

TRV Risk Monitor

ESMA Report on Trends, Risks and Vulnerabilities, No. 1, 2023



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No. 1, 2023

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Executive summary

Risk summary and outlook: The slowdown of economic activity, high inflation, the global tightening of financial conditions, the geopolitical environment and the materialisation of peripheral risks linked to leverage and liquidity are the defining drivers of risk in EU financial markets at the current juncture, aggravated by growing concerns over business practices in the crypto space. Amid this volatile environment, financial markets remained remarkably stable in the second half of 2022 (2H22) and economic sentiment has become more positive in early 2023. But there is no reason for complacency: High levels of uncertainty and fragile market liquidity are limiting the resilience of the financial system against further external shocks. Overall risks to ESMA's remit thus remain at the highest level. Contagion and operational risk levels are considered very high, as are liquidity and market risk levels. Credit risk levels have remained high and are expected to rise, reflecting the growing concerns over public and corporate indebtedness. Risk levels remain very high in securities markets and asset management. Risks to infrastructures and to consumers both remain at high levels, and now with a worsening outlook, while environmental risks remain elevated. Going forward, the confluence of risk sources continues to result in a highly fragile market environment, and investors should be prepared for further market corrections.

Market environment: The tightening of financial conditions globally has weighed on economic activity, and inflation remains very high, although latest macroeconomic data are slightly brighter. Volatility in energy markets stayed elevated despite a general decline in prices. Structural vulnerabilities continue to expose markets and participants to the risk that shocks to markets could be amplified by liquidity supply and demand imbalances.

Securities markets: Equity prices were volatile in 2H22 with markets partially recovering third quarter (3Q22) losses based on newsflow around relatively stable inflation and positive corporate earnings. Price earning (PE) ratios in the EU fell below their ten-year average, suggesting that uncertainty over the economic outlook starts being priced in by market participants. Tighter monetary policy weighed on valuations in fixed-income markets, contributing to upward pressure on yields and spreads. Fixed-income liquidity broadly deteriorated with higher bid-ask spreads across bond types as volatility increased.

Asset management: The EU fund sector saw low levels of performance and outflows across the main fund types in 2H22, except for MMFs which experienced very large inflows in 4Q22. Assets under management experienced their sharpest decline since the Global Financial Crisis. The sector was largely resilient, with orderly redemptions, but the deterioration in macroeconomic conditions amplified vulnerabilities, including exposures to credit risk for bond funds. Maturity mismatches in Commercial Real Estate (CRE) funds persist, and the impact of the UK gilt market turmoil on leveraged Liability-Driven Investment Funds in 2H22 confirmed existing concerns over fund liquidity risk management and excessive leverage, as well as contagion risks given strong systemic interconnections. Containing systemic risk implies strengthening the sector's resilience, which authorities can support by enhancing existing monitoring and their use of supervisory tools.

Consumers: Investor sentiment remains weak, against the backdrop of economic uncertainty. Inflation acts as a drag on real investment returns and contributes to falling household savings. Retail investments in UCITS continued to decline. Consumer complaints, which had spiked in early 2021 during high levels of retail trading and technical problems, have returned to historical levels.

Infrastructures and services: In 2H22 volumes traded in EU equity markets remained stable, while the relative composition showed a slightly decreasing share of lit trading. Central clearing volumes grew further, as margins collected by EU central counterparties (CCPs) for interest rate and commodity derivatives rose with rises in prices and volatility in underlying instruments, while some migration from exchange-traded derivatives (ETD) to over the counter (OTC) energy derivatives was observed. Margins collected for energy derivatives are concentrated in a few large clearing members who clear at only a few EU and non-EU CCPs. CRA views on credit risk generally became more negative, except for sovereigns, with downgrades increasing relative to upgrades.

Market-based finance: Capital market financing decreased sharply in 2022, turning negative for the first time since the market stress related to COVID-19 in early 2020. This is linked to low primary equity and bond market activity in the context of wide investor uncertainty. Tighter credit standards for firms, high corporate debt levels and a rapid increase in the overall cost of external financing in the euro area also played a role. Private markets have continued to grow to reach EUR 8.6tn globally, including an exposure of EUR 1.2tn for EU Alternative Investment Funds (AIFs). While liquidity

transformation is low, lack of reporting of leverage by private equity AIFs makes risk assessment challenging.

Sustainable finance: Net-zero pledges have come under growing scrutiny, with the energy crisis jeopardising decarbonisation objectives. More broadly, the focus on greenwashing has increased while investors increasingly appear to differentiate between products based on their sustainability credentials, as reflected in steady net flows into Sustainable Finance Disclosure Regulation (SFDR) Article 9 funds. Despite this, ESG markets continued to grow, with this trend showing resilience to broader market developments.

Crypto-assets and financial innovation: Crypto-asset valuations have now fallen by almost 70% year-on-year, driven by macro-economic factors and several high-level collapses in 2022. The recent failure of FTX, formerly one of the largest centralised crypto exchanges, triggered some large market corrections across crypto assets. Contagion within the crypto sector has been substantial, reflected in further price drops of key crypto instruments and knock-on bankruptcies among service providers. The reported mismanagement at FTX has further fuelled doubts over business models and practices in the crypto space at large, underlining long-standing existential questions regarding the viability of markets for assets with no intrinsic value, anonymity and lack of transparency as essential market features, and widespread disregard for fundamental principles of good governance, market integrity, client protection, and risk management. Given low exposures by EU market participants, material spill-over effects of the crypto turmoil into the EU financial sector and the real economy have not been registered so far.

Risk dashboard

Overall ESMA remit

Risk categories			Risk drivers	
	Level	Outlook		Outlook
Overall ESMA remit	○	→	– Geopolitical risks	↗
Liquidity risks	○	→	– Macroeconomic environment	↗
Market risks	○	→	– Inflation and interest rate environment	↗
Credit risks	○	↗	– Sovereign and private debt markets	↗
Contagion risks	○	→	– Infrastructure disruptions	↗
Operational risks	○	→	– Other political and event risks	→
Environmental risks	○	↗		

Securities markets

Risk level	Outlook	Risk drivers
○	→	<ul style="list-style-type: none"> – Ongoing uncertainty from Russian invasion, risks of market volatility and market shifts. – Macrofinancial headwinds related to the tightening of financial conditions globally and recession risks. – Reduced growth increasing already high indebtedness from the pandemic and higher debt refinancing costs weakening public and private balance sheets. – COVID-19 residual uncertainty and ongoing impacts. – Massive volatility and losses in crypto markets.

Asset management

Risk level	Outlook	Risk drivers
○	→	<ul style="list-style-type: none"> – Ongoing pressure on real portfolio returns from sharp deterioration in mid-term economic outlook, and supply-side and inflation pressures. – Shocks affecting both asset liquidity and liquidity demands could challenge funds exposed to liquidity mismatches. – Risk appetite shift could drive flows away from riskier types of bond funds (e.g. corporate, emerging market).

Consumers

Risk level	Outlook	Risk drivers
○	↗	<ul style="list-style-type: none"> – Increased market volatility and higher inflation increase short-term risks for consumers, especially losses from negative real returns. – Risks of aggressive marketing, especially of higher-risk structured products and crypto-assets. – Digitalisation and lack of consumer proficiency in social-media-driven trading and copy trading. – Poorly disclosed high costs; conflicts of interest related to payment-for-order flow.

Infrastructures and services

Risk level	Outlook	Risk drivers
○	↗	<ul style="list-style-type: none"> – Ongoing high short-term operational risk of cyberattacks, especially from Russia. – High market volatility raises short-term risks of margin breaches and trade disruptions. – Ongoing significant operational risk to infrastructures generally, including exposure from increasing digitalisation and the use of cloud services in core production processes.

NB: Assessment of the main risks by risk categories and sources for markets under ESMA's remit since the last assessment, and outlook for the forthcoming quarter. Risk assessment based on the categorisation of the European Supervisory Authorities Joint Committee. Colours indicate current risk intensity. Coding: green = potential risk; yellow = elevated risk; orange = high risk; red = very high risk. Upward-pointing arrows = increase in risk intensity; downward-pointing arrows = decrease in risk intensity; horizontal arrows = no change. Change is measured with respect to the previous quarter; the outlook refers to the forthcoming quarter. The ESMA risk assessment is based on quantitative indicators and analyst judgements.

Risk monitoring

Market environment

The macrofinancial environment has continued to deteriorate in the second half of 2022 (22H22) amid a global tightening of financial conditions, high inflation levels and high commodity prices. Economic activity is expected to slow down sharply in 2023, with recession risks increasing (Chart 2). However, latest data points were more positive than expected by forecasters.

Macroeconomic conditions were strongly affected by high inflation and commodity prices in a context of uncertainty related to the ongoing war in Ukraine and a slowdown of activity in the US, Europe and China. In October, the International Monetary Fund (IMF) cut its global real gross domestic product (GDP) growth estimate for 2023 to 2.7 % (–0.2 percentage point (pp) compared with the July forecast), and the European Commission had reduced its EU estimates to 0.3 % for 2023 (–1.2pp compared with July).¹ However, in January 2023, the IMF revised its GDP forecast upward (+0.2pp) to 2.9 percent, as the global economy proved more resilient than expected in 2022 and inflation is expected to decline².

Inflation reached its highest level since the early 1980s in the EU at 11.5 % in October, compared with less than 5 % a year ago (10.6 % compared with 4% a year ago for the euro area (EA)) but started to slow down at the end of the year, falling to 10.4% in December (9.2% for the EA). Inflation rates remain heterogeneous in EU countries, ranging from around 6% in Spain, Luxembourg and France to more than 15% in some Baltic and eastern European countries. In the US, inflation has started to slow earlier, at 6.5% in December against 9.0% in June (Chart 3). Higher prices in the EU were driven mainly by energy (the surge in gas and electricity prices offsetting the decline in oil prices), food and core components (goods and services) and the depreciation of the euro. However, the structure of inflation changed significantly throughout the year from being driven mostly by energy up to August to being fuelled by core components after August.

Monetary policy has tightened further to tame inflation pressures. In the United States, the Federal Reserve System raised its benchmark rate by a cumulative 225 basis points (bps) in

2022H2, resulting in a target rate of 4.50%, a 425bps tightening compared with one year ago. In the euro area, the European Central Bank (ECB) increased its policy rates by 75bps in September and in November, followed by a 50bps rise in December, resulting in a 250bps tightening since end-2021. Similar policy tightening has taken place in other advanced economies, leading to a global simultaneous tightening of financial conditions.

Global financial conditions have tightened further, with corporate bond yields reaching their highest levels since 2009. The increase in yields for highly rated bonds was primarily driven by the risk-free rate (Chart 4), while for lower rated bonds credit spreads also played a role, as investors moved out of riskier assets.

Asset values remained relatively stable at the end of the reporting period compared with end-June, with the exception of commodities which declined substantially (Chart 5). However, asset prices were volatile during 2H22, evidenced by high peak-to-trough levels.

Commodity prices stayed very elevated. While the composite index of commodity prices remained stable, there were substantial price moves during the period for energy prices (Chart 1). Natural gas and electricity futures surged during the summer to reach a peak end-August. Since then, energy prices have been declining, as mild weather and output from other sources have helped dampen demand, resulting in EU storage facilities being 88% full end-December (against 53% in 2021). In contrast, agricultural and metal commodity prices remained relatively stable.

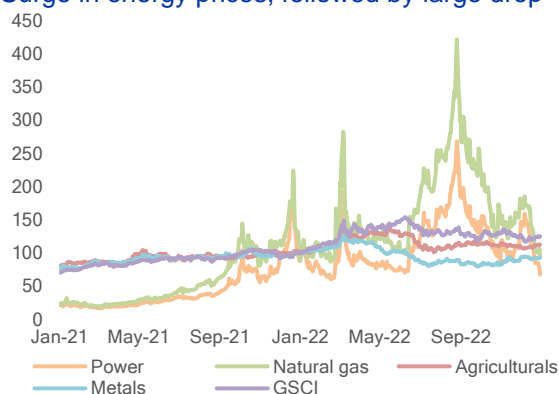
¹ IMF (2022), [World Economic Outlook – Countering the Cost-of-Living Crisis](#); European Commission (2022), [European Economic Forecast – Autumn 2022](#).

² IMF (2023), [World Economic Outlook Update – Inflation Peaking amid Low Growth](#).

Chart 1

Commodity prices

Surge in energy prices, followed by large drop



Note: Commodity price indices rebased at 1/1/2022=100. S&P GSCI indices for global commodities, agricultural products and metals, ICE Dutch TTF futures for natural gas and EEX Phelix futures for power.
Sources: Refinitiv EIKON, Datastream, ESMA.

However, there is no reason for complacency: High levels of uncertainty and fragile market liquidity are limiting the resilience of the financial system against external shocks. The recent stress related to **liability-driven investment** (LDIs) strategies investing in sterling government bonds exemplifies how this risk can crystallise. A large shock to gilts led to substantial liquidity pressure on leveraged LDI funds. Margin and collateral requests on repo backed by government bonds (whose value fell due to the sharp increase in yields), and interest-rate derivatives (IRDs) surged, as higher yields triggered mark-to-market losses. To raise liquidity, LDIs sought to sell sovereign bonds but the market was unable to absorb the volumes of sales, triggering the intervention of the Bank of England to provide a backstop to the sovereign bond market.

Overall, global financial markets remain in a state of **great uncertainty**. The ongoing war in Ukraine and the uncertainty on future monetary policy, combined with signs of a deceleration of economic activity in the US and China could weigh on financial markets, although recent more positive data on the 2023 macroeconomic outlook may mitigate these risks. Geopolitical risks remain elevated at global and regional levels.

Government **debt levels** have continued to decline in 2022. The economic recovery and the rise in inflation have helped reduce the debt burden in real terms. EU gross government debt–GDP ratio dropped to 89 % in 2021, and in the Commission’s November 2022 forecast was

expected to fall to 86 % in 2022. Recession risks in 2023 may increase public indebtedness, which, given higher debt refinancing costs due to rising interest rates, may weaken public balance sheets. Concerns over public and private debt sustainability are also set to rise.

Net **investment flows** from EA-domiciled investors continued to be broadly negative in 2022 (Chart 7). Net outflows reflected mainly net sales of non-EA equities by EA investors, and net sales of EA debt securities by non-EA investors.

The profitability of **EU banks** increased in 1H22, well above 2020 levels, driven by the rise in net interest margins and lending growth and a slight reduction in operating costs.³ While asset quality remains stable, there are early signs of deterioration. For **EU insurers**, macroeconomic risks are the main concerns, while returns have been trending down.⁴

Based on these major developments and a much more uncertain environment, European securities markets are coming under **increased systemic stress**. This is clear from ESMA’s version of the ECB composite indicator of systemic stress (CISS) (Chart 6). Despite an improvement in 2H22, the systemic stress indicator exceeds levels seen during the pandemic, mainly because of the contribution of bond markets developments (in particular the high level of volatility) and to a lesser extent equities.

Structural developments over the last decade have increased the potential for **large liquidity demands** in times of stress. First, the continued rise of open-ended funds providing daily redemptions to investors, while investing in a range of assets with different liquidity, can lead to a risk of large redemptions during volatile periods, as witnessed in March 2020. Second, the move to central clearing for derivatives has reduced financial stability risks, as CCPs act as systemic risk managers that cover counterparty risk in a central manner through a sophisticated set of models and financial resources supporting transparent and liquid markets. However, margin requests can entail liquidity risk for market participants. During the past year, clearing members and their clients have been subject to substantial margin calls of CCPs as a result of Russia’s invasion of Ukraine and its impact on energy markets. These margin increases have created substantial liquidity strains on market participants, in particular non-financial counterparties (NFCs), which typically have

³ EBA (2022), ‘[Risk dashboard –Data as of Q2 2022](#)’.

⁴ EIOPA (2022), ‘[Risk dashboard – October 2022](#)’.

fewer and less liquid assets to meet margin requirements.

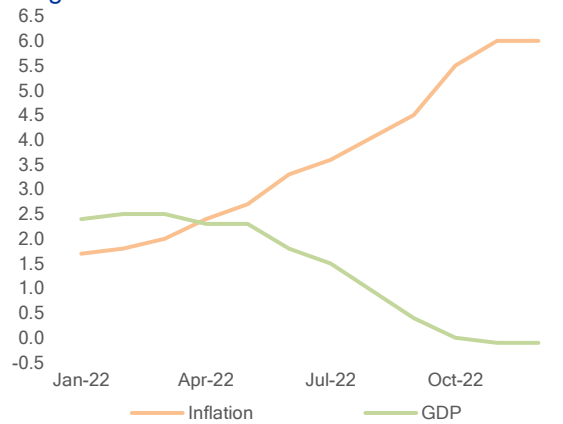
At the same time, **liquidity supply** has also changed substantially over the last decade. On the one hand, the development of electronic trading has allowed proprietary trading firms to become dominant players in liquid markets. On the other hand, the move by banks from a dealer-based provision of liquidity (where banks use their balance sheet through inventories) to a broker-based provision of liquidity (where banks act more pass-through agents) has changed the way liquidity is offered.

In **times of stress**, liquidity might become more fragile as liquidity suppliers retrench because of limited risk appetite and/or limited balance sheet capacity. At the current juncture, given the high levels of uncertainty, this makes it more likely that shocks to markets could be amplified by liquidity supply and demand imbalances.

Key indicators

Chart 2

GDP and inflation forecasts for 2023 Stagflation risks have increased ...



Note: Median GDP growth and inflation forecasts for the euro area for 2023, by vintage month, in %.
Sources: Refinitiv EIKON, ESMA.

