



EUROPEAN CENTRAL BANK
EUROSYSTEM

Financial Stability Review

May 2021



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Foreword



This is the third issue of the Financial Stability Review (FSR) prepared in the context of the coronavirus (COVID-19) pandemic, with many euro area countries having faced a third wave of infections. As a result, a vast number of firms – particularly those in the services, leisure and travel sectors – still cannot operate normally, and the economy is still reliant upon policy support to prevent widespread unemployment, corporate insolvencies and economic contraction. The human and economic costs of the pandemic continue to accrue.

That said, vaccination programmes are progressing and offering a route out of the pandemic. Financial markets have been driven by expectations of an upswing, exemplified by a striking rally in global equity markets. We are optimistic that financial and economic conditions will bounce back. There is, however, a reality that the pandemic will leave a legacy of higher debt and weaker balance sheets, which – if unaddressed – could prompt sharp market corrections and financial stress or lead to a prolonged period of weak economic recovery.

The May 2021 FSR assesses financial stability vulnerabilities – particularly in the corporate sector – and their implications for financial market functioning, debt sustainability, bank profitability and the non-bank financial sector. Risks to financial stability remain elevated and have become more unevenly distributed. The pandemic has imposed higher costs on some vulnerable countries with larger services sectors, which in turn implies a greater need for continued policy support and growing interconnections between their government, corporates and banks. More broadly, the euro area banking sector also continues to face headwinds, with its profitability subject to uncertainty about the balance of loan losses to come and provisions already booked.

This issue of the FSR also looks beyond the pandemic at the other great challenge of our time – climate change – and the risks that this poses to euro area financial stability. A special feature brings together the further enhancements that we have made to our framework for monitoring and assessing climate-related risks to financial markets, banks and non-banks.

The Review has been prepared with the involvement of the ESCB Financial Stability Committee, which assists the decision-making bodies of the ECB in the fulfilment of their tasks. The FSR exists to promote awareness of systemic risks among policymakers, the financial industry and the public at large, with the ultimate goal of promoting financial stability.

Luis de Guindos
Vice-President of the European Central Bank

Overview

Financial stability vulnerabilities remain elevated

The increasingly uneven economic impact of the pandemic has led to a clustering of risks in some sectors and countries.

The recent rise of long-term interest rates has increased focus on asset repricing risks, which may affect non-bank financial institutions with high duration, liquidity and credit risks.

Euro area bank valuations have improved, but profitability challenges remain. Interlinkages between sovereigns, banks and corporates may amplify risks to financial stability.

Euro area financial institutions face material exposures to climate-related risks, but effective green finance can help foster an orderly transition to a low-carbon economy.

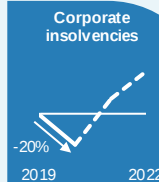
Sharply higher rates may reveal risk asset vulnerabilities

- Pressure on risk compensation
- Increased equity market leverage
- Elevated bond market duration risk
- Tight credit market pricing



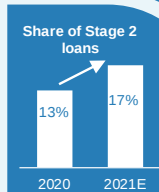
Growing balance sheet challenges in the non-financial sector

- Rising sectoral risk concentration
- Growing corporate solvency issues
- Risk of property market correction
- Materialisation of contingent liabilities



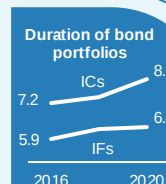
Weaker bank profitability amid high credit risk exposure

- Deterioration in asset quality
- Continued margin decline
- Lower corporate loan demand
- Stable funding conditions



Further increases in credit, liquidity and duration risks for non-banks

- Rotation from bond to equity funds
- Rising global rates could trigger outflows
- Low liquidity buffers could lead to asset sales
- Positive capitalisation effects for insurers



The outlook continues to be dominated by the pandemic, with the risks being concentrated in some sectors and countries with pre-existing vulnerabilities.

Well-targeted policy measures are still warranted to support the economy, while the use of available capital buffers, enhanced credit risk management and effective NPL solutions can protect the recovery and medium-term growth.

