. ³ Panels 3 and 4 are based on UK TR data and cover both UK natural gas contracts (e.g. UK NBP) and exposures on other contracts (e.g. Dutch TTF). Sources: BoE; ESMA.

3. Adaptation to shocks and channels of contagion

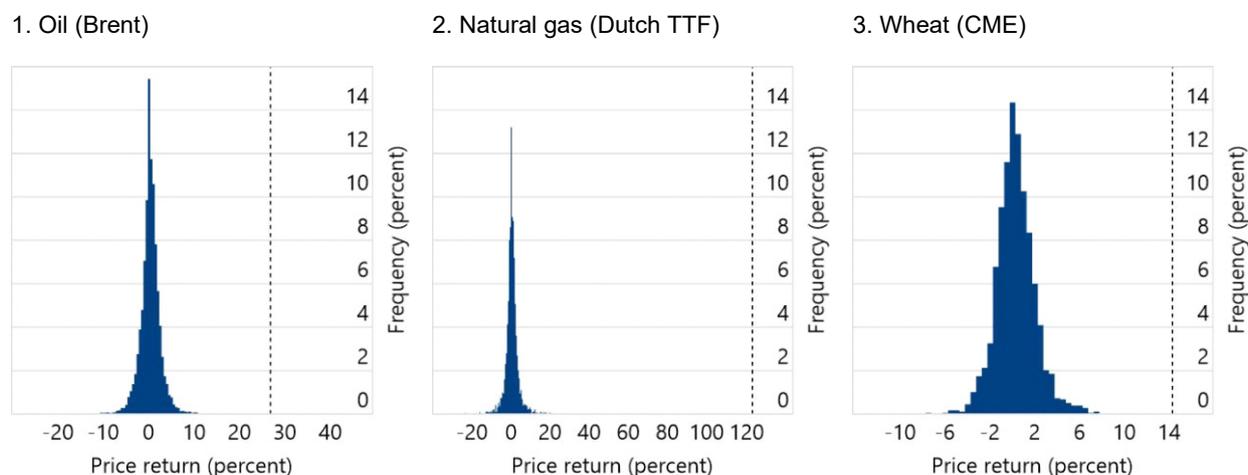
This section discusses the main channels of contagion to the financial system stemming from shocks in commodities markets and describes how the commodities ecosystem has adapted to the volatility shock following Russia's invasion of Ukraine.

3.1. Market liquidity, volatility and margin calls

One key channel of contagion is through the demand for funding liquidity that commodities market players may face as a result of bouts of volatility and sharply higher margin calls. In 2022 there was an extraordinary increase in the price of natural gas (far outside previous experience since 2007), an extreme rise in the wheat price (the highest in the period for which data are available), and a large increase in the oil price (in the tail but within past historical experience)

as shown by the dotted lines in Graph 7.¹⁰ There were also very large movements in spreads between different grades of the same commodity (e.g. diesel vs crude, gasoline vs crude, Dutch vs UK natural gas, etc.).

Distribution of historical weekly commodity price returns¹ **Graph 7**



¹ The dotted lines in the charts show the maximum price rise in February 2022. The horizontal axis shows the range of historical weekly price returns. Panel 1 is based on data since May 1983, panel 2 on data since September 2007 and panel 3 on data since July 2016.

Sources: Bloomberg; FSB calculations.

At the same time, liquidity became strained in some commodity markets. Increased volatility and prices not only led to higher margin requirements but also led liquidity providers to widen bid-ask spreads and reduce quantities of bids and offers. These lowered market liquidity, likely exacerbating volatility, and thus led to a negative feedback loop. Low market liquidity can impair the ability of the financial system to respond to a large shock because investors may be unable to quickly adjust their holdings of assets to raise cash or hedge risks, or they may be able to do so only at a substantial cost. The decline in market liquidity can be illustrated by the rise in price impact in February and March 2022 (Graph 8), which indicates higher trading costs, as well as increases in bid-ask spreads.¹¹

However, market commentary did not point to substantial difficulties in obtaining quotes in oil markets in February-March. Liquidity had also been deteriorating in some of the markets in the lead-up to the Russian invasion of Ukraine (e.g. natural gas), though this was likely related to the rise in geopolitical tensions at the time. Declining market liquidity is also a normal response to a shock. Market-makers often reduce the risks they bear from holding inventories of securities or derivatives in a period of higher volatility.

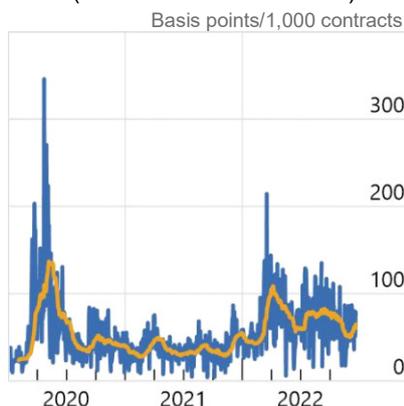
¹⁰ The data on price movements for wheat are likely to be limited by the role of circuit breakers in the CBOT wheat market.

¹¹ See Board of Governors of the Federal Reserve System (2022), [Financial Stability Report](#) (May).

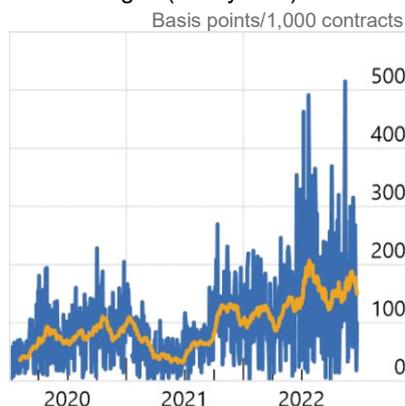
Commodities market price impact¹

Graph 8

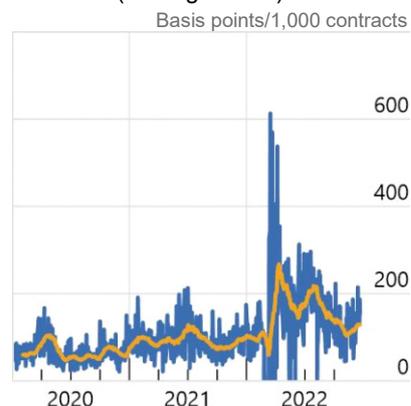
1. Oil (West Texas Intermediate)



2. Natural gas (Henry Hub)



3. Wheat (Chicago SRW)



¹ Price impact shows Kyle's lambda, which is the coefficient in the regression of price returns on net trades. The blue line shows the daily data and the yellow line is the 21-day moving average.

Sources: Refinitiv Tick History; Federal Reserve calculations.