Chart 3

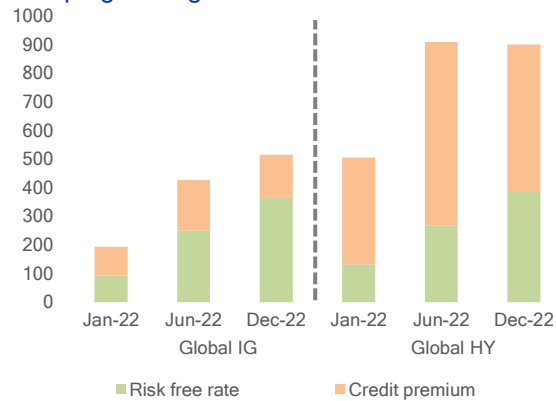
Inflation in the US and the euro area ... as inflation levels remains very high



Note: Annual rate of change in price measures (euro area: harmonised index of consumer prices; US: consumer price index non seasonally adjusted), monthly data in percent.
Sources: Eurostat, US Dept of Labor Statistics, ESMA

Chart 4

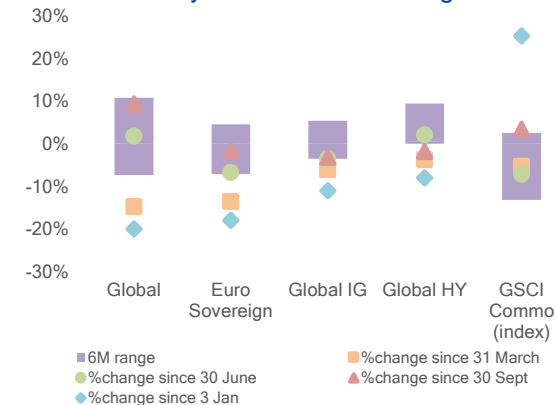
Financial conditions Sharp tightening of financial conditions



Note: Decomposition of bond yields of Bank of America Merrill Lynch Global Corporate Index, in basis points.
Sources: Refinitiv Datastream, ESMA.

Chart 5

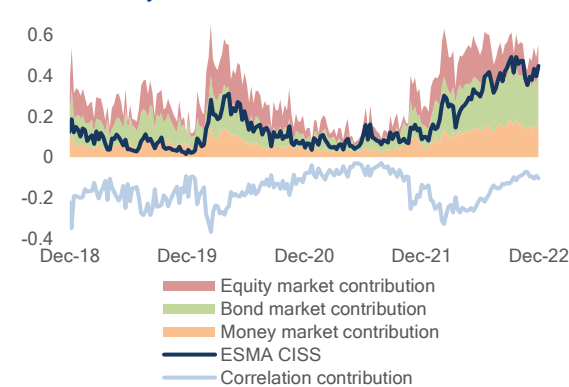
Market performance Relative stability since 3Q22 amid high volatility



Note: Percentage change and range of performance indices of selected asset classes. 6M range is the difference between the maximum and the minimum price change since 1 July 2022.
Sources: Refinitiv Eikon, ESMA.

Chart 6

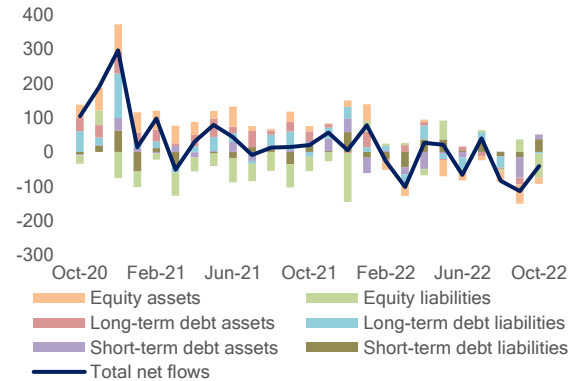
ESMA systemic stress indicator Increased systemic stress



Note: ESMA version of the ECB CISS indicator measuring systemic stress in securities markets. It focuses on three financial market segments: equity, bond and money markets, aggregated through standard portfolio theory. It is based on securities market indicators such as volatilities and risk spreads.
Sources: ECB, ESMA.

Chart 7

Portfolio investment flows from and to the EA Net outflows from EA in 2H22



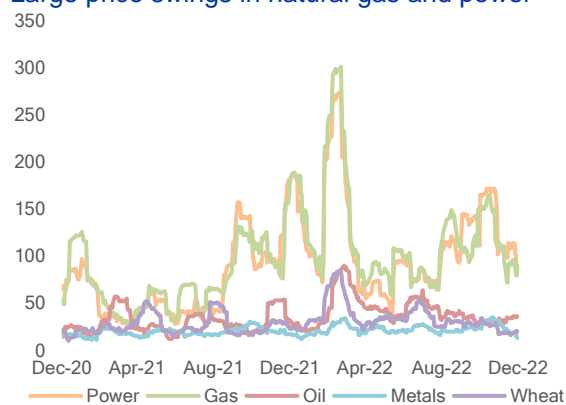
Note: Balance of Payments statistics, financial accounts, portfolio investments by asset class, EUR bn, Assets=net purchases (net sales) of non-EA securities by EA investors. Liabilities=net sales (net purchases) of EA securities by non-EA investors. Total net flows=net outflows (inflows) from (into) the EA.
Sources: ECB, ESMA.

Securities markets

Commodity derivatives: energy remains volatile

Given the continued tensions on commodities and in particular energy markets, **energy-related securities** remained very volatile amid declining prices for energy derivatives and a sharp rise in the valuation of energy companies (Chart 8)⁵. Concerns over the supply of **natural gas** prompted an extreme hike in derivative prices (reaching in August a peak of more than three times its 2-year average). Following a combination of reduced demand, storage replenishment, increased imports and policy measures aimed at capping extreme price increases, gas future prices later decreased (and were 10% below January 2022 levels as of 30 December 2022). Developments in natural gas derivatives markets also affected **power futures**, whose prices are highly correlated (Chart 8). In contrast, values of industrial metals and agricultural commodities indices remained stable over the course of 2H22, displaying moderate price increases and lower volatility.

Chart 8
Commodity derivatives realised volatility
Large price swings in natural gas and power



Note: Commodity price realised volatility (annualised 20D volatility) in %. German Phelix futures for power, Dutch TTF for gas, Brent for oil, S&P GSCI industrial metals index and Euronext wheat futures.
Sources: Refinitiv Datastream, ESMA.

Drop and partial recovery in equity markets

The second half of 2022 has been characterised by rapid movements in **equity prices** and sustained volatility levels. The downward pressure, which started at the beginning of 2022, continued in 3Q22 amid global growth concerns, inflationary pressures and restrictive monetary policy (−5% in the US and −4% in Europe). However, markets bounced back in 4Q22, which was linked to newsflow around corporate earnings and the hope of easing inflation, with main indices marking +15% (Euro Stoxx 50) and +8% (S&P 500) compared with 30 September 2022 (Chart 14).

By sector, with the exception of the energy sector (+27% in 2022 compared with 2021), European stocks valuations are still below their 2021 levels, with real estate (−39%), retail (−31%) and energy intensive sectors, such as technology (−26%) and industrials (−19%), suffering the largest drops (Chart 11). The real estate (RE) sector is going through the largest secondary market losses since 2009 (Textbox 1).

Nevertheless, these losses were partially offset by large gains in 4Q22, which saw significant growth in November for all European sectors. In addition, the negative performance of technology stocks in recent months has been more impactful in the US than in Europe given the large relevance of the sector in US indices.⁶

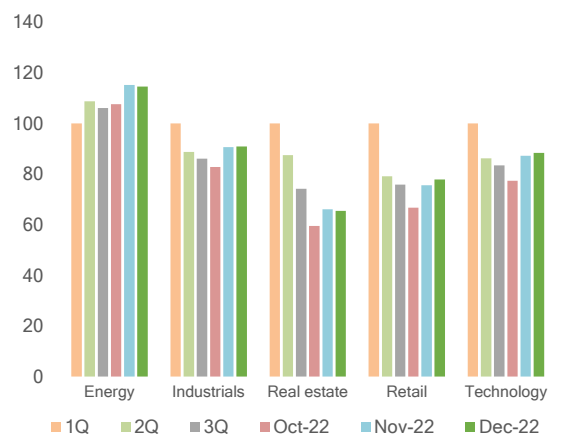
Price-to-earnings (PE) ratios declined further during 2H22 and fell below their 10-year average for the first time since 2H20 both in the EU and in the United States (Chart 16), reflecting the pessimistic market environment and the tighter interest rate setting.

⁵ See also [ESMA's Chair opening statement on energy derivatives markets](#) on 1 December 2022.

⁶ During 1Q22 technology stocks accounted for 27% of the market capitalisation of the S&P 500, while they

accounted for 10% of the Euro STOXX 600 over the same period, according to Refinitiv data.

Chart 9
Performance of selected STOXX600 sectoral indices
Drop in all sectors, except energy



Note: Change in average of market value of selected Euro STOXX 600 sectoral equity indices. Mar-Jun.22= 100.
Sources: Refinitiv Datastream, ESMA.

Textbox 1
Developments in real estate markets

Market stress in the RE sector can be a source of concern for financial stability through interconnectedness of the RE sector with i) the financial system (banks, insurers, pensions and investment funds) and ii) the broader macroeconomic environment (inflation and growth dynamics)⁷. The banking sector is the most exposed to the RE sector, mainly through loans. Financial stability implications could also involve AIFs. As of end-2021, regulatory data show that there were around 4,500 RE AIFs in the EU with a net asset value (NAV) of almost EUR 1tn. Pension funds (24%) owned the most units of RE funds managed or marketed by authorised AIFMs, followed by insurance companies (16%) and households (14%).

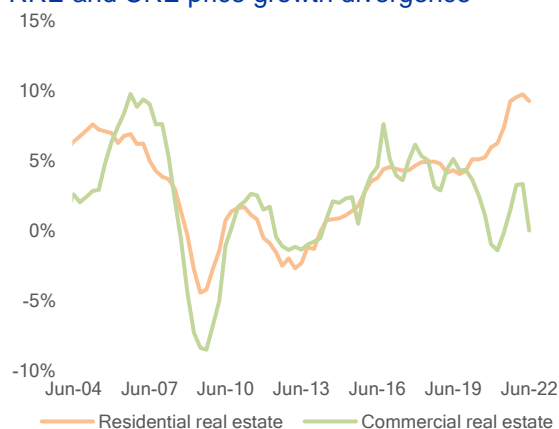
RE markets have come under significant pressure in 2022 through a slowdown in economic activity and rising rates. The demand for both commercial and residential real estate (RRE) is negatively affected by rising rates, as they reduce the affordability of buyers. For CRE, the slowdown in activity also weighed on demand. By the end of 2022, it became more expensive for investors to finance new real estate deals or re-finance existing debt, hence the reduction in the level of investments in the sector. On top of this, the increase in remote technologies (such as e-commerce) in several market sectors during the pandemic has lowered the demand for properties, especially CRE⁸.

The pandemic marked the beginning of the divergence of CRE and RRE markets. Between 2020 and 2022, CRE prices growth was volatile and hovered around 2%, while RRE prices surged (Chart 10). Although RRE price growth has been slowing down recently, valuation in several countries appears stretched compared with fundamentals. Price misalignments in the RE sector are generally a source of risk for financial stability.

Real estate markets began to show vulnerabilities in a context of stretched valuations amid growing residential property prices. Nominal RRE prices grew by 10% year on year in

1Q22, with a slight slowdown in 2Q22 (9.6%). In contrast, CRE markets had already shown signs of deterioration in early 2022, with the growth in nominal CRE prices coming to a halt in 2Q22 (0% in 2Q22 after +35 in 1Q22).

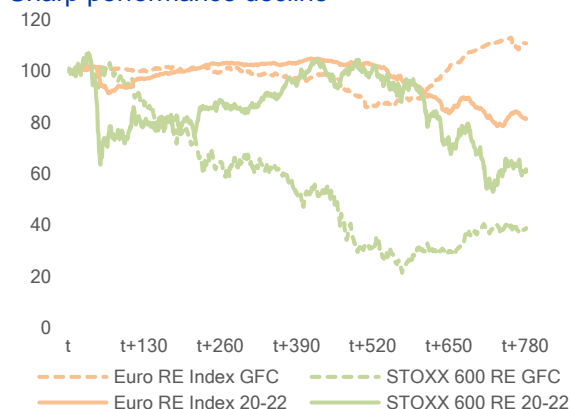
Chart 10
RRE and CRE price growth
RRE and CRE price growth divergence



Note: Year over year growth of nominal quarterly residential and commercial real estate prices in the Euro Area, in%.
Sources: ECB, ESMA.

In financial markets, the ongoing macroeconomic background weighed on financial markets through lower prices across RE asset classes. In equity markets, the STOXX 600 Europe Real estate index declined by -40% in 2022, in a peak-to-trough fall unseen since 2009 (compared with -14% for the wider STOXX 600 index, Chart 11). Similarly, the Bank of America Real Estate Euro corporate bond index was down by -20%, performing significantly worse than in the aftermath of the GFC (compared with -14% for the broader Euro corporate IG index).

Chart 11
RE equity and bond prices
Sharp performance decline



Note: Market performance of STOXX 600 Europe Real Estate Equity Index and BoML Euro Real Estate Index, in bps. Start dates: GFC (01/01/2007), 20-22 (01/01/2020).
Sources: Refinitiv Datastream, ESMA.

On the investment fund side, selected RE or property funds globally have limited withdrawals following an increase in redemption requests, on investors' concerns about the long-term health of the commercial property market⁹. Commercial data pointed towards a general slowdown in flows for property and RE funds in 2022.

⁷ See IMF (2021), *Global financial stability report*, Chapter 3: Commercial Real Estate: Financial Stability Risks During the COVID-19 Crisis and Beyond, April.

⁸ See IMF (2022), *Commercial Real Estate Prices During COVID-19: What is Driving the Divergence?*

⁹ See Financial Times (2022), *Blackstone limits withdrawals at \$125bn property fund as investors rush to exit and Fire sale begins as property funds face rush of UK redemptions*

In that context, the ESRB issued a warning in September 2022, pointing to the risks that rising mortgage rates and the deterioration of the debt-servicing capacity of households could exert downward pressure on prices and trigger the crystallisation of risks in the sector¹⁰. In addition, the ESRB published a Recommendation in January 2023 targeting risks in the CRE sector¹¹.

Pressure on bond yields

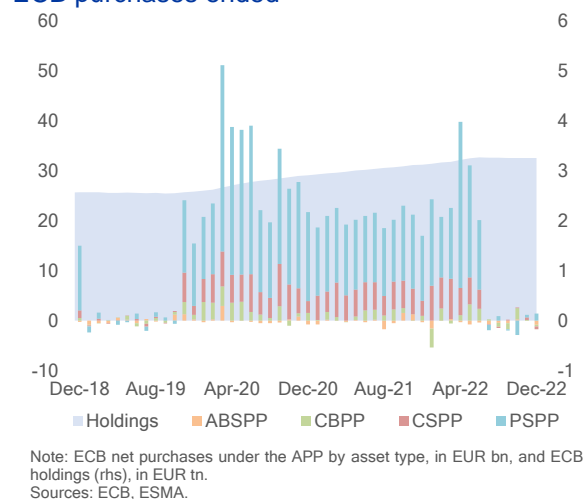
Inflationary pressures, weaker growth prospects and tighter monetary policy expectations continued to shape **fixed income markets developments** in 2H22. This translated into bond yield volatility and a deterioration of liquidity conditions.

European **sovereign bond yields** continued to rise in 2H22 (Chart 17) after a decline in July related to the ECB announcement of a tool to support the effective transmission of monetary policy¹². The largest increases were observed for IT (+130bps), FR (+129bps) and ES (+119bps). In terms of performance, the euro sovereign bond index declined by -7% in 2H22 (-18% in 2022). Moreover, events from outside the EU spilled over into EU markets with further pressures on prices and increased volatility. In the UK, bond prices declined sharply in September on investor uncertainty over the country's expansionary fiscal package, resulting in liquidity strains for LDI strategies¹³. Subsequently, the Bank of England intervened to restore the proper functioning of gilt markets.

The deteriorating macroeconomic environment, coupled with rising input costs, weighed on the profitability of European corporates, especially in the high-yield (HY) sector. In this respect, **corporate bond markets** showed a declining performance overall in 2022, with both investment grade (IG) and HY bond indices lower by -14% and -12% respectively. However, HY valuations showed signs of partial recovery in 2H22 (+4% compared with 30 June). Despite a decline since November, credit spreads across rating categories remained elevated, especially for HY. This signals ongoing concerns about corporate debt sustainability in a weak economic environment and an increase in the cost of refinancing.

Bond markets were also affected by the **balance sheet normalisation** by major central banks, with the ECB ending its net asset purchases as of July 2022 (Chart 12). The reduction in central banks demand for assets, alongside market volatility, is potentially linked to deteriorated liquidity in bond markets with increased vulnerabilities for investors most exposed to credit risk.

Chart 12
ECB net purchase under the asset purchase programme
ECB purchases ended



This also coincided with a slowdown of issuance in primary markets due to higher borrowing costs (see market-based finance section). ESMA **liquidity** indicators showed a broad-based deterioration across most metrics. Bid-ask spreads increased for sovereign bonds (by 2.3bps, at twice its 5-year moving average, Chart 13) and corporate bonds (by 14bps). Market depth declined, resulting in higher price impact, as reflected by the Hui-Heubel illiquidity indicator for selected 10Y sovereign bond futures (Chart A.29). However, price impact measures for corporate bonds improved, as the Amihud illiquidity index showed a significant decline since mid-October (-50%) but continues to remain at elevated levels (Chart 19). Overall, liquidity conditions are worse compared with the market stress related to COVID-19; however, long-term trends indicate that liquidity deterioration is so far contained in the EU compared with the EA sovereign crisis. Liquidity issues in sovereign bond markets could spill over into broader

¹⁰ See [Warning of the European Systemic Risk Board of 22 September 2022 on vulnerabilities in the Union financial system](#).

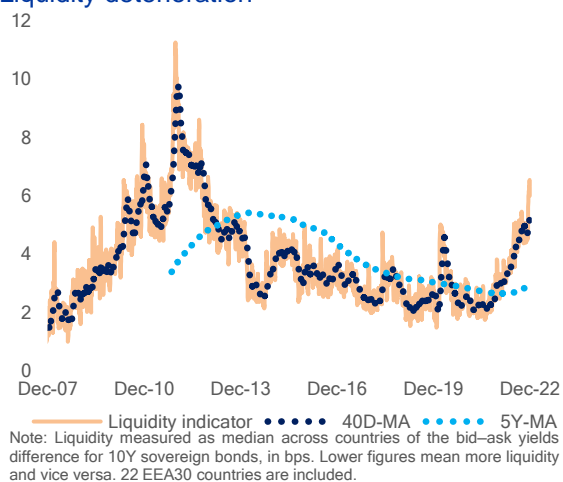
¹¹ See [ESRB issues a recommendation on vulnerabilities in the commercial real estate section in the European Economic Area](#).

¹² See ECB (2022), [The Transmission Protection Instrument](#), July.

¹³ See Textbox 2 for further analysis of the LDI event.

financial stability concerns as witnessed in the events around UK gilts and LDIs (Textbox 2).

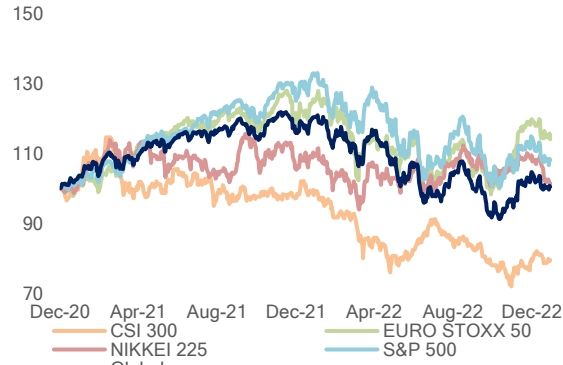
Chart 13
Sovereign bond liquidity indicator
Liquidity deterioration



Looking ahead, market and liquidity risk in fixed income markets remains very high. Credit risk is expected to stay high, with a deteriorating outlook and could weigh on debt-servicing capacities of highly indebted entities. The resilience of fixed-income markets will critically depend on their ability to price in inflationary pressures and withstand the transition to a period of higher interest rates, amid structurally higher liquidity demand in times of market stress.

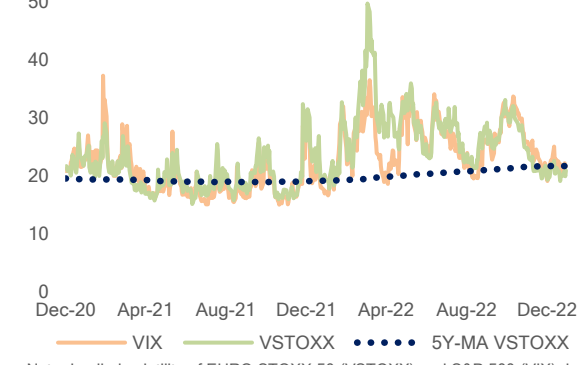
Key indicators

Chart 14
Regional equity market performance
EU rebound in 4Q22 after market correction



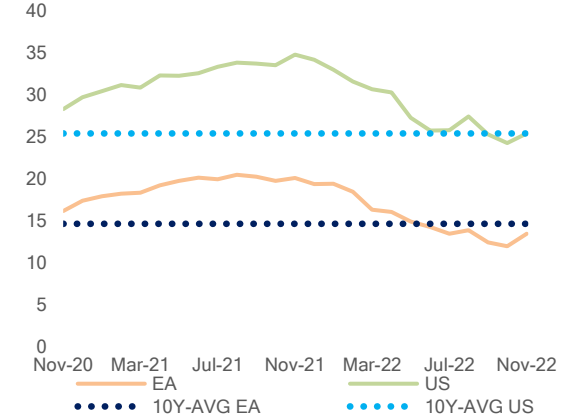
Note: Regional equity return indices. 01/04/2020=100.
Sources: Refinitiv Datastream, ESMA.

Chart 15
Equity market volatility indices
End-2022 volatility back to long-term average



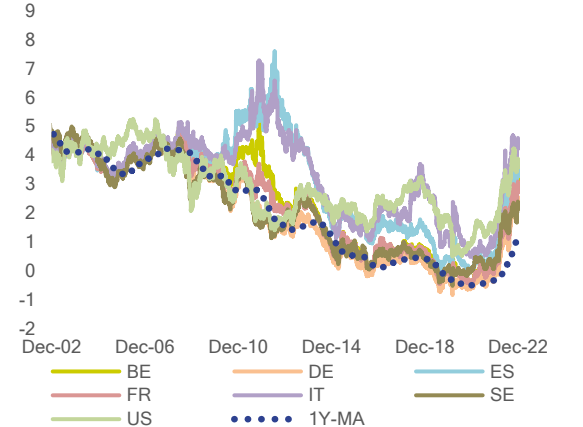
Note: Implied volatility of EURO STOXX 50 (VSTOXX) and S&P 500 (VIX), in %.
Sources: Refinitiv Datastream, ESMA.

Chart 16
Equity market PE ratios
PE ratios close to average in the EU and the US



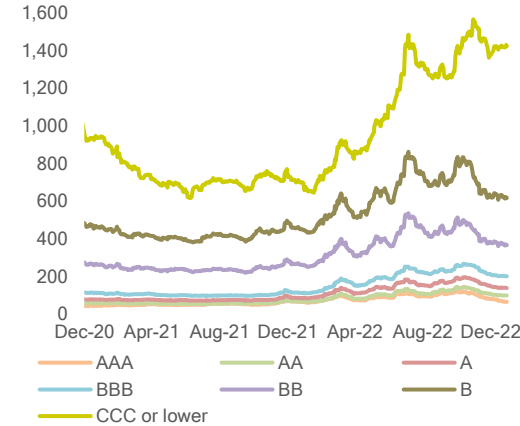
Note: Price-earning ratios based on average inflation-adjusted earnings from the previous 10 years (cyclically adjusted price-earning ratios). Averages computed from the most recent data point up to 10 years before.
Sources: Refinitiv Datastream, ESMA.

Chart 17
EU sovereign bond yields
Sovereign yields continue to rise



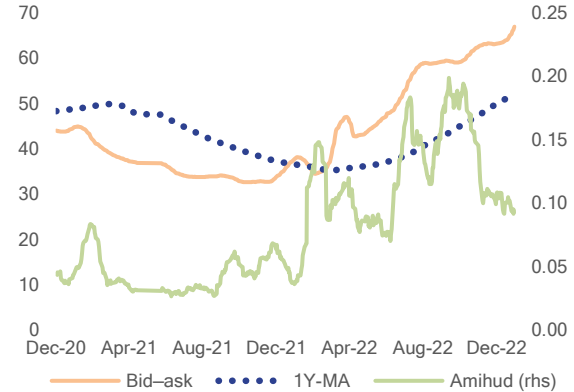
Note: Yields on 10Y sovereign bonds, selected countries, in %. 1Y-MA = one-year moving average of EA 10Y bond indices computed by Datastream.
Sources: Refinitiv Datastream, ESMA.

Chart 18
Euro corporate bond spreads
End-2022 decline, still elevated level



Note: ICE BofAML Euro corporate bond option-adjusted spreads by rating, in bps.
Sources: Refinitiv Datastream, ESMA.

Chart 19
Corporate bond liquidity
Rising bid-ask spreads



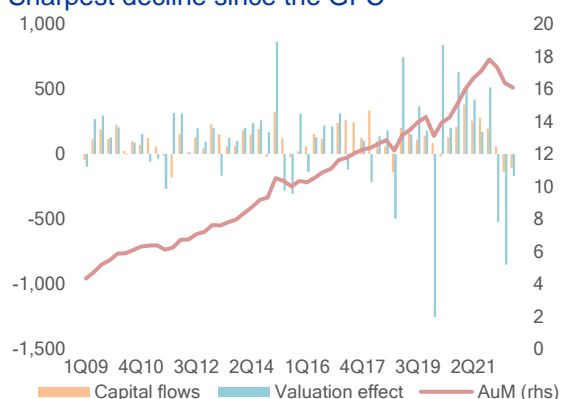
Note: Markit iBoxx EUR Corporate Bond Index bid-ask spread, in bps, computed as a one-month moving average of the constituents bid-ask spread. 1Y-MA = one-year moving average of the bid-ask spread. Amihud liquidity coefficient index between 0 and 1. Highest value indicates less liquidity.

Asset management

Adverse environment across fund categories

The environment has been challenging for the EA asset management industry in 2022, with assets under management (AuM) experiencing their sharpest decline since the GFC (-6% year on year, down to EUR 16tn), mostly due to valuation effects (Chart 20). **Performance** in most fund categories remained negative in 2H22 with equity funds exhibiting a 12-month average monthly performance of -1.3% in December, down from -0.9% in June, and bond and mixed funds reporting respectively -0.9% and -1.1% (-0.7% in June for both). Commodity funds still reported positive returns, at 1.2%, but these were significantly below their highest level of March (3.2%), when commodity prices surged after the Russian invasion in Ukraine.

Chart 20
EA fund AuM
Sharpest decline since the GFC



Note: Net valuation effect related to the AuM of EA investment funds, computed as the intraperiod change in AuM, net of flows received in the respective period. Capital flows and valuation effects in EUR bn. AuM expressed in EUR tn.
Sources: ECB, ESMA.

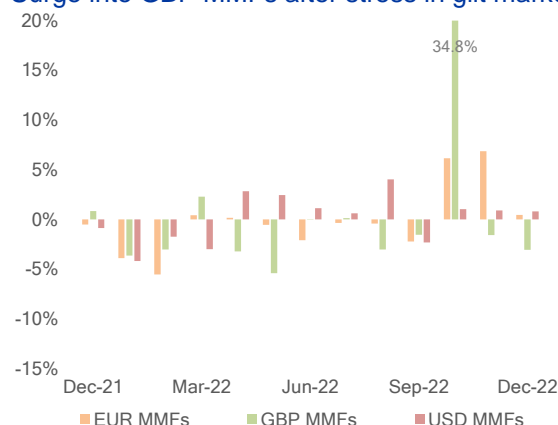
In 2H22 most fund types recorded **net outflows**. For equity, bond and mixed funds negative performance led to redemption requests with net outflows totalling 1.0 % of NAV (Chart 25).

However, despite their positive performance, commodity funds in particular experienced substantial outflows (-23 %), albeit from a low base.

Money market funds (MMFs) did not initially benefit from their status of low-risk asset and experienced outflows in 3Q22 (-1%) before recovering in 4Q22, up to total inflows of 11%

over the reporting period. Variation between MMFs denominated in EUR, GBP and USD has been significant. In particular, MMFs denominated in GBP were particularly exposed to the stress affecting the gilt market that followed the UK's 'mini-budget' on 23 September. Some GBP funds experienced outflows above 15% of their net asset value over one week, along with some large deviations between the constant net asset value and the market based value for LVNAVs, as LDI funds redeemed MMF shares to raise cash to meet margin and collateral requirements (Textbox 2). This trend spectacularly reversed following the intervention of the Bank of England to support the market, as GBP MMFs received nearly 35% inflows for the month of October alone (Chart 21). Overall, GBP MMFs recorded inflows of 27% in 2H22, before EUR MMFs (10%) and USD MMFs (4%).

Chart 21
MMF flows
Surge into GBP MMFs after stress in gilt market



Note: Monthly net flows for MMFs by currency, in % of NAV.
Sources: Refinitiv Lipper, ESMA.

Funds largely resilient, credit risks elevated

The EU fund industry was generally resilient to **liquidity risk**, as funds were generally able to meet redemptions requests in an orderly way. When looking at bond fund portfolios, the liquidity of assets is stable both in IG and HY bond funds (Chart 26), although corporate bond funds in general decreased their cash holding, from 2.4% to 2.1% (median). Moreover, following heightened redemption requests, GBP MMFs increased the proportion of liquid assets in their

portfolios during the last week of September, with both daily and weekly liquidity levels rising significantly.

However, the deterioration in macroeconomic conditions increases the risk of materialisation of **credit risk**, as bond fund exposures to riskier issuers have remained elevated in 2H22, especially for HY funds (Chart 27). The credit quality of HY portfolios remained close to a five-year low, now having a rating between BB– and B+ on average. The likelihood of credit risk materialisation also increased with rising interest rates, as seen in elevated credit spreads (Chart 18).

In addition, the high level of inflation and subsequent monetary tightening increases **interest rate risk** to which fixed-income funds are exposed. Against this background, bond funds have continued to decrease the maturity of their portfolio, down to an average effective maturity of 6.9 years for IG and 3.5 years for HY funds, an 8-year low at the end of 2H22. This is further reflected in terms of duration, with the duration of the EUR IG Corporate Bond Index declining from 5.2 years in 1H22 to 4.6 years at the end of 2022. Similarly, the duration of the EUR HY corporate index receded from 4.1 to 3.2 years over the same period. This implies that the potential valuation impact of a 100bp yield shock has decreased by 0.6 and 0.9 percentage points respectively. Similarly, MMFs have significantly reduced their average weighted maturity to improve resilience to a rate rise, down to a 10-year low of 19 days (Chart 29).

While vulnerabilities related to liquidity, credit and interest risk can materialise separately, **systemic risk** is more likely to crystallise due to a combination of vulnerabilities in the current environment, as illustrated by the stress affecting LDI funds.

In the case of LDI funds, although their portfolio was liquid, they faced an unexpected and unprecedented shock because of the sharp rise of UK sovereign yields at the end of September 2022. The impact of the shock was further amplified by the use of leverage, directional positions and in some cases the use of affected assets as collateral (Textbox 2). Eventually the shock propagated to other assets as LDIs redeemed from MMFs to raise cash. At least five EU MMFs low volatility net asset value (LVNAV) denominated in GBP experienced cumulative

redemptions exceeding 10% in a week, in a context of NAV deviations close to the regulatory threshold (20bps). The contagion stopped as the Bank of England stepped in to support the UK gilt market. This episode revived concerns regarding the vulnerabilities of some MMFs to liquidity stress, and the need to address those risks to improve the overall stability of financial markets¹⁴.

Textbox 2

Stress related to LDI Strategies

End-September 2022, some funds pursuing LDI strategies were subject to acute liquidity stress as a result of the sharp rise in UK sovereign yields (130 bps in a few days). The increase in yields triggered a large fall in the value of sovereign bonds used as collateral by LDI funds and margin requests on IRD exposures of those funds. As LDIs sold sovereign bonds amid low liquidity, the downward price pressure created a self-reinforcing price spiral which forced the Bank of England to intervene (Breedon, 2022)¹⁵. This textbox reviews this episode of market stress using regulatory data.

LDI funds are typically set up by defined benefits pension schemes that provide guaranteed returns to future pensioners. Given this, pension funds face a duration mismatch: they have long-term liabilities (around 30 years) while the sovereign bonds they hold through LDIs have an average maturity of 10 to 20 years. LDI funds are open-ended funds that use derivatives and repo borrowings to reduce the duration and return mismatch. To achieve this, LDIs use IRDs to obtain a short exposure to interest rates (i.e. they face mark-to-market losses when rates go up) which allows the funds to reduce the duration mismatch (by taking on 20-year exposures). LDIs can also reduce the return mismatch between the guaranteed returns owed to pensions and the low returns on sovereign bonds by entering into repo transactions where they pledge their sovereign bonds as collateral to obtain cash that is then invested in higher-yielding assets (Chart 22).

Most LDIs are EU-domiciled AIFs held by UK investors. As of end-2021 there were around 500 AIFs (85% of which denominated in GBP) with a NAV of EUR 250bn. Those funds had gross leverage of around 370% of NAV, mainly from IRDs and repo (Chart 23).

The sharp rise in GBP yields triggered stress for LDIs. Although the surge in rates resulted in an improvement in solvency for pension schemes (as the higher rates are used to discount the pension liabilities), it created liquidity issues. First, LDIs faced margin requests on their IRD exposures (reflecting mark-to-market losses on their short positions). Second, the sharp fall in the value of the collateral pledged in repo transactions (mainly sovereign bonds) triggered the need to post additional collateral. To meet the liquidity demands, LDIs started selling sovereign bonds, but the large volumes of sales caused a further decline in the value of the bonds, due to the limited absorption capacity of the gilt markets. LDIs also redeemed from GBP denominated MMFs, spreading liquidity pressures to EU-domiciled MMFs, resulting in large outflows in a context of significant NAV deviations for GBP LVNAVs.

Following the intervention of the Bank of England through temporary sovereign asset purchases, liquidity improved, and prices rebounded, mitigating liquidity pressures on LDIs. Since then, National Competent Authorities (NCAs) in Ireland

¹⁴ ESMA (2022), '[ESMA Opinion on the review of the MMF Regulation](#)'.

¹⁵ Bank of England (2022), '[Risks from leverage: how did a small corner of the pensions industry threaten financial stability?](#)' – speech by Sarah Breedon.

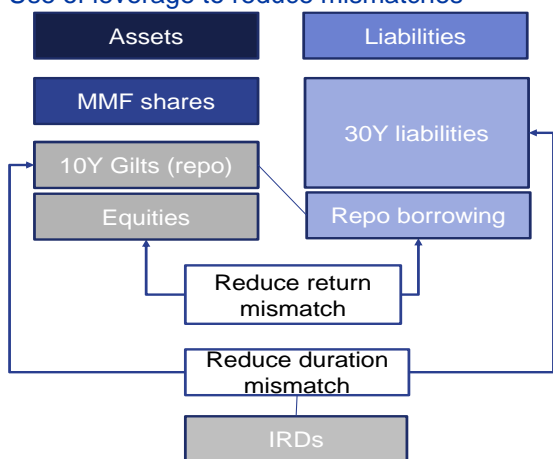
and Luxembourg have asked LDI managers to maintain the current level of resilience, an initiative supported by ESMA¹⁶.

This episode shows how leverage can amplify shocks and trigger liquidity strains within the EU financial system, even if the initial shock originated outside the EU.

Chart 22

LDI balance sheet

Use of leverage to reduce mismatches

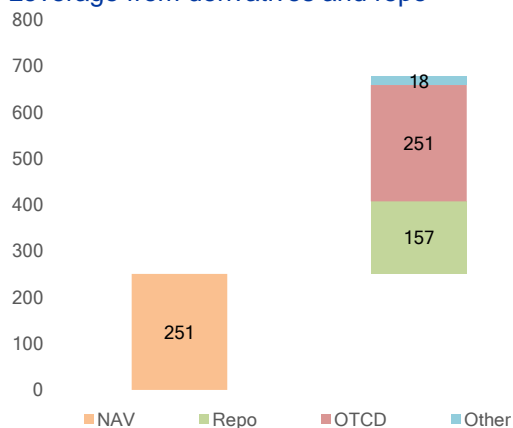


Note: The figure refers to a stylised balance sheet of pension funds when consolidating LDI funds' assets and liabilities. LDI funds have repo borrowing and fund shares on the liability side and pension funds hold the fund shares.

Chart 23

LDI leverage

Leverage from derivatives and repo



Note: NAV and sources of leverage, in EUR bn for AIF LDIs, end-2021. OTCD: Over-the-Counter derivatives. Sources: AIFMD, ESMA.

stemming from exposures to the CRE sector, the ESRB considered that investment funds should strengthen their resilience and adequately reflect the heightened risks in the risk management practices (see Textbox 1 on real estate).