Overall, the main commodity markets covered in this note continued to function during the period of stress. Despite very high volatility in certain commodities and in certain geographical areas, the commodities ecosystem did not seize-up, though circuit breakers and price limits did temporarily halt trading in some markets. One key exception, however, is the LME nickel market. On 7 March 2022, the price of nickel on LME soared by 69% in one day, and following a further spike in the price the following day, nickel's value had increased by more than 270% over the course of the three trading days to 8 March.¹² This was an unprecedented increase in the price of the metal. In response to these extreme market dynamics, LME suspended nickel trading and cancelled a number of trades.

Participants in the LME nickel market with short positions faced a surge in margin calls as a result of the extraordinary price volatility. Over the period from 4-7 March members had posted nearly \$16 billion in margin to the CCP, LME Clear. This placed significant liquidity strains on certain participants in the market. Some market participants with short positions – including in OTC markets – closed out their trades in response to escalating margin calls by buying nickel thus driving up prices further.

This episode highlights a number of themes discussed in this report, such as the presence of large, concentrated positions and the opacity of markets. The episode also underlines the immediate liquidity demands that market participants can face in volatile market conditions.

There were also sudden price increases and volatility in other commodities markets in 2022. While these rises were not as extreme as in the nickel market, they also led to sharp rises in margin calls by CCPs. Margin calls are essential to mitigate counterparty credit risks at CCPs

¹² For more information on the events in the LME nickel market, see Oliver Wyman (2023), [Independent Review of Events in the Nickel Market in March 2022: Final Report](#), January.

and clearing members (Box 1). However, to meet margin calls, commodities firms often need to draw on liquidity, for example by borrowing more or drawing on bank credit lines.¹³

Box 1: Margin practices

CCPs calculate initial margin to protect against potential future changes in the market value of contracts in the event of a counterparty default. CCPs collect variation margin, reflecting day-to-day changes in the market value of derivatives, to prevent an accumulation of risk exposure as open positions change in value. CCPs can also apply add-on margins, for example to cover concentrated exposures or wrong way risk. CCPs calculate margin requirements on centrally cleared portfolios and mark participants' portfolios to market at least daily. CCPs have the authority and operational capacity to make intraday margin calls, both scheduled and unscheduled. During the settlement process, CCPs generally pass the variation margin in cash from counterparties whose positions have mark-to-market losses to those whose positions have mark-to-market gains.¹⁴

CCPs call for initial and variation margin from the clearing member, either on behalf of their clients or for the clearing member's own proprietary portfolio. For initial margin, the clearing member may choose to charge the client more margin than is required by the CCP (sometimes known as the margin multiplier or add-on). The margin multiplier can depend on the underlying assets traded and the exposure, but can also reflect the type of client (hedge funds tend to be charged higher multipliers than non-financial corporates), the creditworthiness of the counterparty, the quality of the collateral, and the clearing member's risk appetite.

Clearing members provide a range of services to their clients, including settlement, custody and short-term funding to cover margin calls, particularly for intraday margin calls. In many jurisdictions, clearing members that handle customer accounts are predominantly banks and so subject to capital and liquidity requirements that address, among other things, any additional exposure to customers from these ancillary funding functions. Clearing members also have contractual obligations to provide margin to the CCP from their own resources if clients cannot meet their contractual obligations in time.

Generally, CCPs will permit initial margin to be satisfied by cash or non-cash collateral, such as highly-rated sovereign debt securities, gold and in some cases private sector securities such as money market fund units, ETFs and corporate bonds. For commodities trades, some CCPs also accept bank letters of credit as collateral to cover initial margin.¹⁵ In accepting this collateral, CCPs may apply limits on the amount of non-cash collateral for each participant and typically apply haircuts to the value of non-cash collateral. Studies have shown that for some time periods, approximately half of the collateral collected by CCPs for margin can be in the form of non-cash collateral, usually sovereign debt.¹⁶ CCPs typically require variation margin to be paid in cash in the currency of contract denomination.

For non-centrally cleared derivatives transactions, margin is not always exchanged. The BCBS-IOSCO Margin Requirements only apply where both counterparties are 'covered entities' – i.e. financial firms and systemically important non-financial firms¹⁷ with a minimum level of non-centrally cleared

¹³ Some EU Member States gave access to state aid facilities or state guaranteed loans to allow non-financial energy firms to come up with the required margins, although information on the extent to which such facilities have been used is not available.

¹⁴ There are a few examples (e.g. London Metal Exchange) where the CCP does not execute this full two-way flow and instead retains the variation margin it has collected at the CCP on behalf of in-the-money participants. In such a case, these participants can only use the variation margin to offset any initial margin obligations, and their variation margin is not generally available as a source of liquidity prior to the expiration of the underlying contract.

¹⁵ CCPs also accept other types of margin for commodities markets not covered by this note, including warrants (on metals) and emissions allowances (to cover associated short positions).

¹⁶ BCBS-CPMI-IOSCO (2021), [Review of Margining Practices](#).

¹⁷ Central banks, sovereigns, multilateral development banks, the Bank for International Settlements, and non-systemic, non-financial firms are not covered entities.

derivatives of €8 billion or equivalent of gross notional outstanding for each category of derivatives. In this case both counterparties are expected to exchange the full amount of variation margin on a regular basis (e.g. daily) and to exchange initial margin with a minimum threshold not exceeding €50 million, excluding positions taken for hedging purposes.¹⁸ Where margin is not required to be exchanged, a counterparty is likely to manage the OTC derivatives exposures as part of its overall credit risk management of that counterparty (e.g. through the use of credit limits).

Aggregate initial margin collected by CCPs – across all markets and not just commodities – rose by almost \$100 billion worldwide over the year to February 2022, mostly in exchange-traded derivatives (Graph 9, panel 1). The increase in aggregate initial margin was not as large as during the COVID-19 related market event in March 2020 (which rose by \$160 billion), though this likely reflects the fact that the jump in volatility occurred across a wide range of derivatives markets, not just commodities markets. Most of the recent increase in initial margin was at European CCPs, likely reflecting the larger volatility in European commodities, particularly natural gas (Graph 9, panel 2). While the initial margin calls in March 2020 were mostly for banks, February 2022 brought margin calls for non-bank clearing members – who tend to be more involved in commodities markets than other markets – as well as banks (Graph 9, panel 3).

There was wide variation in the increase in initial margin across commodities markets, with one of the largest increases for Dutch natural gas (Graph 9, panel 4). Over the two months to the end of April 2022, initial margin requirements almost doubled (as a percentage of notional outstanding) to a level about five times higher than a year earlier.

It is difficult to isolate variation margin for commodities trades, as it is often calculated on the basis of the whole portfolio, but overall variation margin in CCPs almost doubled, again mainly in European CCPs where it peaked at about \$70 billion. The increase was even larger at some individual CCPs, with variation margin six times larger than normal levels at UK CCPs on 1 March 2022, a larger increase than during the COVID-19 episode.¹⁹

Market intelligence suggests that some clearing members in Europe asked their clients for higher margin on their derivatives transactions than required by CCPs. Clearing members are required to meet intraday margin calls by the CCP on very short notice, but may not yet have collected the margin from their clients. Clearing members apply a margin multiplier to their clients reflecting an assessment of their clients' credit risk; such multipliers reached 1.5–2.0 during the period of volatility in March 2022. While this reduces counterparty credit and liquidity risk for clearing members, it multiplies the funding liquidity risk for commodities firms.

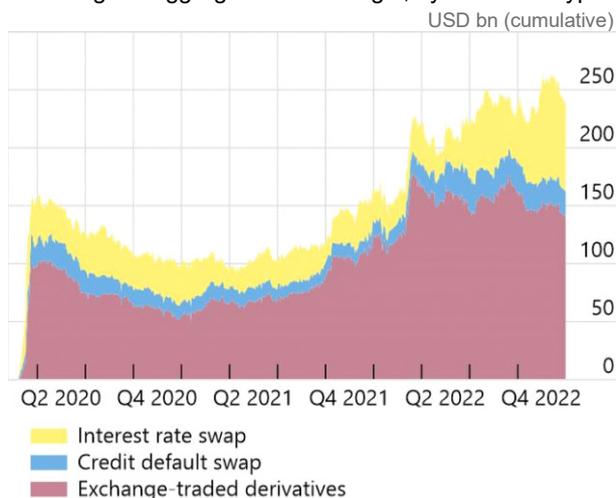
¹⁸ The threshold is applied at the level of the consolidated group to which the threshold is being extended and is based on all non-centrally cleared derivatives between the two consolidated groups. The required amount of initial margin may be calculated by reference to either (i) a VAR-style quantitative portfolio margin model that estimates a 10-day potential exposure using a 99% confidence interval or (ii) a standardised margin schedule. The standardised initial margin schedule for such commodities derivatives is 15% of notional exposure.

¹⁹ See the speech by Segal-Knowles (2022), [Central clearing: three lessons and a path forward](#), Bank of England, May.

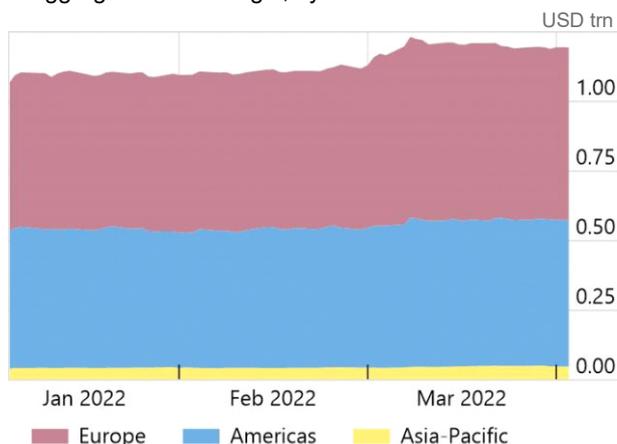
CCP margin¹

Graph 9

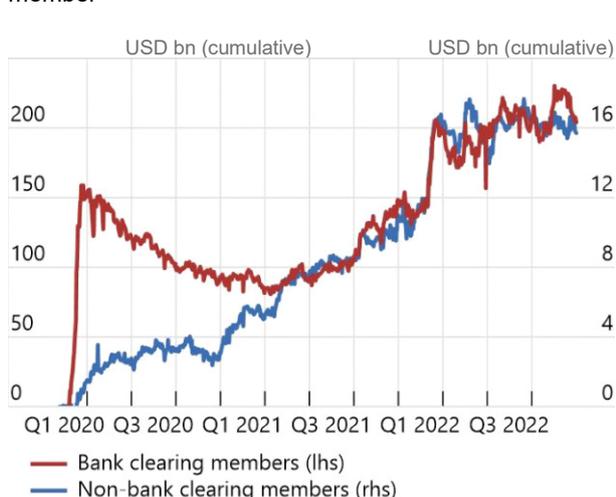
1. Change in aggregate initial margin, by derivative type²



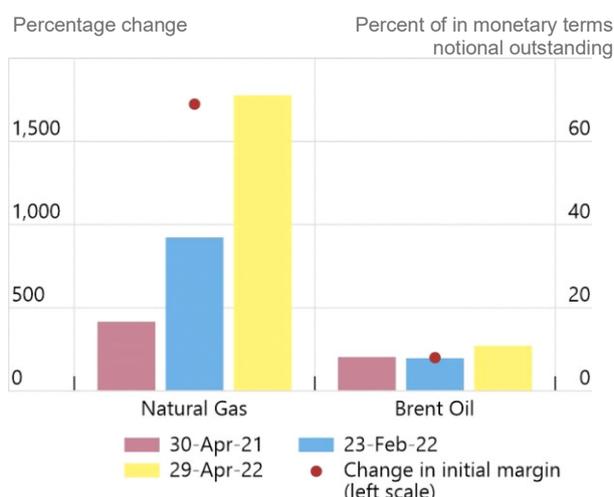
2. Aggregate initial margin, by location of CCP



3. Change in aggregate initial margin, by clearing member



4. Initial margin for commodity futures contracts³



¹ Different market regulators used different methodologies for providing these data (e.g. some used required initial margin while others use the value of collateral held as initial margin). However, when aggregated globally and across regions, these differences do not affect the overall initial margin trends. For bank holidays and other data interruptions, smoothing averages were used. The data are not comprehensive and hence the data cannot be used to infer the comparative size of initial margin in the regions. ² Panel 1 shows data for the following CCPs: CME, EEX, ICE Clear, ICE EU, ICE US, LCH Ltd, LCH SA, MGEX and OCC. ³ Panel 4 shows initial margin requirements for futures listed on ICE venues.

Sources: CFTC; ECB; IOSCO-FSEG; and FSB calculations.

While there is little data available on how clients in the commodities market funded their margin calls,²⁰ market intelligence suggests that some commodities traders were able to meet their demand for liquidity by increasing their use of revolving credit facilities (RCFs) or by borrowing additional funds. There is also some evidence of commodities traders successfully applying for additional credit lines, though some of these loans came with high associated interest rates and restrictive covenants. Additionally, a few commodities traders cut back their dividends to conserve cash or sought other financing, such as via private equity.