In that context, ESMA guidelines¹⁷ on Article 25 AIMFD set a common framework requiring NCAs to assess leverage-related risks stemming from funds or groups of funds on a regular basis and to report the results to ESMA. This includes, where appropriate, the measures taken to address the risks identified. In November 2022, the Central Bank of Ireland (CBI) notified ESMA of its intention to implement leverage limits to RE funds, by restricting their recourse to borrowing up to a maximum level of 60 percent of their total assets. RE funds in Ireland were characterised by a combination of vulnerabilities:

- 22% of Irish RE funds employed leverage on a substantial basis, with a median leverage ratio of 677% of their NAV (measured using the commitment method), compared with 433% for other EU RE funds.
- AIFs established in Ireland had a large market share in the underlying market, estimated at 35% of the “invested” Irish CRE market.
- Irish RE funds were also exposed to liquidity mismatches for approximately 40% of their assets.

ESMA considered that the combination of these vulnerabilities gave Irish RE funds the potential to amplify shocks affecting this market through disorderly asset sales, with broader macro-financial implications. Therefore, ESMA considered in its advice that the conditions for taking actions are met, and that the measures proposed by the CBI were appropriate¹⁸.

In the light of existing vulnerabilities, ESMA generally encourages NCAs to continue to monitor risks closely, in particular for funds exposed to the RE sector, and to take measures when appropriate, or to ensure the effectiveness of existing measures when they are in place, as is the case in Ireland.

Addressing fund vulnerabilities

In light of the vulnerabilities identified in the financial system of the EU, in particular risks

¹⁶ See [CSSF](#), [Central Bank of Ireland](#) and [ESMA](#) communications in November 2022.

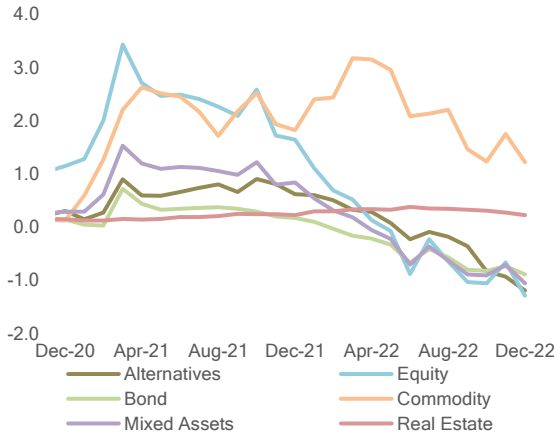
¹⁷ ESMA [Guidelines](#) on Article 25 AIFMD

¹⁸ ESMA [advice](#) on a proposed measure by the CBI.

Key indicators

Chart 24

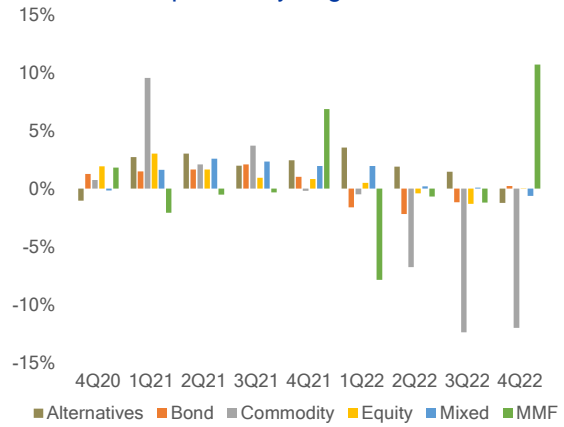
EU fund performance by asset class
Performance decline for most asset classes



Note: EU27-domiciled investment funds' annual average monthly returns, asset weighted, in %.
Sources: Thomson Reuters Lipper, ESMA.

Chart 25

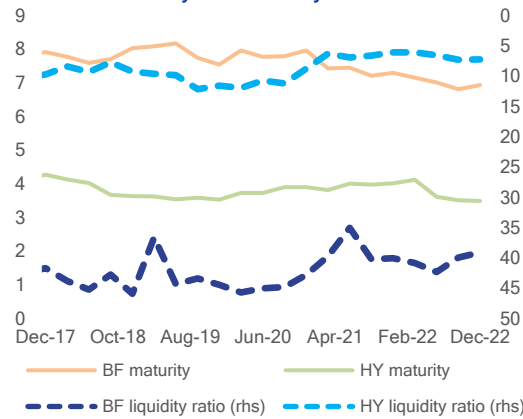
EU fund flows by fund type
Outflows, except for very large 4Q MMF inflows



Note: EU27-domiciled funds' quarterly flows, in % of NAV.
Sources: Refinitiv Lipper, ESMA.

Chart 26

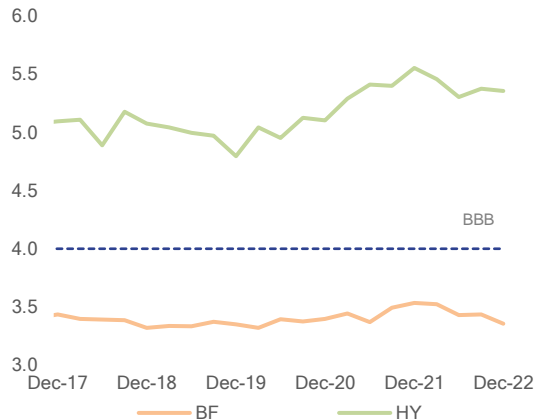
Corporate bond fund cash holdings
Portfolio maturity historically low



Note: Quarterly effective average maturity of EU27 fund assets, in years; ESMA liquidity ratio (rhs, in reverse order).
Sources: Refinitiv Lipper, ESMA.

Chart 27

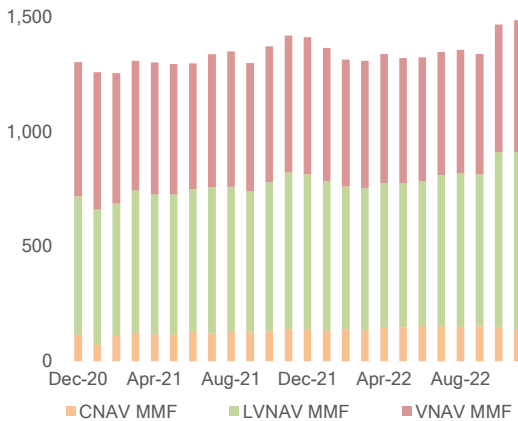
Credit risk
Credit risk elevated in HY funds



Note: Quarterly average credit quality (S&P ratings; 1= AAA; 4= BBB; 10 = D) for EU27-domiciled funds.
Sources: Refinitiv Lipper, ESMA.

Chart 28

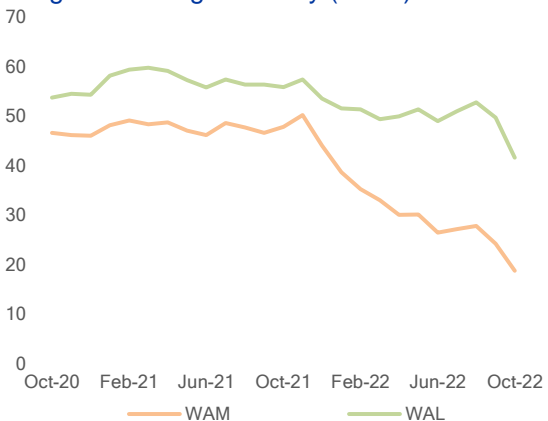
MMF total assets
Total assets increase in 2H22



Note: MMF assets by type, in EUR bn.
Sources: Refinitiv Lipper, ESMA.

Chart 29

MMF maturity
Weighted average maturity (WAM) declines



Note: Weighted average maturity (WAM) and weighted average life (WAL) of Europe-domiciled MMFs, in days. Aggregation carried out by weighting individual MMFs' WAM and WAL by AuM.
Sources: Fitch Ratings, ESMA.

Consumers

Confidence remains weak

Investor confidence remained strongly negative in 3Q22, despite mildly improving in November. Low confidence reflects the persistency of high inflation, uncertainty in the future economic outlook and tightening of financial conditions. Institutional and retail investor sentiment converged, remaining well below zero. This is observable for current and future sentiment alike, signalling significant concerns for consumers in the short-term and weak expectations for long-term developments (Chart 32).

Growth in **household financial assets** strongly declined, especially for investment fund shares and equity. Annualised growth rates for equity and investment fund assets were -3% and -4% respectively in June 2022, while they were largely positive at the end of 2021, at 13% and 14% respectively (Chart 33).

Even if declining in December to 9.2% in the euro area, **inflation** has been affecting consumers in the short-term affecting their available resources, especially for low-income households.¹⁹ Real investment returns have been driven down, affecting consumers' investment and savings in the long term.

Large reduction in nominal and real returns

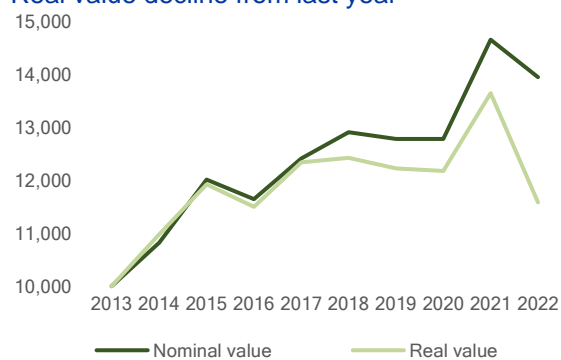
In the current context, the **performance of retail investments** continued to decline. In November 2022, the 1-year moving average (1Y-MA) of monthly gross nominal returns of a stylised household portfolio was just below zero, compared with 1.1% one year earlier. The deterioration is even larger when accounting for inflation, as real returns were -1.2% in November 2022, compared with 0.9% the year before (Chart 34).

Failing to take inflation into account may be of **substantial detriment** to consumers. Besides the more immediate effect on consumers' cost of living, there is also the impact on investment and

savings and the ability to have a buffer against future expenditures.

Chart 30 reports the nominal and real values of a hypothetical investment of EUR 10,000 for ten years. In nominal terms the investment value reached almost EUR 14,000 in 2022. When considering inflation, the real value of this 10-year investment was around EUR 11,600 in September 2022, decreasing from September 2021 as inflation sharply increased.

Chart 30
Value of an investment of EUR 10,000
Real value decline from last year



Note: 10Y investment of EUR 10,000 in a stylised portfolio, nominal and real value. Portfolio composition based on asset weights computed using National Financial Accounts by Institutional Sectors: 36% for collective investment schemes, 39% for deposits, 22% for shares and 3% for debt securities. Costs, fees and other charges incurred for buying, holding or selling these instruments are not taken into account.

Sources: Refinitiv Datastream, Refinitiv Lipper, ECB, Eurostat, ESMA.

In addition, concerns have risen in relation to the persistent appetite of retail investors for crypto assets, especially in relation to high market volatility and recent events.²⁰

The uncertain market environment and fall in market valuations was also reflected in the persistent decline in **investment fund (IF) performance and net flows**. Net annual performance, especially for equity and bond funds sold to retail investors, remained negative and deteriorated in 3Q22 reaching -15% and -10% respectively (Chart 35). Similarly, net flows also declined. Despite net inflows in equity funds, annual net flows declined from EUR 70.5bn in 2Q22 to EUR 35.5bn in 3Q22. Net outflows continued to be observed for bonds, with net annual outflows reaching more than EUR -50bn in 3Q22 from EUR -34bn in 2Q22 (Chart 36).

¹⁹ ECB (2022), [‘The impact of the recent rise in inflation on low-income households’](#)

²⁰ See section on Crypto assets and financial innovation

in this publication.

Investor protection: complaints steady

Among NCAs reporting quarterly data, **complaints** reported through firms and directly by consumers to NCAs totalled around 4,100 in 3Q22, below the 2-year quarterly average. Complaint numbers are down from the high levels seen in 1Q21, which were associated with a large increase in retail trading seen during the early phase of the COVID-19 pandemic amid turbulent trading conditions.

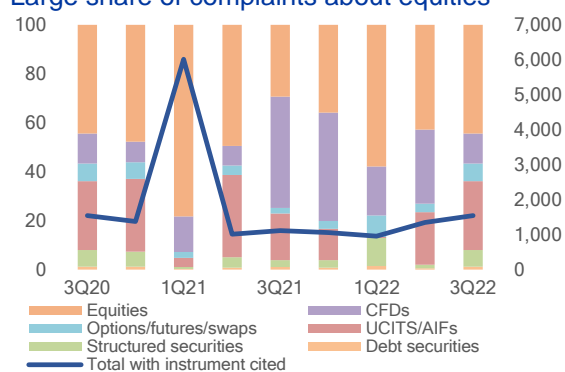
Interpreting patterns in complaints data requires an understanding of recent events and data limitations – such as significant time lags – and heterogeneity between countries.

This can also be seen when looking at complaints by financial instrument. In 3Q22, around half of complaints for which an instrument type was recorded related to equities (Chart 31), though this was below the peak seen in 1Q22, at more than half the total.

The relatively high levels of complaints relating to contracts for differences (CFDs) persisted, making up one fifth of the total. However, these results must be interpreted with caution, as the data do not include some major retail markets for CFDs (e.g. the Netherlands, Poland) and only some complaints can be categorised by financial instrument.

Chart 31

Complaints data by financial instrument type Large share of complaints about equities



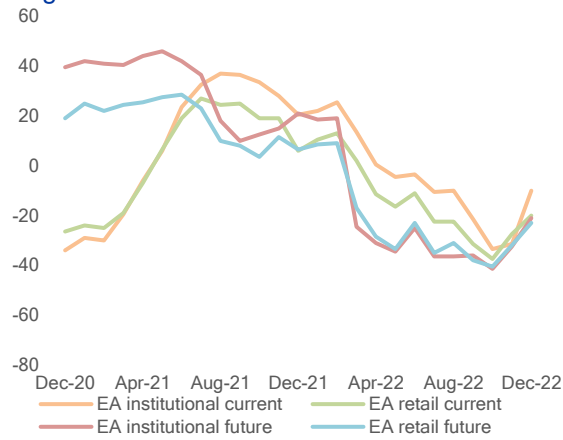
Note: Share of complaints from quarterly-reporting NCAs (n=14) received direct from consumers and via firms by type of financial instrument, where none of the instruments listed was reported. 'Total with instrument cited'=number of complaints via these reporting channels excluding those with instrument type not reported or reported as 'other' or 'N/A'. 'Total complaints'=number of complaints via these reporting channel whether or not further categorisation possible. 'CFDs'='Contracts for Differences'. Sources: ESMA complaints database

Key indicators

Chart 32

Investor sentiment

Negative current and future investor sentiment

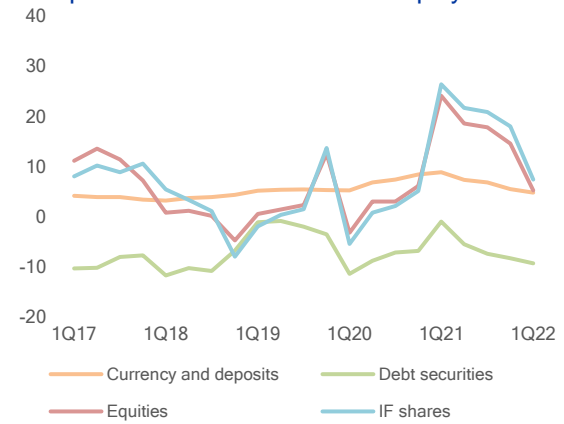


Note: Sentix Sentiment Indicators for the EA retail and institutional investors on a ten-year horizon. The zero benchmark is a risk-neutral position. Sources: Refinitiv Datastream, ESMA.

Chart 33

Growth rate in financial assets

Sharp decline for IF shares and equity

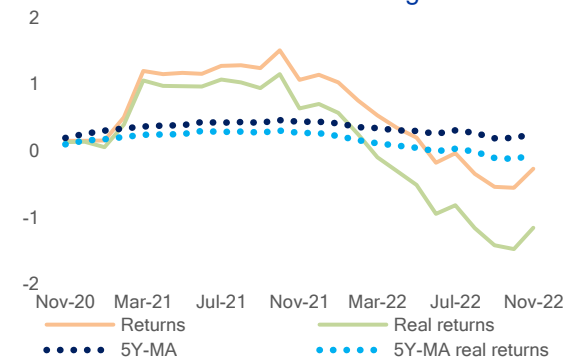


Note: Average annualised growth rates of financial asset classes held by EU27 households, in %. IF shares=investment fund shares. Sources: ECB, ESMA.

Chart 34

Nominal and real returns

Nominal and real returns more negative



Note: One-year moving average of the monthly gross nominal and real returns of a stylised EU household portfolio, in %. Asset weights, computed using National Financial Accounts by Institutional Sectors, are 36% for collective investment schemes, 39% for deposits, 22% for shares and 3% for debt securities. Costs, fees and other charges incurred for buying, holding or selling these instruments are not taken into account. Sources: Refinitiv Datastream, Refinitiv Lipper, ECB, Eurostat, ESMA.

Chart 35

Retail UCITS net flows by asset type

Overall decline in net flows

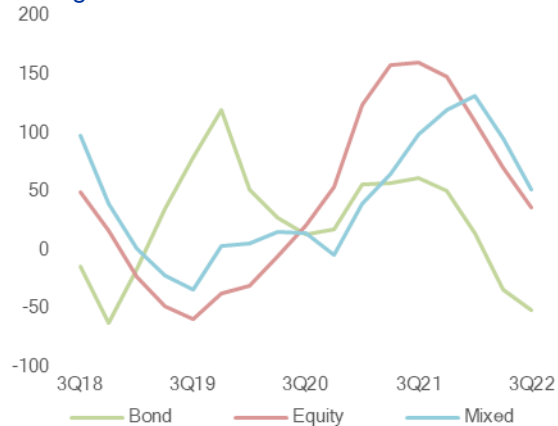


Note Evolution of net annual performance (net of ongoing costs (TER), subscription and redemption fees) of EU27 UCITS, retail investors only, by asset class, in %. Sources: Refinitiv Lipper, ESMA.

Chart 36

Equity UCITS net returns by management type

Strong decline in returns

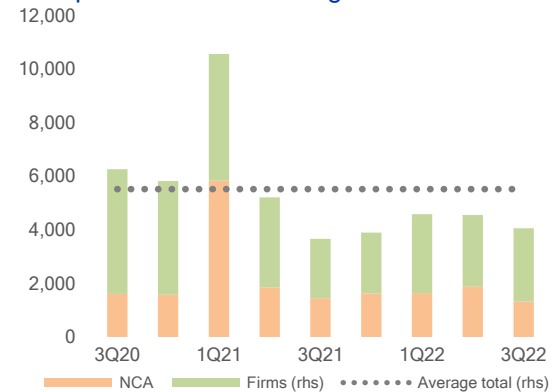


Note: EU27 UCITS annual net flows, retail investors only, at quarterly frequency by asset class, EUR bn. Sources: Refinitiv Lipper, ESMA.