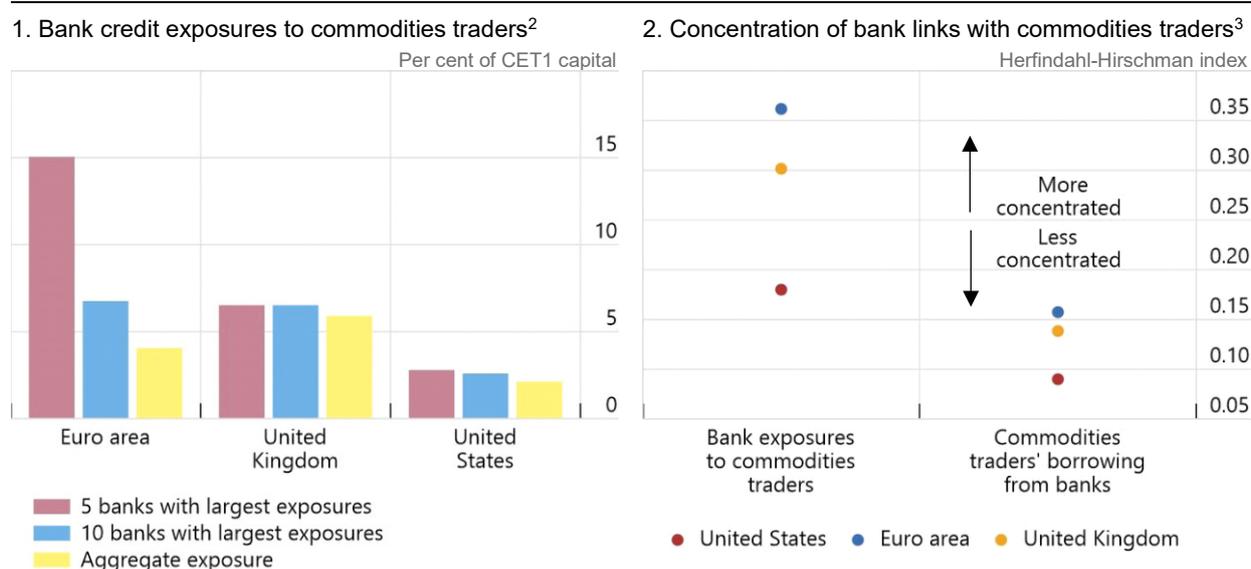
²⁰ The BCBS-CPMI-IOSCO (2021) [Review of Margining Practices](#), however, includes substantial detail on the funding of margins by clients during the March-April 2020 episode.

3.2. Credit exposures

Another potential channel of contagion is from bank credit exposures to commodities markets. In many jurisdictions, the large commodities traders often use RCFs from banks for their day-to-day liquidity needs. Participants in the commodity supply chain also use trade financing – such as letters of credit – to fund the purchase of physical commodities. These loans are backed by a commercial contract for the delivery of physical commodities and so are mostly collateralised. Most loan agreements also have covenants that require commodities traders to hedge their exposure to physical commodities. In addition, larger commodities traders obtain credit from groups of banks through syndicated loans.

Bank exposures to commodities traders and derivatives, Q2:2022¹

Graph 10



CET1=common equity Tier1 capital.

¹ The graph is based on bank exposures to a set of 27 commodities trading entities. ² In panel 1 exposure includes term loans, trade credit and committed credit lines.

Sources: BoE; ECB; US Federal Reserve; FSB calculations.

Bank credit exposures to commodities traders appear manageable in aggregate, but can be concentrated in individual banks. Data on bank credit (term loans, trade credit and committed credit lines) to the same set of commodities traders reveal that aggregate credit exposures of banking sectors in the Euro area, UK and US are relatively limited at 2-6% of common equity tier 1 (CET1) capital (Graph 10, panel 1).²¹ Nevertheless, some individual banks can have much higher exposures, with the five banks lending the most to commodities traders having an average exposure of 15% of CET1 in the Euro area, with a similar level of exposure in Swiss banks.

In addition, Herfindahl-Hirschmann indices suggest that relatively few banks provide credit to commodities traders in the euro area, UK and Switzerland (i.e. there is more concentration), though these banks lend to a relatively large number of commodities traders (i.e. traders' borrowing from banks is less concentrated) as shown in Graph 10, panel 2.

²¹ Banking sector exposures were measured relative to the same set of 27 commodities trading groups in order to ensure consistency across jurisdictions. This set encompassed the largest commodities traders, including those listed in Table 1.

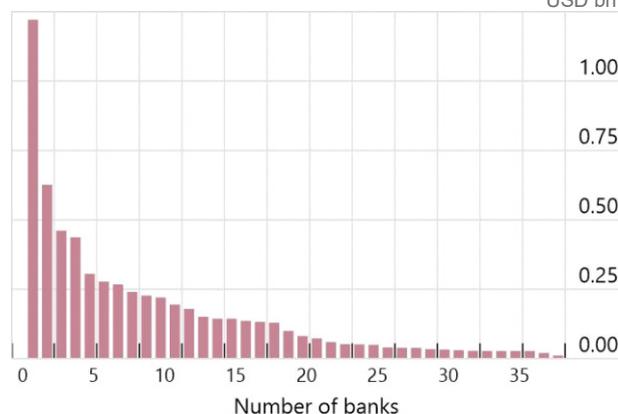
Syndicated lending data also appears to provide further evidence of concentration in individual bank exposures to commodities firms. However, this lending tends to take place only for the largest loans and to the largest commodities firms, and so while it is an important segment of lending, it may not be representative of total lending by banks. Information on individual bank participation in syndicated loans to commodities firms is available for 33 deals between 2020 and 2022. This suggests a significantly skewed market with a few large banks dominating (Graph 11, panel 1). Data on a further 52 syndicated loans to the commodities complex are also available, though there is no information on individual bank exposure on these additional loans. Even if it is assumed that each participating bank takes an even share in these remaining loans, there is still a skewed picture with five banks accounting for one-third of the total exposure, 10 banks for half of the exposure and 20 banks for three-quarters of the exposure.

Bank syndicated loans and commodities derivatives exposures

Graph 11

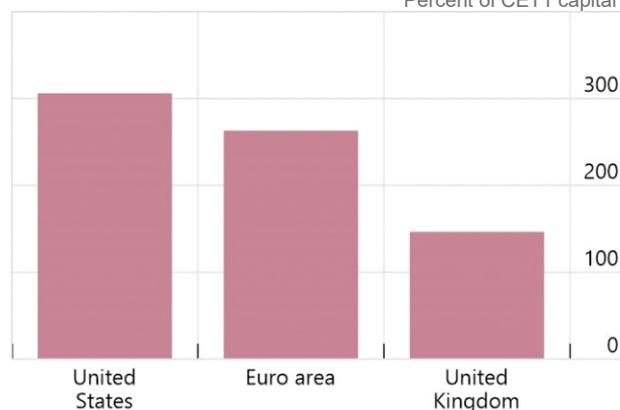
1. Bank syndicated loans to commodities firms, 2020-22¹

USD bn



2. Bank commodities derivatives exposure, Q2:2022²

Percent of CET1 capital



¹ Panel 1 shows data for 33 syndicated loans where information on individual bank exposure is available. ² Panel 2 shows gross notional outstanding in commodities derivatives as a percent of CET1 capital

Sources: BoE, Dealogic; ECB, US Federal Reserve; FSB calculations.

As discussed above, banks increased their lending – and hence exposure – to commodities traders in Q1:2022 to meet the increased demand for liquidity to meet margin calls. However, market contacts suggest that some banks may not be willing to extend more credit to smaller or financially weaker commodities traders, and that could constrain the ability of these firms to actively trade in physical commodities markets.

In the event of a failure of a commodities trader, banks would also be potentially exposed to insolvency processes, especially for institutions with a large and complex set of open derivatives positions across both OTC and centrally cleared markets. Whilst some resolution arrangements exist for physical energy markets in some jurisdictions, there is currently no specialised resolution regime for commodities traders or other physical markets intermediaries. Contractual arrangements can be complex in physical markets and are often accompanied by financial hedges as well as financing trades (e.g. syndicated loans or letters of credit). Given the cross-jurisdictional presence of commodities traders, the lack of contractual continuity provisions, and the likely absence of replacement clauses, an orderly wind down of a material player may prove to be highly challenging.

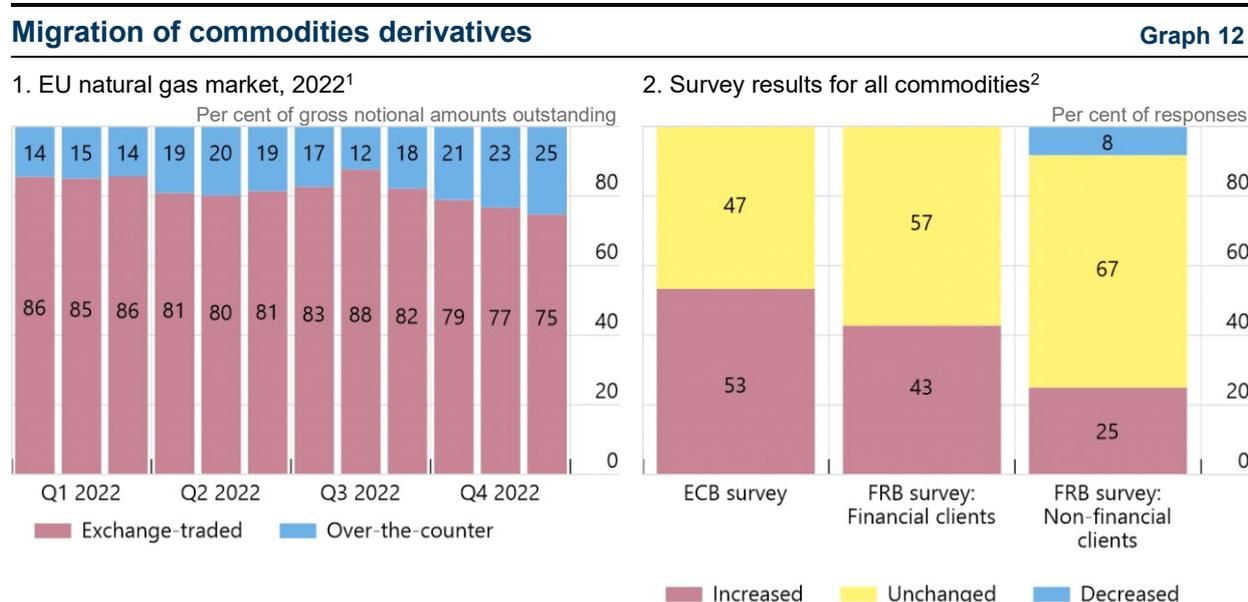
Bank lending to hedge funds, who themselves have leveraged positions in commodities derivatives, also represents additional credit exposure. Data on these exposures tends to be

less readily available, and while information from TR data (discussed in Section 2) suggests that only a few hedge funds are significant players in commodities derivatives markets, this information is only for oil and natural gas derivatives markets in Europe.

Counterparty credit exposures between participants involved in commodities derivatives transactions could also act as a channel of contagion. Gross notional exposures of banks' commodities derivatives portfolios amounted to 220-310% of CET1 capital as of Q2:2022 (Graph 11, panel 2). However, it should be noted that gross notional amounts do not take into account the netting of offsetting derivatives positions and so significantly overstate the market risk in these portfolios. Bank counterparty risk is also mitigated by the use of CCPs in ETD transactions and – to a lesser extent – by margins in OTC trades.

3.3. Recent shifts in commodities derivatives activity

Several different pieces of evidence point to a migration of commodity derivatives activity in some segments of the market from centrally cleared ETD markets to largely uncleared, bilateral OTC markets. European commodities market firms adapted to the spike in margin requirements at the end of Q1:2022 by optimising the level and composition of the market, funding liquidity (i.e. obtaining the necessary funds to pay margin) and counterparty credit (when trading OTC) risks they take on. This has led to the migration of some activity by highly-rated commodities traders that were able to take advantage of the beneficial collateral terms in OTC markets. There, however, has not been a wholesale migration of activity as there are limits to the amount of OTC trading that can take place due to counterparty credit limits, and because many commodities firms typically transact in ETD trades where liquidity is higher.



¹ The chart shows gross positions, rather than the economic exposure, and as such might overstate the share of exchange-traded derivatives due to duplication of trades across client, intermediaries and clearing members. A substantial portion of physically-settled OTC activity is also not captured by TR data due to reporting exemptions, resulting in a potentially meaningful underestimation of OTC activity. ² The ECB SESFOD survey was published in June and the FRB SCOOS survey was published in September. The ECB survey only included 'yes' and 'no' answers – all 'no' answers have been assigned to 'unchanged' in the chart.