Chart 37

Overall complaint volumes

Complaints near 2Y average



Note: Number of complaints recorded by quarterly-reporting NCAs (n=14) via given reporting channels. "NCA"=Reports lodged directly by consumers with NCAs. "Firms"=Complaints recorded by NCAs via firms. "Average total"=average total number from 3Q20 to 3Q22. Sources: ESMA complaints database.

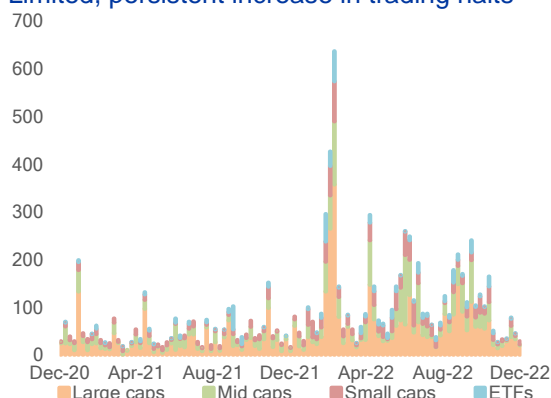
Infrastructures and services

Trading venues: trading volumes stabilise

After reaching record levels in the first half of the year, European Economic Area (EEA) **equity trading volumes** slowed down during the summer and later stabilised in 2H22, reaching EUR 1.1 tn in November 2022 (- 6.8 % with respect to end 1H22). In 2H22 a small, yet significant, decrease in OTC trading was observed (-1.4 pp to 19.3%), while the relative share of trading on European lit venues increased by 1.3 pp to 67.3%. The relative composition of equity trading in dark pools, periodic auctions and systematic internalisers remained stable in 2H22 (Chart 42).

The number of **circuit breaker** events remained significantly below the elevated levels reached during the March 2020 market stress; however, the average of trading halts in our sample in 2H22 more than doubled (+111%) compared with 2H21 and is slightly lower than the 1H22 average. This moderate increase is likely to be linked to market volatility and sizeable changes of stock prices during the reporting period (Chart 38).

Chart 38
EU circuit-breaker occurrences
Limited, persistent increase in trading halts



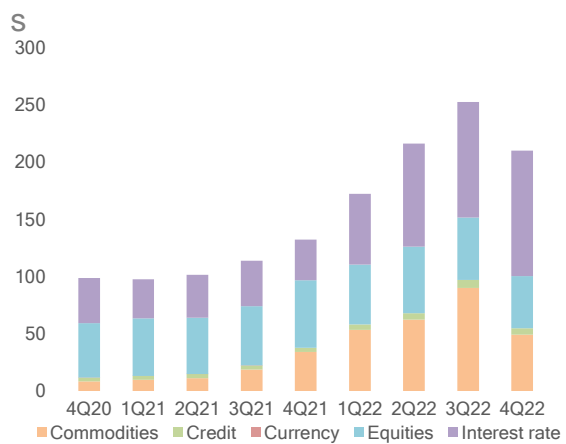
Note: Weekly number of circuit-breaker trigger events by type of financial instrument and by market cap registered on 29 EEA30 trading venues for all constituents of the STOXX Europe Large/Mid/Small 200 and a large sample of ETFs tracking these indices or some of their subindices.
Sources: Morningstar Real-Time Data, ESMA.

Clearing: sharp increase in margin levels

Clients and clearing members in the **central clearing eco-system** experienced an increase in

margin collected by CCPs, following price movements and heightened volatility (Chart 39). European energy derivatives were particularly affected. This extreme market situation resulted in substantially higher margin requirements in the third quarter both in EU CCPs (44% increase in 3Q22, only to come down by 45% in 4Q22) and in one systemically important non-EU CCP that clears EU commodity derivatives contracts. As energy prices declined, margin decreased but remained at substantially higher levels than in 4Q21 before the Ukraine invasion. For interest rate derivatives, margins continued to increase (e.g. for EU-CCPs by 22% over 2H22), following global interest rates increases and high volatility levels. In contrast, the stress on the UK gilt market had a limited impact on the EU clearing landscape and systemically important non-EU CCPs active on this market as UK IRDs account for a small share of total margins and a large portion of UK pension funds use OTC derivatives.

Chart 39
Initial margins collected by EU CCPs by asset class
IRD margins up, commodity margins volatile

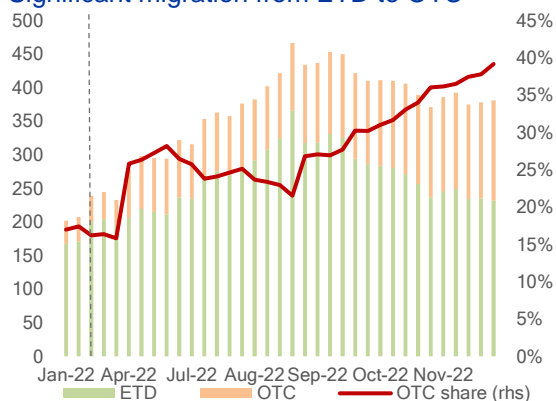


Note: Outstanding amounts of initial margin required and excess collateral received by EU27 CCPs for derivatives (CCP.A, CC&G, BME data missing). in EUR bn.
Sources: TRs, ESMA.

In **commodity derivatives markets**, the sharp price rises of energy derivatives observed until end-August, and the corresponding increase in margin requirements on ETDs have been associated with a migration of derivatives transactions to non-cleared OTC markets, especially for non-financial corporates. Some firms might migrate to OTC markets to reduce liquidity risk linked to rapidly changing variation and initial margins to be posted in cash or in high-quality collateral. On OTC markets, less

restrictive collateral arrangements could potentially be negotiated, particularly by high-rated commodities firms²¹. Before the Russian invasion of Ukraine, non-financial corporation (NFC) exposures to OTC energy derivatives amounted to around 15% of outstanding gross notional amounts and increased to around 25% after the beginning of the Russian invasion of Ukraine (Chart 40). Since end-August the migration to OTC has accelerated with OTC accounting for close to 40% of gross exposures end-December. Such migration presents risks as OTC markets are less liquid and transparent than ETDs and counterparty risk is higher because there is no centralised risk management for OTC transactions. The migration of OTC may also reduce liquidity and price discovery on lit markets. Appropriate pricing of cleared positions is crucial for the valuation of cleared positions and the evaluation of CCP risk exposures towards clearing members. In that context, the European Council adopted end-2022 a Regulation establishing a market correction mechanism (MCM) for natural gas derivatives (Textbox 3).

Chart 40
ETD and OTC energy derivatives exposures
Significant migration from ETD to OTC



Note: Outstanding amounts on natural gas and power derivatives for NFCs, in EUR bn and share of OTC in %. Intragroup trades are excluded. Dashed line shows the beginning of the invasion of Ukraine.
Sources: TRs, ESMA.

Less transparency and liquidity lead to challenges in assessing concentration risk in energy derivatives markets. Trade repository data indicate that the EU natural gas derivatives network tends to be structured around two clusters: an ETD cluster, where a few banking clearing members cater to a range of energy firms

and an OTC cluster where energy firms trade with each other (Textbox 4).

Textbox 3

The EU Market Correction Mechanism

On 22 December 2022, the European Council adopted Regulation (EU) 2022/2578 (the Regulation) establishing a market correction mechanism (MCM) to protect Union citizens and the economy against excessively high prices. The Regulation entered into force on 1 February with application from the same day while the MCM only starts applying on 15 February 2023.

The MCM will be activated upon a 'market correction event', i.e. when the front-month TTF derivative settlement price, as published by ICE Endex B.V (a) exceeds EUR 180/MWh for three working days; and (b) is EUR 35 higher than the reference price calculated by ACER during these three working days, based on prices for global natural gas markets.

Once the MCM is activated, prices of TTF derivatives that are due to expire in the period from the expiry date of the front-month TTF derivative to the expiry date of the front-year TTF derivative shall be capped at the 'dynamic bidding limit', defined as the reference price + EUR 35. If the reference price is below EUR 145/MWh, the dynamic bidding limit remains at EUR 180/MWh.

ESMA published a preliminary data report in January 2023²² indicating that the adoption of the MCM Regulation had no identified significant impact at the current juncture.

The report notes that, by curbing the key price discovery function of regulated markets, the MCM will not come without consequences on market participants' trading behaviour and may have an effect on the ability of all market participants to effectively manage their risks. It would appear likely that market participants adapt to the MCM by redirecting their trading activity to those contracts / venues / execution types not affected by the MCM. Some of these adaptations are likely to reinforce trends that can already be observed today, such as the trend to move trading OTC, which is likely to further lower open interest and ultimately reduce available liquidity on regulated markets for TTF contracts.

The MCM is also expected to impact the relevant CCPs and the clearing ecosystem. The use of less reliable price sources for the CCP's margin calculations and default management may affect the CCP's ability to manage risks. The clearing ecosystem may also be impacted through an increase in margin calls, a potential overall reduction of market liquidity, as well as a potential reduction of hedging opportunities.

²¹ For firms exchanging initial margins on OTC trades, the requirements for uncleared commodity products are expected to increase by 80%, following the update of the industry's standard model to calculate initial margins (SIMM).

²² See ESMA (2023), '[Preliminary data report on the introduction of the market correction mechanism](#)', 23 January.

Textbox 4

The EU natural gas derivatives network

The high volatility levels of energy derivatives and the corresponding increase in margins required by CCPs on ETDs, and by counterparties for OTC derivatives have resulted in liquidity pressures for some firms, especially non-financial corporates.

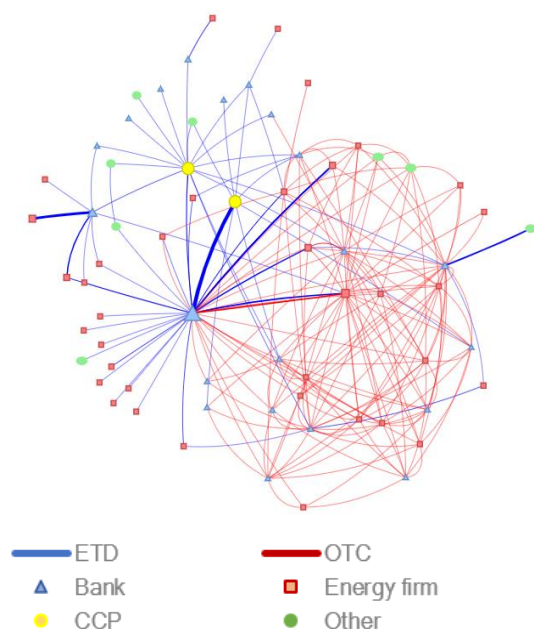
Data reported under EMIR can be used to describe the network of natural gas derivatives in the EU and assess potential concentration risk in these markets. EMIR data from November 2022 are used to assess the interconnections between the top 30 largest EU counterparties (in gross notional amounts at group level). However, non-EU counterparties with exposures to EU natural gas derivatives through non-EU entities are not covered, even though they can play a significant role in EU markets.

Chart 41 displays the EU natural gas derivatives network as of November 2022. The two CCPs (yellow circles) are related to a number of clearing members for ETDs (blue curved lines), most of them banks (blue triangles). Clearing is concentrated among EU banks, with a few banks playing a central role, as shown by the width of the curved lines (which are based on the relative bilateral exposure of each node) and the size of some triangular nodes (proportional to the notional exposure of each entity to the overall market). Clearing members tend to cater to a range of clients, almost all of them energy firms (red squares) that tend to use one clearing member.

On the right side of the chart, OTC derivatives markets (red curved lines) tend to be organised around energy firms, and a small number of banks. While some EU energy firms use ETD and OTC, most tend to concentrate their exposures towards one type of derivatives.

This analysis shows how trade repository data can be used to assess the interconnectedness of EU derivatives market.

Chart 41

Natural gas derivatives network
Concentration of clearing activity

Note: Gross positions of the top 30 counterparties in the natural gas derivatives markets as of November 2022. The size of each node is proportional to the relative size of the counterparty. Edges represent bilateral exposures in ETD and OTC derivatives and the width is proportional to the relative size of the bilateral position compared with the overall notional amounts.

Sources: TRs, ESMA.

CRAs: credit outlook slowly turning more negative

In the second half of 2022, the **outlook for credit risk** from credit rating agencies (CRAs) generally became more negative, except in sovereigns, with downgrades gradually increasing relative to upgrades, as the deterioration in the economic conditions fed into CRAs assessments. However, rating movements remained limited compared with movements in market indicators such as credit default spreads. The moderate changes in ratings are likely to be due to borrower refinancing needs remaining limited following the significant refinancing while interest rates were still low.

Ratings drift for EEA-30 issued debt fell across asset classes except sovereigns (Chart 47). Drift for non-financial and financial corporates remained positive but near zero, while insurance drift turned negative. The weekly proportion of corporate issuers with rating changes experiencing a downgrade (as opposed to an upgrade) exceeded 50% in late 2022 (Chart 46). **Non-financial downgrades** were also more prevalent in sectors more exposed to the economic downturn and higher interest rates, particularly the real estate and technology sectors. Non-financial defaults increased notably in 2H22, also for RMBS, though overall default levels remained low by historical standards in all asset classes.

Among corporate non-financial instrument ratings in the EEA-30 with an outlook, there has also been an **increase in negative outlooks** for HY ratings (27 %, + 3 pps) since the end of 1H22, while the proportion of those with a positive outlook has also fallen (9 %, -5 pps). In contrast, there was little change for IG ratings with an outlook.

Sovereign drift rose slightly and remained above zero, associated with upgrades in some public, state and regional ratings outweighing downgrades in a few regional ratings. Structured finance drift fell in all products but remained materially positive for asset-backed securities (ABS), residential mortgage-backed securities (RMBS) and collateralised debt obligations (CDOs), in contrast to commercial mortgage-backed securities (CMBS) where drift fell more and approached zero.

Fallen angels, downgrades from investment grade to high yield, which were a major concern at the onset of the COVID-19 pandemic, remained few despite the continuing weak

economic outlook. In 2H22 the share of fallen angels among IG ratings was 0.03 % for corporates (down from 0.07 % in 1H22) and 0.07 % for structured finance (up from 0.04%), while for sovereigns it remained at 0 %. Upgrades from HY to IG (rising stars) were also fewer in 2H22 than in 1H22 for corporates (0.8%), unchanged for structured finance (1.5%), while for sovereigns there was a sharp rise reflecting upgrades among HY ratings (9.7% in 2H22 up from 0.3 % in 1H22).

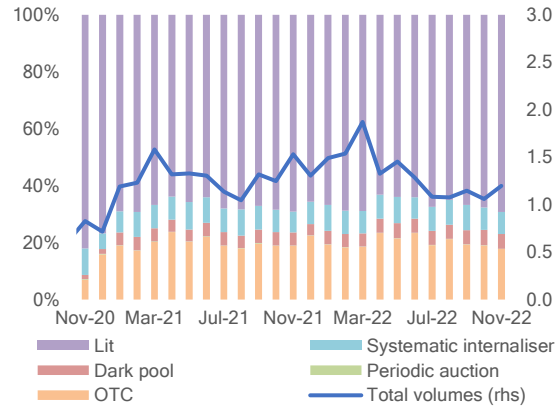
Looking ahead, near-term rating changes appear more skewed towards the downside as challenging economic conditions, higher inflation levels and higher interest rates persist and the proportion of issuers needing to refinance grows over time.

Key indicators

Chart 42

Equity trading volumes

Volumes stable, moderate decrease in OTC

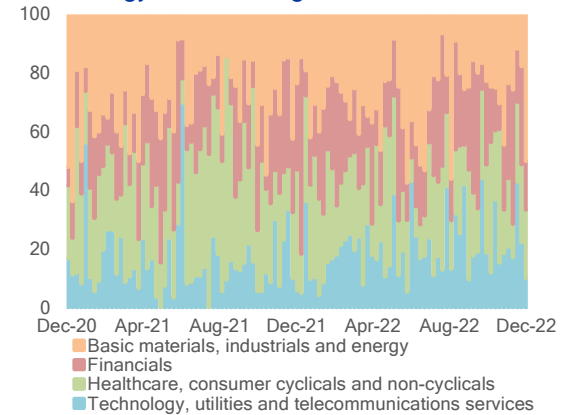


Note: Type of equity trading in the EEA as a percentage of total equity turnover. Total equity trading turnover in EUR trillion (rhs). Last available data point is October 2022. Poland data included from 2021 onwards. Sources: FIRDS, FITRS, ESMA.

Chart 43

EU circuit breaker trigger events by sector

Technology, consumer goods most common

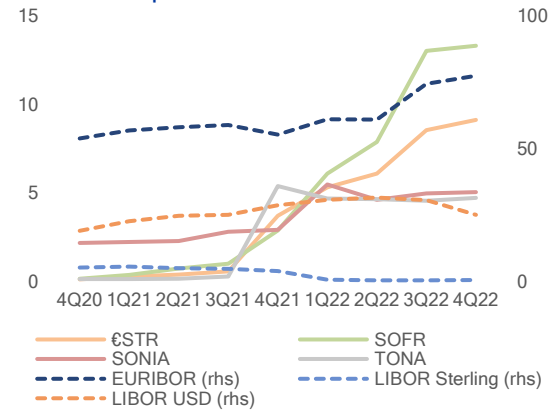


Note: Percentage of circuit-breaker trigger events by economic sector registered on 29 EEA30 trading venues for all constituents of the STOXX Europe Large/Mid/Small 200. Results displayed as weekly aggregates. Sources: Morningstar Real-Time Data, ESMA.