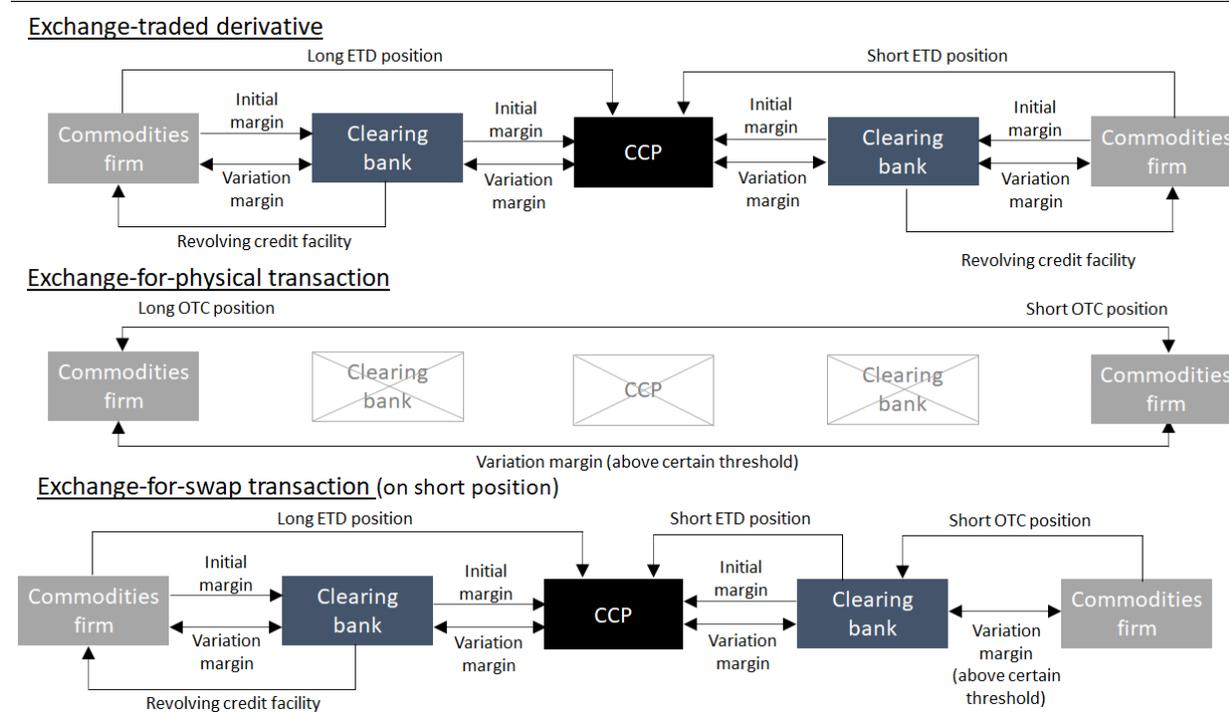
Sources: ECB; ESMA; FRB.

Aggregate TR data on natural gas derivatives in the EEA appear to show some migration of activity from centrally cleared ETD markets to largely uncleared OTC markets. There was an increase in the proportion of OTC activity from April 2022, and while this was cut back in the summer, a surge in prices and margins on natural gas contracts in August spurred a further increase in OTC trades (Graph 12, panel 1).

Survey evidence on the migration of activity is mixed (Graph 12, panel 2). In the ECB Survey on Credit Terms and Conditions (SESFOD), which asked questions about commodities derivatives in general (and not just natural gas), more than half of respondents reported a shift from ETD to less collateralised market segments.²² Some respondents to the FRB Survey on Dealer Financing Terms (SCOOS) also reported that there had been a shift to OTC markets since the beginning of the year, again for commodities derivatives in general, but the majority of respondents suggested that OTC activity was unchanged.²³

Exchange-traded derivatives compared with exchange-for-physical and exchange-for-swap transactions

Figure 2



ETD = exchange-traded derivative; OTC = over-the-counter.

Source: FSB.

The increased use of exchange-for-physical (EFP) trades (or the similar exchange-for-swap trades, also known as liquidity swaps) might explain some of these observations in the market and survey evidence. EFP transactions involve two counterparties that have existing ETD positions (Figure 2, top panel) and both want to transfer them to bilateral OTC contracts (Figure 2, middle panel). The transactions take place by closing-out the original ETD positions

²² See https://www.ecb.europa.eu/stats/ecb_surveys/sesfod/html/index.en.html.

²³ Two-fifths of respondents reported that the uncleared share of commodities derivatives transactions by financial clients had increased and a small net fraction of respondents reported an increased in the uncleared share by non-financial clients. See <https://www.federalreserve.gov/data/scoos.htm>.

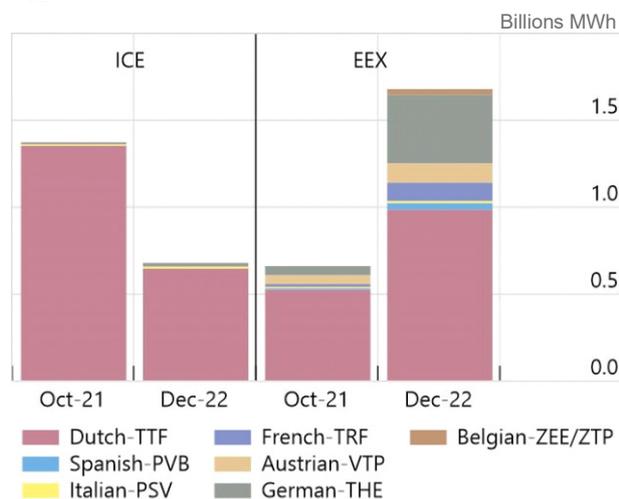
and creating a new physically-settled OTC contract. The two commodities firms would typically not post initial margin and only pay each other variation margin when agreed thresholds are reached.

Exchange-for-swap transactions are typically structured so that a commodity firm enters into an OTC commodity swap with a bank or another counterparty (Figure 2, bottom panel). Again, the firm does not typically post initial margin to the bank and only posts variation margin if a certain threshold is reached. The bank would usually hedge the new OTC swap by stepping into the trader's original ETD trade. This means that overall ETD open interest may not fall, but that the commodity trader migrates their exposure from ETD to OTC. However these trades only appear to be available to more highly rated commodities traders and those not subject to uncleared margin rules that mandate the positing of initial and variation margin.²⁴

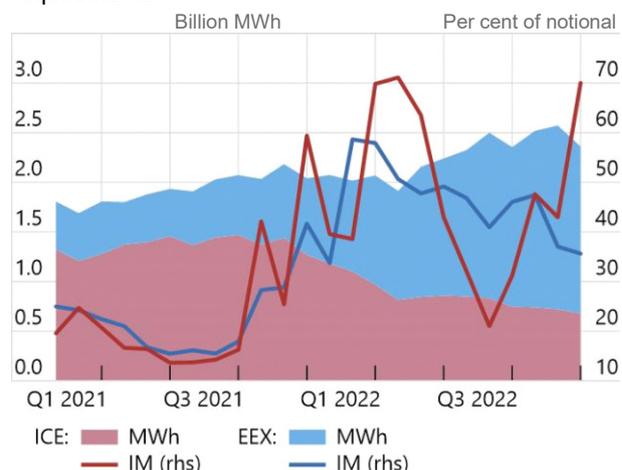
There is some evidence of a movement of natural gas ETD activity from ICE to EEX. Between October 2021 and November 2022, the amount of natural gas derivatives on ICE halved (from 1.4 to 0.7 billion MWh) while it more than doubled on EEX (from 0.7 to 1.9 billion MWh) over the same period (Graph 13, panel 1). This shift between exchanges was likely due to a combination of factors. First, this change happened at a time when ICE initial margin requirements had risen substantially and were higher than the initial margin on EEX (Graph 13, panel 2). Second, there may have been margining benefits for those commodities traders who previously had positions on both ICE and EEX and that could take advantage of portfolio netting, in particular with EEX-listed benchmark German power contracts. Third, EEX now offers a wide range of non-benchmark natural gas contracts (i.e. other than Dutch TTF), which can allow for more efficient hedging and reduced basis risk stemming from price differentials (Graph 13, panel 1).

Migration between exchanges and hedging activity **Graph 13**

1. Euro area natural gas positions by venue and trading hub



2. Euro area natural gas positions and margin requirements¹



IM = initial margin.

¹ Positions in natural gas contracts for the euro area trading points. IM requirements for the front-month benchmark natural gas (Dutch TTF) futures as % of the notional.

Sources: EEX; ICE; ECB calculations.

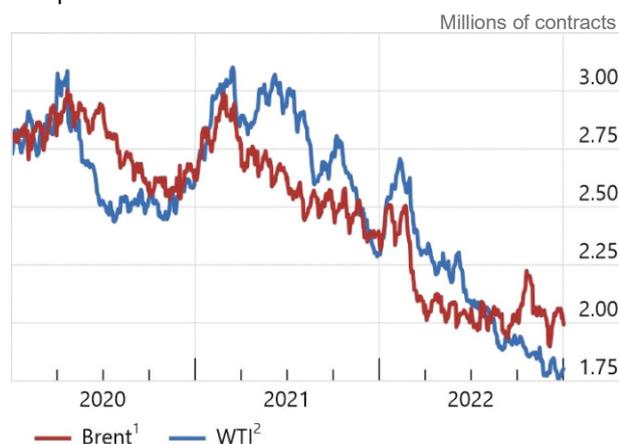
²⁴ See BCBS-IOSCO (2020), Margin requirements for non-centrally cleared derivatives.

Market contacts also point to a curtailment of hedging activity as a result of higher margin requirements. The decline in hedging can be illustrated by the cut back in open interest in commodities derivatives markets. Open interest for oil (Brent and WTI), natural gas (Dutch TTF) and wheat slumped in March 2022 (Graph 14, panels 1-3). While some of this decline could reflect the migration of activity between exchanges or to OTC markets, market intelligence has suggested that some commodities firms are hedging less, exposing them to higher market risk. BIS analysis on WTI oil futures also suggests a reduction in hedging. The number of end users with long (short) positions dropped from 46 (36) just before the start of the war to 33 (31) in May 2022, though the numbers are more stable over the year as a whole (Graph 14, panel 4).

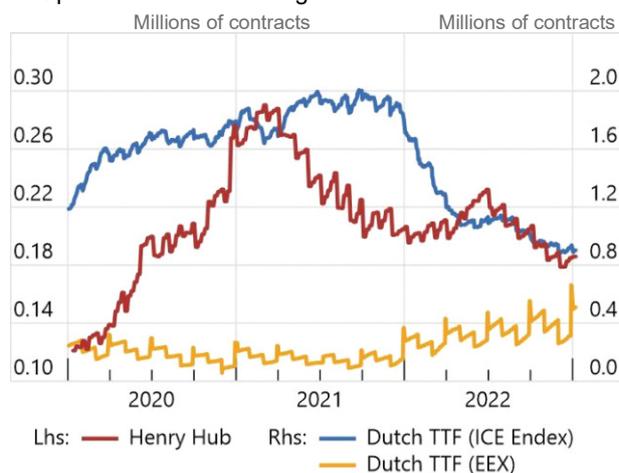
Commodities hedging activity

Graph 14

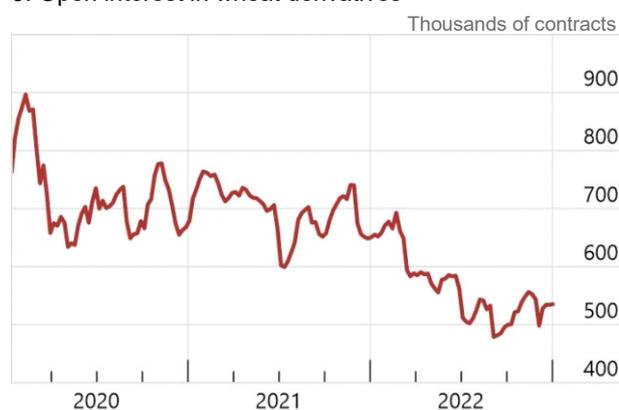
1. Open interest in oil derivatives



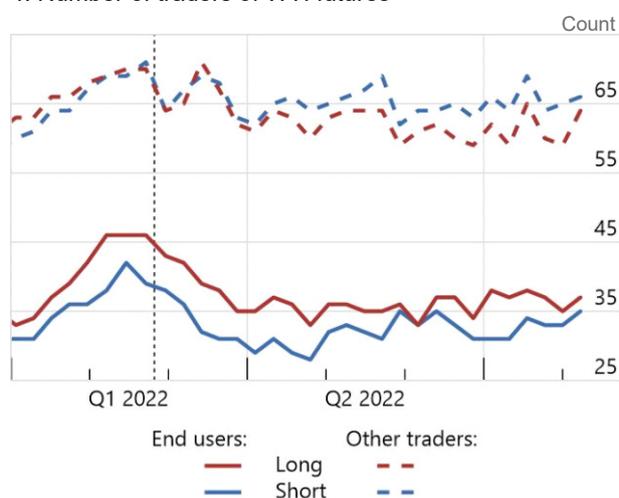
2. Open interest in natural gas derivatives



3. Open interest in wheat derivatives³



4. Number of traders of WTI futures⁴



¹ Generic 1st Crude Oil, Brent and Generic 1st Brent crude oil last day. ² Generic 1st Crude Oil, WTI (CME) and Generic 1st Crude Oil, WTI (ICE). ³ Wheat contracts of 5000 bushels. ⁴ Panel 4 is taken from BIS (2022), *Commodity markets: shocks and spillovers*, September. The dashed vertical line indicates 24 February 2022 (start of war in Ukraine).