Chart 44

Interest-rate derivatives linked to new risk-free rates

Continued uptake

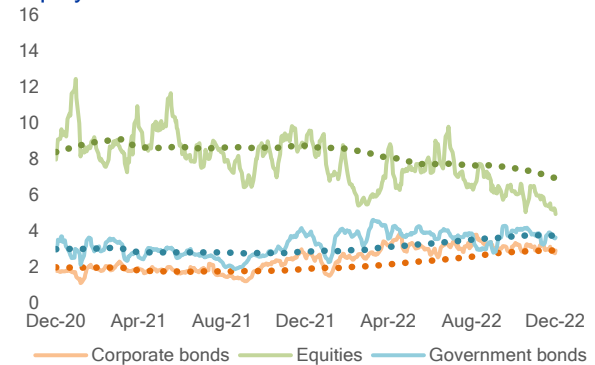


Note: Gross notional amount of IRD outstanding referencing benchmarks, EUR tn. Sources: TRs, ESMA

Chart 45

Settlement fails in EU CSDs

Equity settlement fails down for EQ

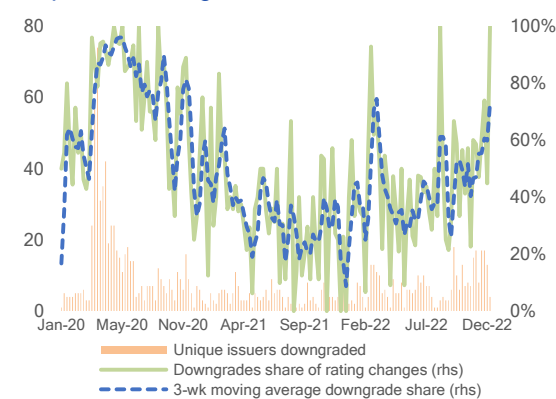


Note: Share of failed settlement instructions in the EEA30, in % of value, one-week moving averages. Missing data for some CSDs prior to mid-March 2020. Dotted lines represent one-year moving averages of the respective asset classes. Sources: NCAs, ESMA.

Chart 46

Corporate issuers downgrades

Corporate downgrades continue to rise

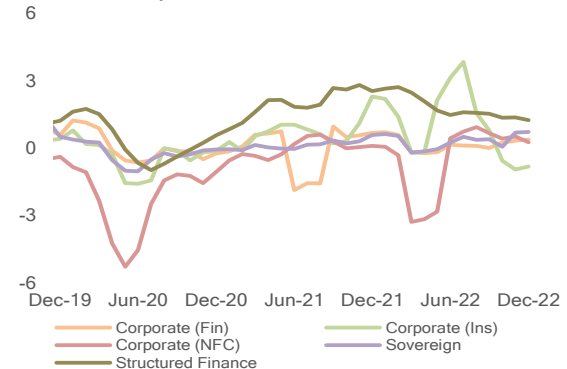


Note: Number of EEA30 corporate issuers with at least one bond downgraded, and ratio of downgraded corporate issues over upgrades and downgrades (3 week moving average). Sources: ESMA, RADAR

Chart 47

Credit ratings drift

Falls for corporates and structured finance



Note: 3-month moving average of net rating changes in EEA30 outstanding ratings from all credit rating agencies, excluding CERVED and ICAP, by asset class, computed as the percentage of upgrades minus the percentage of downgrades. EEA30 ratings. Fin - Financials, Ins - Insurance, NFC - non-financials. Sources: RADAR, ESMA.

Structural developments

Market-based finance

Lower availability of market-based financing

Market-based financing availability has decreased rapidly in 2022, turning negative for the first time since the market stress related to COVID-19 in early 2020 (Chart 51). This is linked to low primary market activity in the context of wide investor uncertainty and tighter credit standards for firms and coincided with a rapid increase in the overall cost of external financing in the EA, particularly driven by rising costs of market-based debt²³.

Low equity issuance

Amid uncertain and volatile secondary markets, **equity issuance** was particularly low in 2022. After the 2021 boom, equity markets could not take-off throughout the year. A total of EUR 67bn was raised in equity primary markets, a -60% decline compared with 2021 and 48% below the average of the past 5 years.

Declining valuations inhibited most of the European **initial public offerings (IPOs)** activity in 2H22 (Chart 52). In total, there were 44 new listings worth EUR 10.2bn. While this marks a decline from the same period the previous year (-50%), the total value issued doubled from 1H22. This was not driven by an increased number of deals (-35% from 1H22), but by one of the largest listings (in September) ever recorded in Europe by a DE firm in the consumer cyclicals sector, which accounted for 90% of the total 2H22 IPO issuance. Excluding the consumers sector, tech and energy IPOs (EUR 0.3bn and EUR 0.2bn respectively) topped other sectors in terms of value. Post-IPO underperformance is another factor contributing to lower activity. Overall, IPOs accounted for 30% of total equity issuance with **follow-on issuance** continuing to remain quiet (EUR 25.2bn in 2H22).

By observing the post-pandemic trend, equity issuance seems inversely proportional to

secondary market volatility. This may suggest that private firms hold back from going public when market prices are unstable. With secondary equity markets underperforming, private equity groups might have increased appetite for newly public companies as potential investment targets. **Private markets** have been growing substantially in the US and Europe over the last few years (See Textbox 4).

Textbox 4

Private markets: Trends and risks

Over the last decade, private markets have grown markedly in the US and more recently in the EU. Private markets allow institutional investors (private equity firms and other asset managers) to acquire stakes in non-public companies (venture and growth capital) including through mergers and acquisitions of firms (private equity). Private markets can also be used to provide credit to risky firms and to invest in real assets (infrastructure for example)²⁴.

Unlike in public markets, participation of retail investors is very low in private markets, while alternative funds provide intermediation services mostly on behalf of institutional investors (generally pension funds and other investment funds). Consequently, private markets are subject to lighter regulation than public markets.

The size of global private markets was estimated to be around EUR 8.6trn end-2021 in terms of AuM²⁵. The US accounts for around 56% of the market, followed by Europe at 24%. In terms of flows, private capital accounts for more than half of fundraising over the last few years, followed by private equity (Chart 48). In 2022, Europe accounts for 15% of total global fundraising, 8 pts below the share of the previous year (23%). As of 3Q22, there was a general decline in the capital raised across different strategies (especially Fund of Funds (-28%) and secondaries²⁶ (-26%)) except for real assets (+23%) and venture capital (+6%).

European exposure

The exposure of European entities to private markets can be measured from an investor's perspective (the amount of money invested in private markets) or from a borrower's perspective (the amount of funding or equity provided by private market investors). Overall, EU AIFs had exposures to private markets of around EUR 1.2trn end-2021, mainly through unlisted equities (EUR 685bn), and loans (EUR 514bn). Within AIF types, private equity funds had a NAV of EUR 700bn end-2021, a 67% increase compared with 2020.

EU private equity investors tend to invest mainly in firms domiciled in the EEA and to a lesser extent in the US. US

²³ See ECB (2022), *Economic Bulletin Issue 7*, Chapter 5, November.

²⁴ See also Aramonte, S. and F. Avalos (2021), 'The rise of private markets', *BIS Quarterly Review*, December.

²⁵ Ibid.

²⁶ Secondary funds, commonly referred to as secondaries or continuation transactions, purchase existing interests

or assets from primary private equity fund investors. For example, a primary private equity fund may purchase a stake in a private company, and then sell that interest to a secondary buyer. Sellers gain liquidity, while buyers may find the portfolio claim or asset(s) attractive for a number of reasons.

investors are exposed to firms in their own country, but they also have significant stakes in EEA companies (Chart 49).

Risks

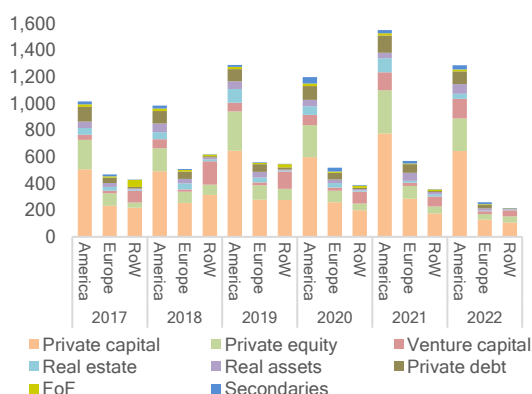
Private markets can provide benefits to firms by facilitating their access to finance. However, private markets also entail risks. Overall, **liquidity transformation** is limited. Liquidity risk on the liability side is generally low, as funds investing in private markets tend to be closed-ended, with investors committing capital for an extended period of time. In contrast, liquidity risk on the asset side can be significant as investors tend to hold instruments with very low levels of liquidity such as unlisted equities.

Risks related to **leverage** are difficult to assess. First, some private market transactions typically involve high levels of leverage at the portfolio company level. In a typical private equity transaction funded through a leverage buyout a shell company is set up to acquire the target company. The purchase is funded through debt (and equity) and the target company then issues bonds to repay the loans. Despite the potentially high levels of leverage involved, under AIFMD private equity AIFs (unlike other AIFs) do not report leverage at the portfolio company level (no pass through approach), making it hard to estimate the actual levels of leverage²⁷.

The **lack of transparency** in private markets can also entail risks for investors and potential costs for companies raising capital from those investors. In addition, data gaps and fragmentation of data sources make it challenging for regulators to assess risk in private markets²⁸. In the US, the Securities and Exchange Commission (SEC) has proposed new rules to enhance transparency, including through reporting requirements on fund strategies, use of leverage and the financing of target companies²⁹.

Chart 48

Global private fundraising market Mostly US, peak in 2021



Note: Private fundraising by region and type of strategy, in EUR bn. RoW = rest of the world; America = North America; Europe includes UK. 2022 data as of 30 September 2022.
Sources: Pitchbook Inc., ESMA.

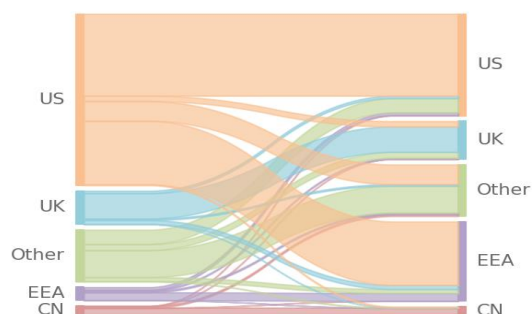
²⁷ For further details on the regulatory treatment of private equity AIFs, see ESMA (2022), '[Annual Statistical Report on EU Alternative Investment Funds](#)'.

²⁸ See also the discussion in the section on private equity and private debt in AMF (2022), '[2022 Markets and risk outlook](#)', June.

²⁹ See SEC (2022), '[SEC Proposes to Enhance Private Fund Investor Protection](#)', February.

Chart 49

PE investments into investee companies Largest flows from US private equity firms



Note: Private equity investments by domicile of investors (left-hand side) and investee company (right-hand side). Data cover the full year 2022. Chart shows PE investment flows from investor firms into investee companies.
Sources: Refinitiv Eikon, ESMA.

Small and medium-sized enterprises (SMEs)

external financing continued to be tied to bank loans, with a still limited use of capital markets. In general, the overall share of SMEs reporting external financing gaps remained wide at 7% in the EA.³⁰ In equity secondary markets trading in SME shares accounted to 1.6% (EUR 71bn) of total turnover volumes in shares, in line with earlier periods. Trading volumes on SME growth markets continued their decline totalling EUR 3.8bn as of November 2022 (-48% from the previous half).

Low bond issuance as borrowing costs rise

Although they picked up in November and December, corporate bond primary markets slowed down overall in 2022 (-42% compared with 2021 and -38% compared with 2020 and 2019). Issuance declined because of rising borrowing costs in a context of monetary policy tightening and already high levels of indebtedness. At the same time, more profitable firms had reduced financing needs, resulting in lower supply.

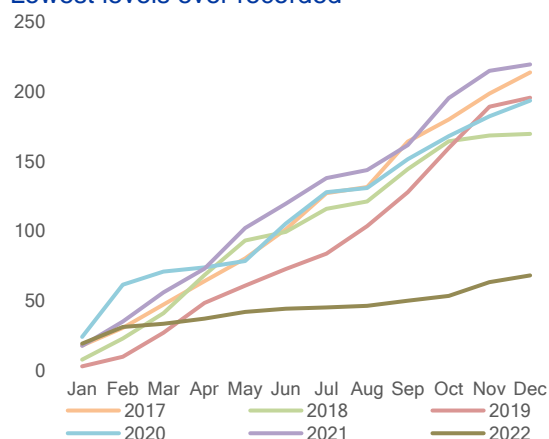
Total **corporate bond** issuance in 2H22 increased by 65% from 1H22 but stood 18% lower from 2H21, to a total of EUR 571bn (of

³⁰ See ECB (2022), '[Survey on the access to finance of enterprises in the euro area](#)' – April to September 2022. The financing gap indicator combines both financing needs and the availability of bank loans, credit lines, trade credit, and equity and debt securities issuance at firm level.

which EUR 282bn were non-rated bonds). IG accounted for 92% of the size of issued rated bonds (EUR 265bn, –23% since 1H22 and –14% from 2H21). Wider spreads, and investors' 'flight-to-quality' strategies, contributed to a sharp decline in the demand for HY bonds. HY bond issuance totalled of EUR 23bn (Chart 50) during the reporting period, the lowest levels ever recorded since 2008. In this context, the average rating at issuance reflects the increasing demand for quality in fixed income markets with a jump from slightly below BBB to A- (Chart 52).

Chart 50

Cumulative HY bond issuance Lowest levels ever recorded



Note: Cumulative amount of gross HY corporate bond issuance in the EEA30 since 2017. EUR bn.
Sources: Refinitiv Eikon, ESMA.

Linked to higher interest rates and the shape of the yield curve maturity at issuance became significantly shorter – with the average weighted maturity at issuance dropping to 5 years in December from 10 years in January 2022. Overall, 58% (EUR 322bn) of bonds had a maturity ranging between 1 and 5 years at issuance. This is confirmed by the issuance of short-term instruments reaching the highest quarterly levels ever recorded in 2H22 of a total of EUR 1tn, 40% above the 5Y MA.

Corporate debt levels have grown by slightly less than EUR 1tn since the beginning of 2020 and have stabilised at EUR 10tn as of end-2022. Against the background of elevated inflation and rising funding costs, corporate debt sustainability remains a considerable risk, especially for more vulnerable firms.

Structured deals

Industry data show that the issuance of **securitised products** increased by 12% in 3Q22 compared with the previous quarter for a total of EUR 39bn (out of which 47% was placed). However, it declined by –18% compared with 3Q21. In 4Q22, the yearly increasing trend continued with a total financing of EUR 65.5 bn (+66% from 3Q22) although below 4Q21 levels (–35%). Total 2022 issuance amounted to EUR 203bn a 13% decline from 2021³¹.

Within securitised products, **collateralised loan obligations (CLOs)** issuance slightly picked up in 2H22, reflecting improved liquidity in the markets. The decline in CLO prices in September, partly due to forced sales by pension funds using LDI strategies, attracted demand and resulted in an uptick in such deals³². According to JP Morgan data, total CLO issuance in 2H22 totalled EUR 12.5bn, a much smaller amount than in the same period in 2021 (–48%).

³¹ See AFME (2022), [Securitisation Data Snapshot: Q3 2022](#).

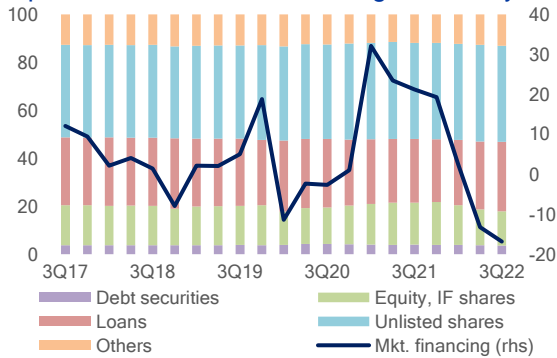
³² See Bloomberg (2022), [‘CLOs Rally as Investors Savor Liquidity Revealed by UK Selloff’](#).

Key indicators

Chart 51

Market financing

Rapid decline in market financing availability

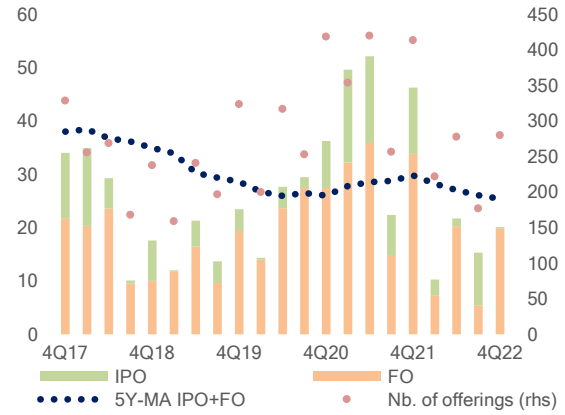


Note: Liabilities of EA NFCs, by debt type as a share of total liabilities. Others include: financial derivatives and employee stock options; insurance, pensions and standardised guarantee schemes; trade credits and advances of NFC; other accounts receivable/payable. Mkt. financing (rhs)= annual growth rate in debt securities, equity and investment fund (IF) shares, in %. Sources: ECB, ESMA.

Chart 52

Equity issuance

Few deals in 2H22

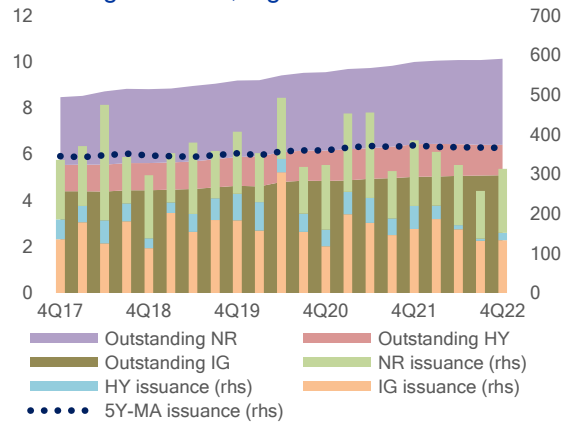


Note: Equity gross issuance in the EEA30 by type, EUR bn, and number of equity offerings. 5Y-MA = 5-year moving average of the total value of equity offerings. Sources: Refinitiv EIKON, ESMA.

Chart 53

Corporate bond issuance and outstanding

Declining issuance, high debt levels

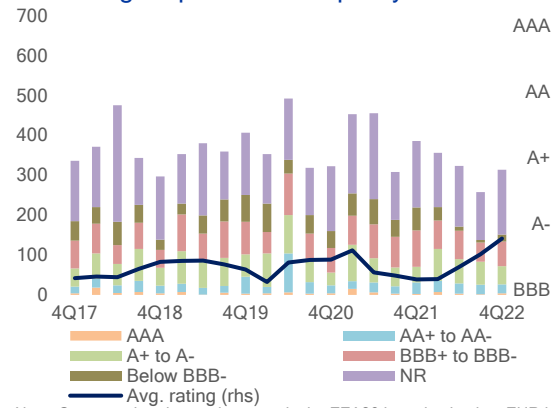


Note: Quarterly investment grade (rating >= BBB-), high-yield (rating < BBB-) and non-rated corporate bond gross issuance in the EEA30 (rhs), EUR bn, and outstanding amounts, EUR bn. Maturities < 12 months are excluded. Sources: Refinitiv EIKON, ESMA.