Sources: BIS; Bloomberg; CFTC;

Market participants suggest that the decline in liquidity has been particularly pronounced for longer-dated derivatives contracts (e.g. with an initial maturity of more than 18 months) and in non-standard contracts. These developments imply that the quality of hedges may have also fallen. Reports suggest that so-called 'dirty' hedges – in which relatively liquid short-tenor

benchmark derivatives contracts are used to hedge non-benchmark physical commodities – have been increasingly used, leading to greater basis risk for commodities market participants.

4. Conclusions and policy implications

Despite the extreme volatility and price rises in commodities markets and the resultant increase in margin calls in February-March 2022, the commodities ecosystem was able to absorb the shock, markets continued to function in the main, and there was limited impact on the rest of the financial system. Much of the turmoil involved particular commodities markets located in Europe as a result of Russia's invasion of Ukraine.

Commodities market participants have adapted to the shock by trying to reduce funding liquidity risk through the movement of some derivatives activity away from ETD trading to OTC markets. This, however, has increased other vulnerabilities in the commodities ecosystem. In particular, EFP trades involve bilateral links between commodities traders and dealer banks which add to the complexity and counterparty risk in commodities derivatives markets. The sometimes lower margin requirements in the resulting OTC trades also exacerbate the counterparty credit risks faced by banks and commodities firms involved in these trades.

Furthermore, the purported cutting back of hedging activity, and a possible reduction in the quality of hedges, have likely increased market risks in the commodities sector. This could reduce the resilience of commodity traders' and producers' balance sheets as they could become more exposed to losses from fluctuations in commodities prices.

A key takeaway of this report is that there is significant concentration in commodities markets:

- Certain banks are more highly exposed to commodities traders, some of whom represent a significant share of market activity, are highly leveraged and rely on short-term debt.
- In addition, a few banks have an outsized role in commodities derivatives markets, particularly as clearing members that act as intermediaries between commodities firms (e.g. commodities traders and producers) and CCPs.
- A few large CCPs are used to clear commodities derivatives.
- Some commodities market participants represent a significant portion of outstanding exposures in certain markets.
- A few PTFs account for a significant part of commodities derivatives ETD trading volumes.

The juxtaposition of this concentration and interlinkages in the commodities sector – along with large and leveraged commodities traders, less standardised margining practices and opacity in OTC markets – could all come together to propagate losses.

Continued geopolitical tensions involving major commodities producing countries and heightened macroeconomic uncertainty in an environment of tightening financial conditions raise the risk of further significant volatility in commodities markets. In the event of another bout of

extreme market volatility, CCPs and banks are likely to make further margin calls to their clients, banks may seek to limit their counterparty credit exposures, and both brokers and PTFs may cut back on their intermediation activity. While these actions are part of a prudent management of the risks by individual entities, together they could exacerbate liquidity mismatches and crystallise losses for some firms, thereby propagating shocks in commodities markets. These potential risks are discussed below.

- First, the combination of sharply higher CCP margin requirements and clearing member margin multiples – in response to spikes in price volatility – could create funding liquidity challenges for some commodities traders or producers who do not have sufficient liquidity for such a scenario. While these liquidity demands have been met so far, some banks have indicated that they might not be willing to extend more credit to certain commodities traders. In a further period of commodity price volatility, this cautious approach could become more widespread. If some commodities traders are unable to fund these margin calls, they may be forced to exit positions.
- Second, another pullback in commodity market activity could lead to a further reduction in market liquidity with lower depth and wider bid-ask spreads. This would make it more difficult for market participants to hedge and manage their risks. Low market liquidity makes price movements more sensitive to further shocks, increasing volatility further, potentially leading to a greater retrenchment by market participants, which may spur volatility on again, and so on.
- The failure of a major commodities market participant could create losses for its counterparties in OTC markets, particularly if bilateral exposures have not been adequately collateralised.

This all suggests that there is a need to continue monitoring developments in commodities markets and the preparedness of commodities firms – working with CCPs and clearing members – to manage sudden increases in margin on derivatives positions.²⁵

This report also identified a number of data gaps that have hampered the assessment of vulnerabilities and made it difficult to quantify the transmission channels. For example, there have been difficulties in obtaining cross-border exposures in OTC markets, or data on the network of exposures to assess the build-up of concentrated positions. Information on the trading behaviour and funding needs of commodities traders is also limited. These data gaps reflect both information not currently available to authorities (e.g. because the relevant entities are outside the regulatory perimeter), but also challenges in sharing available information across authorities and jurisdictions. Addressing these gaps is necessary to enhance the assessment of vulnerabilities in commodities markets.

Finally, a number of the vulnerabilities and channels of contagion discussed in this report – including leverage, the impact of large margin calls on liquidity demand, and market opacity – are not unique to commodities markets. Many of these issues are being addressed in the FSB's

²⁵ Relatedly, IOSCO updated its principles on commodities derivatives markets in January 2023. The revisions aim to ensure that the principles continue to provide a resilient framework for the regulation and oversight of the commodities derivatives markets. See IOSCO (2023), [Principles for the Regulation and Supervision of Commodity Derivatives Markets](#), January.

work programme to enhance the resilience of NBFIs.²⁶ This programme includes work to: assess and, where necessary, address vulnerabilities associated with non-bank leverage; carry out policy work on the liquidity preparedness of market participants; strengthen the ongoing monitoring of NBFIs risks; and advance the understanding of systemic risks in NBFIs.

²⁶ See FSB (2022), Enhancing the Resilience of Non-Bank Financial Intermediation: Progress report, November.

Abbreviations

CBOT	Chicago Board of Trade
CCP	Central counterparty
CET1	Common equity Tier 1 capital
CME	Chicago Mercantile Exchange
ECC	European Commodity Clearing
EEA	European Economic Area
EEX	European Energy Exchange
EFP	Exchange-for-physical
EFS	Exchange-for-swap
ETD	Exchange-traded derivative
ETF	Exchange-traded fund
ICE	Intercontinental Exchange
LCH	London Clearing House
LME	London Metal Exchange
NBFI	Non-bank financial intermediation
NYMEX	New York Mercantile Exchange
MGEX	Minneapolis Grain Exchange
OCC	Options Clearing Corporation
OTF	Organised trading facility
OTC	Over-the-counter
PTF	Principal trading firm
RCF	Revolving credit facility
TR	Trade repository
TV	Trading venue