Chart 54

Corporate bond issuance by rating class

Increasing corporate bond quality at issuance

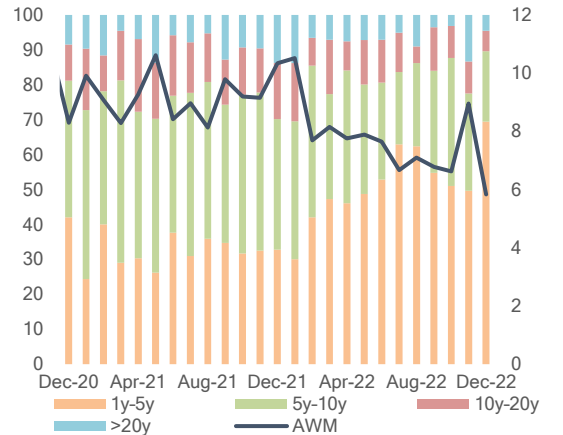


Note: Corporate bond gross issuance in the EEA30 by rating bucket, EUR bn. Avg. rating=weighted average rating computed as a one-year moving average of ratings converted to a numerical scale (AAA=1, AA+=2, etc.) excluding non-rated bonds. Maturities < 12 months are excluded. Sources: Refinitiv EIKON, ESMA.

Chart 55

Corporate bond issuance by maturity bucket

Issuance at shorter maturities

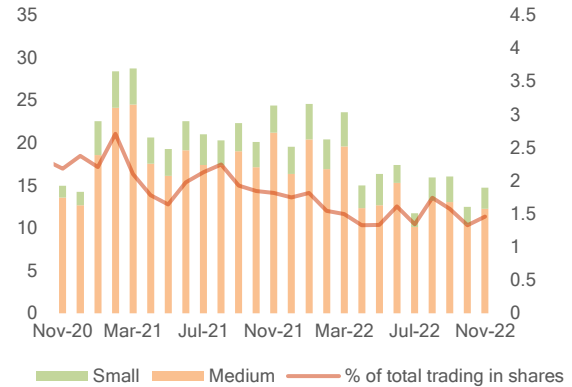


Note: Monthly share of corporate bond issuance by maturity bucket, in % (lhs) and average weighted maturity at issuance (AWM), in years (rhs). Sources: Refinitiv Eikon, ESMA.

Chart 56

Trading volumes in SME shares

Stable volumes in 2H22



Note: Monthly trading volumes on EEA30 venues of SME shares, EUR bn (lhs), and % share of the total trading in shares (rhs). 'Small'=(0,20mn), 'Medium'=(20mn,200mn). 2022 classification of SMEs is based on share market capitalisation in 2021. Sources: FIRDS, FITRS, ESMA.

Sustainable finance

Greenwashing risk comes into focus

One of the key implications of the energy crisis is the risk it creates to carbon neutrality objectives. The continued dependency of the global economy on fossil fuel energies was laid bare at the COP27 meeting, where the inability to reach an agreement on the phase-out of oil and gas sparked concerns that the Paris Agreement goals – which include bringing global energy-related greenhouse gas emissions to net zero by 2050³³ – are becoming out of reach.

In this context, the net-zero commitments made by firms have come under increasing scrutiny. Beyond the limitations of carbon offsetting mechanisms³⁴, greater use of coal as a substitute for natural gas imports from Russia has driven up emissions from energy consumption. This could put in jeopardy private sector decarbonisation targets, including those attached to financial instruments such as sustainability-linked bonds (Textbox 4).

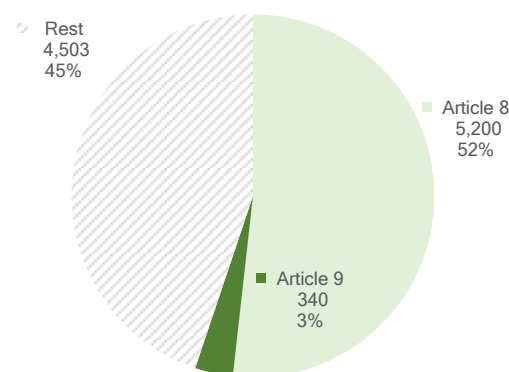
Public scepticism about the well-founded intentions of climate pledges is becoming apparent with the increased focus on greenwashing. A recent string of news, reports and policy announcements show how central the issue of greenwashing has become, including for investors and issuers facing growing reputational risk. In the US, the SEC fined BNY Mellon in June for material misstatements and omissions and charged Goldman Sachs in November for procedural failures in their ESG investment policies.³⁵ In Europe, German prosecutors raided Deutsche Bank's headquarters in May following greenwashing allegations against asset management arm DWS,³⁶ while the UK advertising watchdog banned a series of HSBC climate-related adverts for failing to acknowledge the bank's own contribution to global emissions.³⁷

Rebuilding trust will take some time and require greater transparency efforts. In the EU, disclosure obligations such as those introduced by the Sustainable Finance Disclosure Regulation (SFDR) will help, even though there are some challenges that would merit adjustments.

Shades of 'greenness' and investor differentiation

Since the application of SFDR in March 2021, EU funds have to disclose the sustainability characteristics they promote under SFDR Article 8, or their sustainable investment objective under Article 9. In 4Q22, 38% of UCITS funds were disclosing under Article 8 and 4% under Article 9, managing a combined 55% of UCITS fund assets (Chart 57).

Chart 57
UCITS fund assets managed by Articles 8 and 9 funds
SFDR Articles 8 and 9 funds account for 55% of assets



Note: Share of UCITS investment funds with an SFDR Article 8 or 9 statement in their pre-contractual documentation, EUR billion and % of assets under management.

Sources: Morningstar, ESMA.

The significant share of funds disclosing under Articles 8 and 9 reflects to a large extent the rise of ESG investing in the EU asset management industry. Indeed, according to Morningstar, the share of assets managed by ESG funds³⁸ has

³³ International Energy Agency (2021), [Net Zero by 2050 – A roadmap for the global energy sector](#), May.

³⁴ See ESMA (2021), [Report on Trends, Risks and Vulnerabilities](#), No.2, pp.44-45.

³⁵ See SEC (2022), [SEC Charges BNY Mellon Investment Adviser](#), 23 May, and [SEC Charges Goldman Sachs Asset Management](#), 22 November.

³⁶ Reuters (2022), [Germany officials raid Deutsche Bank's DWS over 'greenwashing claims'](#), 31 May.

³⁷ The Guardian (2022), [Watchdog bans HSBC climate ads in fresh blow to the bank's green credentials](#), 19 October.

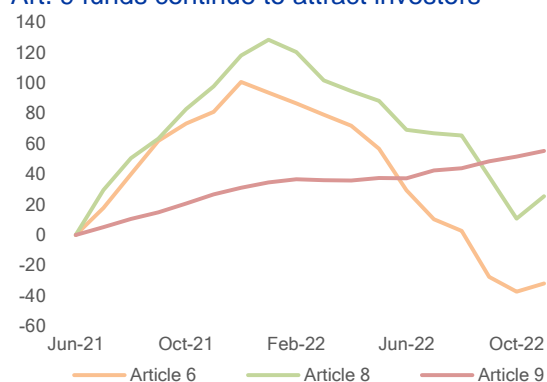
³⁸ Morningstar definition of sustainable investment fund is used to identify ESG funds. Morningstar classifies a product as a sustainable investment "if the use of one or

grown almost continuously over the past years, from 8% in 4Q20 to 19% in 4Q22 (Chart 63).³⁹ However, in the absence of an EU-wide labelling regime for ESG funds, some managers have also used Articles 8 and 9 as proxy labels for communication purposes. SFDR was not intended to be a labelling regime and does not include the type of requirements usually attached to voluntary labels, prompting further concerns of potential greenwashing.

Since the introduction of the SFDR disclosure regime, many funds have changed SFDR status. A large majority of these reclassifications were funds 'upgrading' from SFDR Article 6 to Article 8, reflecting (at least to some extent) the rise of ESG investing in the EU. SFDR fund 'downgrades' remained more limited until several large asset managers reclassified around EUR 130 bn worth of Article 9 products in 4Q22. This followed a string of upgrades towards the end of 2021, which had raised concerns over the possible misuse of Article 9 status.⁴⁰

The misuse of SFDR as a marketing tool could create potential risks to investors as demand for sustainable products remains strong. Between January and November 2022, investors have withdrawn EUR 93bn from Article 8 funds (equivalent to -2% of Art.8 fund assets in 3Q22) compared with net outflows of EUR 133bn for funds without any sustainability characteristics or objectives (-3% of AuM), while they allocated EUR 24bn to Article 9 funds (+7% of Article 9 fund AuM; Chart 58).

Chart 58
EU fund flows by SFDR disclosure regime
Art. 9 funds continue to attract investors



Note: Cumulative flows into EU 27 equity, bond and mixed investment funds since end-June 2021, by disclosing regime under SFDR (EUR bn). Funds are categorised based on their SFDR status at the beginning of each quarter. Sources: Morningstar, ESMA.

Besides the continued appetite for ESG investment vehicles, these trends highlight the greater resilience of products with higher perceived sustainability credentials, confirming the view that sustainability-oriented investors are less sensitive to short-term returns.

The resilient appetite for sustainability-related products was confirmed by continued market growth. The total value of ESG bonds outstanding was up 12% from June to reach EUR 1.5 trillion in December. Corporate issuance dropped by 19% in 2H22 from 2H21, in line with broader corporate bond market developments, while public sector issuance picked up again (+22%) following a sharp slowdown in 1H22. This suggests that sovereigns may have postponed some of the planned auctions because of market turmoil at the beginning of the year.

The drop in private sector issuance affected all ESG bond types, with sustainability-linked bonds recording the largest slowdown (-69%) in a context of growing concerns around transparency (Textbox 5). Green bond issuances decreased too but investor appetite for these instruments remained, with the persistence of a sustainability premium for green bonds with maturities of over ten years.

more approaches to sustainable investing is central to the investment products overall investment process based on its prospectus or other regulatory filings" (see Morningstar (2022), [Morningstar Sustainable Attributes, Framework and definitions for the Sustainable Investment and Employs Exclusions attributes](#)).

³⁹ Differences in the historical value of ESG funds AuM compared with previous reports are related to changes in the classification of ESG funds by Morningstar.

⁴⁰ Responsible Investor (2022), 'SFDR reclassifications raise 'legitimate' greenwashing concerns, warns Morningstar', 8 February.

Textbox 5

Sustainability-linked bonds under scrutiny

Sustainability-linked bonds (SLBs) have become an attractive sustainable debt alternative to use-of-proceeds bonds. While SLB proceeds can be allocated to general purposes, the issuer commits to a sustainability outcome in the future through so called ‘sustainability performance targets’ tracked using key performance indicators (KPIs). Missing a target triggers a penalty mechanism, typically in the form of a coupon step-up. Despite the rapid rise of SLBs, concerns around the materiality of the targets and the effectiveness of the penalty mechanisms have been voiced, raising questions about the role of SLBs in financing the transition.

An analysis of 182 SLBs issued by EEA-domiciled corporates shows average step-ups between 14bps and 33bps per KPI, depending on the number of KPIs and targets used (Table 1). SLBs with multiple KPIs tend to face higher cumulative penalties, but this comes at the expense of a lower step-up per KPI. For example, the average step-up for SLBs with only one target is more than twice the average step-up per KPI for SLBs with 3 targets – diluting the importance of each target. A small majority of SLBs use one KPI only (53%).

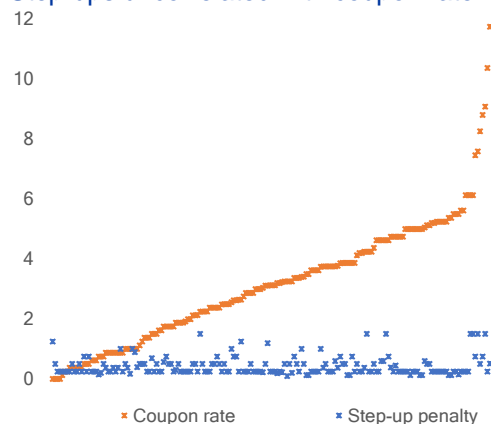
The size of the coupon step-up also remains a focal point with academic research highlighting the potential for a “free lunch” for some SLB issuers.⁴¹ Indeed, SLB penalties are both small compared with the coupon rate, and uncorrelated with it (Chart 59). This implies that the limited financial incentive to reach a sustainability performance target further decreases with the credit quality of the issuer (leaving aside possible reputational effects). These issues are compounded by the penalty mechanism sometimes kicking in too close to the maturity date.

Other SLB misgivings include the adoption of accommodative baseline for the sustainability performance targets and the potential absence of penalties attached to interim targets, giving issuers leeway in meeting the stated objectives without any material changes. Additionally, 85% of the SLBs in the analysed sample included a call option, which may enable issuers to reduce the cumulative amount of the penalty by recalling the bond before it matures.⁴²

SLBs have the potential to support a broader issuer base, in particular those typically operating in energy-intensive sectors, to make long-term sustainability changes to their business models. For these instruments to bring meaningful changes will require addressing credibility issues, including regarding the sustainability targets and penalty mechanisms. Improved disclosure requirements for SLB issuers may help by fostering greater transparency in the market

Chart 59

Sustainability-linked bond coupons and step-ups
Step-ups uncorrelated with coupon rate



Note: Coupon rate and step-up penalty of sustainability-linked bonds issued by EEA-domiciled corporates, in %.
Sources: Refinitiv Eikon, ESMA

Table 1

SLB coupon step-up
Coupon step-ups vary substantially

	Average	Minimum	Maximum
1 KPI	33	10	150
2 KPI	25	10	75
3 KPI	14	5	40
≥4 KPI	21	18	30

Note: Average, minimum, and maximum coupon step-ups per KPI (in bps) used in 182 sustainability-linked bonds issued by EEA-domiciled corporate issuers.
Source: Refinitiv Eikon, ESMA.

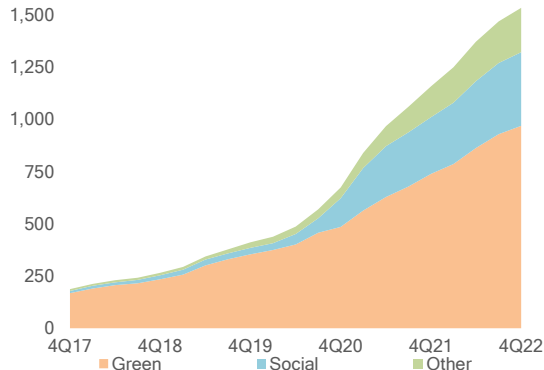
⁴¹ Koelbel, J.F., Lambillon, A-P. (2022), ‘Who pays for sustainability? An analysis of sustainability-linked bonds’.

⁴² Ibid.

Key indicators

Chart 60

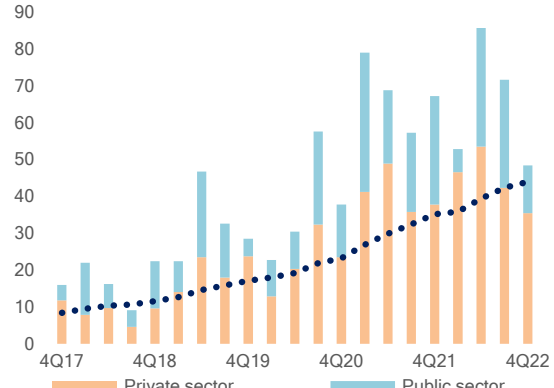
EU ESG bonds outstanding
Market size continued to increase



Note: Total amount of ESG bonds outstanding issued by EEA30-domiciled issuers, EUR bn.
Sources: Refinitiv EIKON, ESMA.

Chart 61

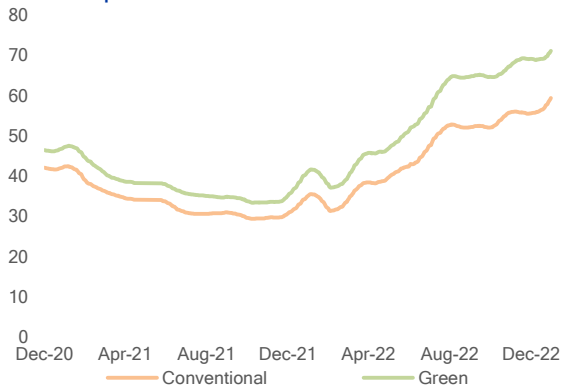
Green bond quarterly issuance
Corporate green bond issuance resilient



Note: Green bond gross issuance in the EEA30 by sector, EUR bn.
Sources: Refinitiv EIKON, ESMA.

Chart 62

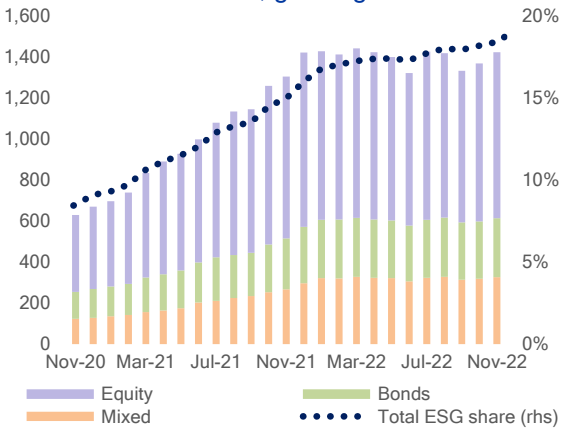
Corporate green bond and conventional bond liquidity
Bid-ask spread differential continues to widen



Note: One-month moving average of the bid-ask spread of green and conventional bonds from green bond issuers included in the Markit iBoxx EUR Corporate bond index, in bps.
Sources: IHS Markit, ESMA.

Chart 63

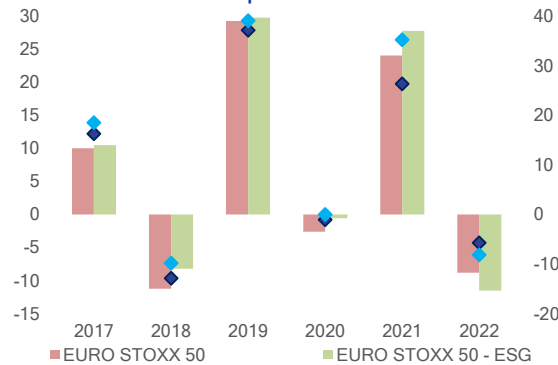
ESG fund assets
Stable ESG fund AuM, growing market share



Note: AuM of EU-domiciled ESG funds by type of fund, EUR bn, and share of ESG fund AuM in total fund AuM (rhs), in %.
Sources: Morningstar, Refinitiv Lipper, ESMA.

Chart 64

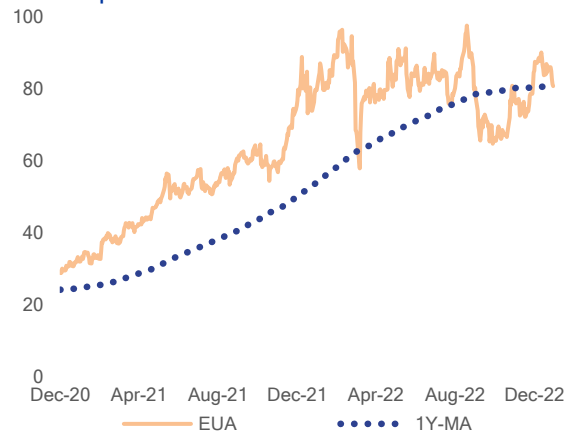
ESG leaders index risk-adjusted returns
ESG 'leaders' underperformed in 2022



Note: Annual returns of the EURO STOXX 50 and its ESG leaders subindex, in %. Risk-adjusted returns, on rhs, measured as Sharpe ratios. Current year data year-to-date.
Sources: Refinitiv Datastream, ESMA.

Chart 65

Emission allowance prices
Carbon prices fluctuated



Note: Daily settlement price of European Emission Allowances (EUA) on European Energy Exchange spot market, in EUR/tCO₂.
Sources: Refinitiv Datastream, ESMA.

Crypto-assets and financial innovation

FTX collapse reveals crypto weaknesses

After the crypto selloff in 1H22, driven by macro-economic factors and several prominent failures, including of the Terra/Luna ecosystem and centralised lending platform Celsius, crypto-assets dipped to a two-year low in the wake of the collapse of once top-5 crypto exchange FTX (Textbox 6) This caused total crypto **market capitalisation** to fall by yet another 20% within less than a week. The industry that was once valued at roughly EUR 2.6tn in November 2021, now sits at around EUR 770bn (Chart 67).

Trading volumes are trending downwards, after a temporary rise following FTX's collapse (Chart 68).

The market capitalisation of stablecoins is receding as well at around EUR 130bn (–9% year-on-year), as investors shift away from crypto-asset markets (Chart 69). Bitcoin (BTC) continues to prevail as the largest token with a market share of around 40%, followed by Ether (ETH) with 20% of total crypto-asset market cap.

Total value locked (TVL) in **decentralised finance (DeFi)** protocols plunged to EUR 40bn (–75% year-on-year), a level equivalent to 5% of the total crypto-asset market capitalisation. The absolute value lost because of software vulnerabilities in DeFi (so-called 'exploits')⁴³ declined in line with crypto-asset valuations while it remains steady at around 0.5% of TVL, thus representing an ongoing concern.

European crypto-asset exchange-traded products (ETPs) did not show major flows and AuM declined to around EUR 3bn amid falling crypto valuations. However, open interest in **Bitcoin futures at regulated exchanges** surged following the collapse of FTX (Chart 70).

Textbox 6

⁴³ 'DeFi exploits' are defined as any type of hack or abuse of an underlying blockchain infrastructure that results in losses for investors. DeFi is particularly exposed to exploits because of its open-source nature, which exposes the code to everyone, allowing hackers to exploit the protocols.

⁴⁴ ESMA delivered its official [assessment to the European Parliament's ECON Committee](#) on 30 November 2022.

The collapse of FTX⁴⁴

Until November 2022, FTX was considered one of the largest and strongest crypto exchanges worldwide, having been valued at USD 32bn in early 2022 and backed by several prominent institutional investors. FTX appeared to have come out from the H1 2022 crypto market drawdown (–60% within a couple of months) relatively unharmed, and even helped to bail-out smaller competitors (including crypto lender BlockFi).

This perceived resilience came to a sudden end when an article⁴⁵ published confidential balance sheet details of FTX's proprietary trading house Alameda Research, effectively questioning its solvency.

Following the article, the CEO of Binance – the largest crypto exchange and a competitor of FTX – announced his intention to sell a major stake of FTX-Tokens (FTT) that were held on Binance's books. The announcement triggered a large decline in the price of FTT and FTX customers started to withdraw their money from the exchange. Only two days later, Binance and FTX suddenly announced a non-binding letter of intent for FTX to be acquired by its largest competitor.

However, after just one day of due diligence and citing an investigation by US-authorities, Binance abandoned the deal, describing "issues beyond [its] control or ability to help". What followed was a 90% devaluation of FTTs, a fall of total crypto-asset market cap by 20% and FTX filing for bankruptcy proceedings in the US just a few days later.

As became apparent, FTX was lacking around USD 8bn – a demise caused by governance failures, the absence of adequate internal controls and a potential misuse of customer funds.

FTX was popular among institutional investors including crypto hedge funds and its collapse left several of its clients with their assets trapped (over USD 3bn alone for FTX's largest 50 customers)⁴⁶. Contagion spread to other crypto-native players such as lending platforms Genesis and BlockFi, the latter being in default.

Crypto-asset monitoring

The pronounced cyclicity of crypto-assets (rapid expansions followed by sharp contractions), as underlined by recent collapses (algorithmic stablecoin Terra in May, lending platform Celsius in July and crypto-exchange FTX in November), have led ESMA to include crypto-assets in its established **risk assessment**

⁴⁵ Ian Allison (2022), '[Divisions in Sam Bankman-Fried's Crypto Empire Blur on His Trading Titan Alameda's Balance Sheet](#)', CoinDesk, 2 November.

⁴⁶ Laurence Fletcher and Joshua Oliver (2022), '[Hedge funds left with billions stranded on FTX](#)', *Financial Times*, 22 November.

framework. The scoring is performed along six dimensions and allocates for each component a current risk level together with a short to medium-term risk outlook (Table 2).

Table 2

ESMA framework for crypto-asset risks
Medium-high risk with negative outlook

	Level	Outlook
Liquidity	○	→
Market	○	→
Credit	○	↗
Contagion (internal)	○	→
Contagion (external)	○	↑
Operational	○	↗

NB: Colours indicate current risk intensity. Coding: green = potential risk; yellow = elevated risk; orange = high risk; red = very high risk. Upward-pointing arrows = increase in risk intensity; downward-pointing arrows = decrease in risk intensity; horizontal arrows = no change. Change is measured with respect to the previous quarter; the outlook refers to the forthcoming quarter. The ESMA risk assessment is based on quantitative indicators and analyst judgements.

At the current juncture, **market-risk** (i.e. the risk of overall deteriorating crypto valuations), **internal-contagion risk** (i.e. the risk of a single platform or protocol failure to affect the wider crypto system) and **operational risk** (i.e. the risk of an operational malfunctioning at a platform, protocol or blockchain level to harm investors) are at the highest level. In the absence of adequate rules and supervision of operators, those risks have proven to materialise and are expected to remain at high levels or even increase. The case of FTX has once more demonstrated how operational risks, including non-transparent business practices and governance failures can affect the whole crypto system. However, external contagion risk to the wider financial system remains low, mainly due to limited intersystem exposures and the recent (partial) deleveraging in crypto-asset markets.

Environmental impact of crypto assets

In September, **Ethereum** completed the transition of its consensus mechanism, from an original proof-of-work (PoW) to a new proof-of-stake (PoS) mechanism. PoS is intended to make

Ethereum faster, more secure, and more energy efficient. It is expected to reduce the blockchain's electricity consumption by over 99% and will help to save emissions as large as those of countries such as Denmark or Chile⁴⁷.

In fact, emissions caused by crypto assets originate from the electricity consumption of miners for adding new blocks of transactions to a blockchain. **PoW consensus mechanisms** require miners to compete based on computing power. It can be regarded as the original way of working and was invented together with Bitcoin, which still relies on it. With the growing popularity of crypto-assets and rising prices, a whole industry has developed around crypto-mining. The Cambridge Centre for Alternative Finance estimates Bitcoin's annual electricity usage at around 83 TWh, 0.4% of global consumption⁴⁸.

PoS consensus mechanisms overcome the excessive use of electricity by relying on miners' deposits of tokens, meaning the mining-competition depends on the amount of individually deposited funds instead of computing power, making it considerably more sustainable.

After Ethereum's transition, around **35% of crypto assets use a PoS mechanism**, compared with 10% a year earlier (measured by market cap). This includes stablecoins, which usually do not run a proprietary blockchain but rely on Ethereum or other PoS tokens (Chart 69).

Artificial intelligence

A recent ESMA analysis of around 145,000 financial documents issued by over 22,000 European investment funds finds the number of funds that state using **Artificial Intelligence (AI) or Machine Learning (ML)** in the investment process to be limited – estimated at 54 entities as of October 2022 (Chart 66). Although this figure has increased five-fold over the past five years, it remains modest, accounting for less than 0.1% of the UCITS industry in the EU. It may, however, underestimate the real number of funds that leverage some form of AI to support their investment decisions, and solely show that AI is not used as a marketing tool⁴⁹.

⁴⁷ The Economist (2022), 'The future of crypto is at stake in Ethereum's switch', 6 September.

⁴⁸ Cambridge Centre for Alternative Finance, 'Cambridge Bitcoin Electricity Consumption Index'.

⁴⁹ For a more detailed analysis see ESMA (2023), 'Artificial intelligence in EU securities markets', TRV Risk Analysis Article.

Chart 66

Investment funds that declare using AI or ML Funds publicising AI use increasing but limited



Note: Number (left axis) and assets under management (right axis, in EUR bn) of EU investment funds that declare using AI or ML as part of the investment process in publicly available documents such as prospectuses, KIIDs, and shareholder reports.

Sources: Morningstar Direct, Refinitiv Lipper, ESMA

Innovation developments

Market intelligence suggests that crypto assets and distributed ledger technology (DLT) remain the most common areas of development related to financial innovation in the EU. This has been confirmed by a recent survey run within the European Forum of Innovation Facilitators (EFIF) that focused on the number and nature of inquiries related to financial innovations received by the innovation hubs and the regulatory sandboxes in the EU Member States. The exercise confirms that crypto-assets and DLT remain the most common topics in over 40% of inquiries and sandbox testing. Other prominent innovations relate to payment services (20%), crowdfunding (11%), InsurTech (7%) and GreenTech (6%). Several jurisdictions also reported AI, RegTech/SupTech, Data Analytics, InvestTech, open banking, Metaverse, biometrics, internet of things and quantum computing (Chart 69).

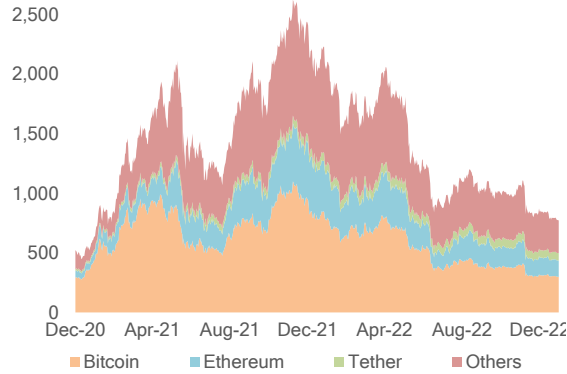
Key indicators

Chart 67

Market capitalisations

Crypto market hits two-year low

3,000



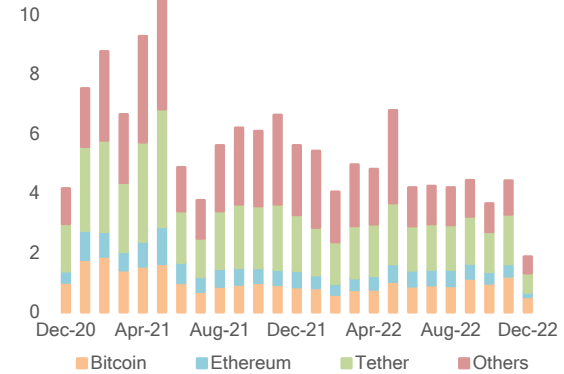
Note: Market capitalisation of Bitcoin, Ethereum, Tether and other crypto-assets, in EUR bn.
Sources: CoinMarketCap, ESMA.

Chart 68

Crypto-asset trading volume

Volumes trending downwards

12



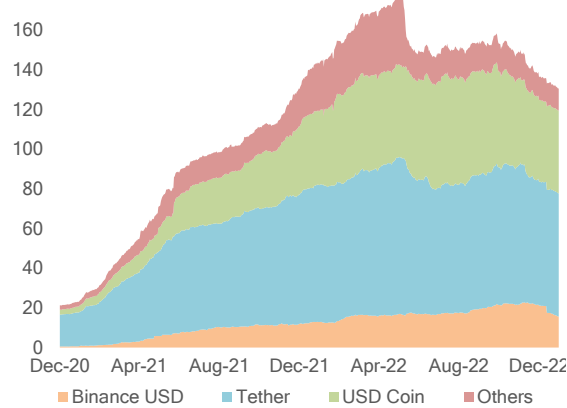
Note: Trading volumes of Bitcoin, Ethereum, Tether and other crypto-assets, in EUR tn.
Sources: CoinMarketCap, ESMA.

Chart 69

Stablecoin market capitalisation

Stablecoin market receding

180



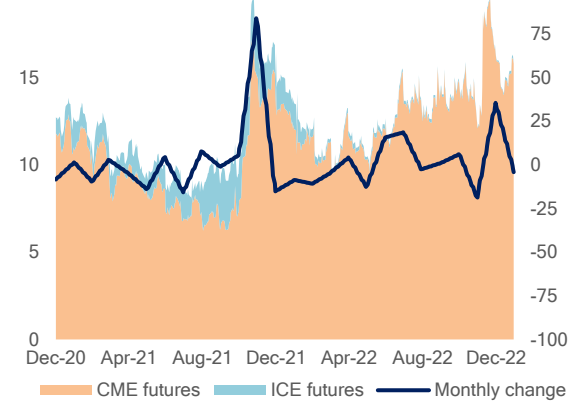
Note: Market capitalisation of Binance USD, Tether, USD Coin and other stablecoins, in EUR bn.
Sources: CoinMarketCap, ESMA.

Chart 70

Bitcoin Futures

Open interest on CME close to all-time high

20



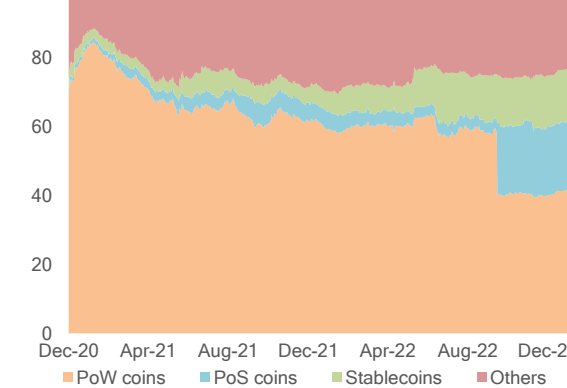
Note: Total open interest in Bitcoin futures, in thousand of contracts, and change in monthly average total open interest, in %.
Sources: Refinitiv Datastream, ESMA.

Chart 71

Crypto assets by consensus mechanism

Proof-of-work coins in decline

100



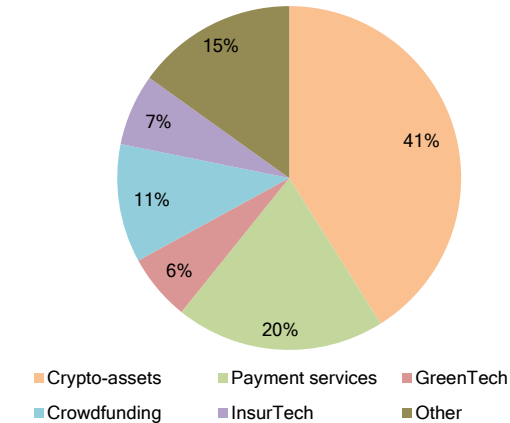
Note: Market capitalisation of crypto-assets by consensus mechanism, as % of the total. PoW=Proof-of-Work, PoS=Proof-of-Stake. Stablecoins only include Binance USD, Tether and USD Coin.
Sources: CoinMarketCap, ESMA.

Chart 72

Innovations in EU regulatory hubs and sandboxes

Crypto assets remain most prominent

100



Note: Innovations addressed to regulatory hubs & sandboxes
Sources: EFIF submissions; ESMA calculations

Annexes

TRV Statistical Annex

In addition to the statistics presented in the risk monitoring and risk analysis sections, we provide extensive and up-to-date charts and tables with key data on the markets under ESMA's remit in the TRV Statistical Annex, which is published jointly with the TRV and can be accessed on ESMA's website (<https://www.esma.europa.eu/market-analysis/financial-stability>).

List of abbreviations

1H(Q)22	first half (quarter) of 2022
1Y-MA	1-year moving average
2H(Q)22	second half (quarter) of 2022
ABS	asset-backed securities
AI	artificial intelligence
AIF	Alternative Investment Fund
AuM	assets under management
BTC	bitcoin
bp	basis point
CBI	Central Bank of Ireland
CCP	central counterparty
CDO	Collateralised debt obligation
CFD	contract for differences
CLO	collateralised loan obligation
CISS	composite indicator of systemic stress
CRA	credit rating agency
CRE	commercial real estate
CSD	central securities depository
DeFi	decentralised finance
DLT	Distributed ledger technology
EA	euro area
ECB	European Central Bank
EEA	European Economic Area
ESG	environmental, social and governance
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
ETD	exchange-traded derivative
ETH	Ether
ETP	exchange-traded product
EU	European Union
GDP	gross domestic product
GFC	Global Financial Crisis
HY	high yield
IG	investment grade
IMF	International Monetary Fund
IPO	initial public offering
LDI	Liability-Driven Investment
LVNAV	low volatility net asset value
MCM	Market correction mechanism
ML	machine learning
MMF	money market fund
NAV	net asset value
NCA	national competent authority
NFC	non-financial corporation
OTC	over the counter
PE	price-to-earnings
pp	percentage point
PoS	proof of stake
PoW	proof of work
RE	real estate
rhs	right hand side axis
RRE	Residential real estate

SEC	Securities and Exchange Commission
SFDR	sustainable finance disclosure regulation
SMEs	small and medium-sized enterprises
UCITS	undertakings for collective investment in transferable securities
WAM	weighted average maturity
YTD	Year to date

Currencies and countries abbreviated in accordance with ISO standards.