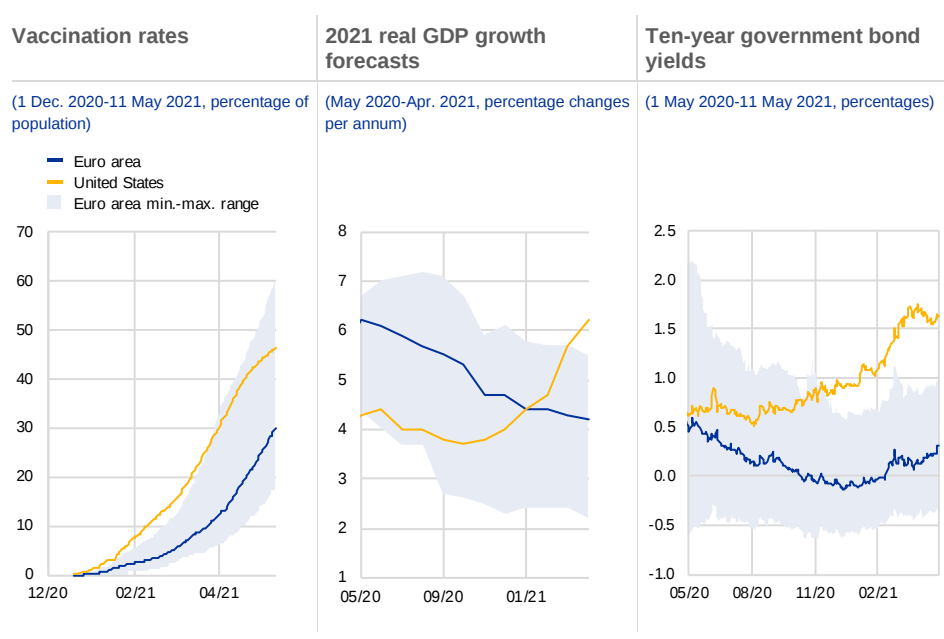
Euro area recovery has been delayed, with the impact of the pandemic increasingly concentrated in some sectors

A third wave of coronavirus infections in the euro area has weighed on the near-term economic outlook. More targeted lockdown and social distancing measures and economic adaptation have helped euro area economies to cope better with the pandemic. Nonetheless, many euro area countries faced a third wave of infections in the first months of 2021 that – together with the slow start of the vaccine roll-out – has delayed the economic recovery (see [Chart 1](#), left and middle panels). Looking ahead, progress with vaccinations and the gradual easing of containment measures should support a rebound in economic activity in the course of 2021.

The impact of the pandemic has been increasingly concentrated in some sectors and countries with pre-existing vulnerabilities. The euro area services sector continues to be more adversely affected by the restrictions on social interaction and mobility than manufacturing. The weakest performing sectors, such as trade, transport and accommodation, as well as arts and entertainment, have seen continued declines in gross value added of 2-4 times the aggregate. By contrast, the industrial sector has been recovering faster, supported by improved foreign demand. This sectoral divergence, combined with differing trajectories of the pandemic, has led to a wide divergence in 2021 economic forecasts at the euro area country level (see [Chart 1](#), middle panel).

Chart 1

US growth prospects have improved, triggering a rise in nominal yields with global implications, while the pace of euro area recovery has moderated in the short term



Sources: Our World in Data, Consensus Economics Inc., Bloomberg Finance L.P., Reuters and ECB calculations.
 Note: Left panel: vaccination rate refers to people who have received at least one dose of a COVID-19 vaccine as a share of the total population. Data are obtained from the [Our World in Data](#) international COVID-19 dataset, which includes a full list of the national authorities disseminating country-level data. For more information, see Mathieu et al., "A global database of COVID-19 vaccinations", *Nature Human Behaviour*, 2021. Middle panel: the minimum-maximum range covers 11 euro area countries surveyed by Consensus Economics (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain).

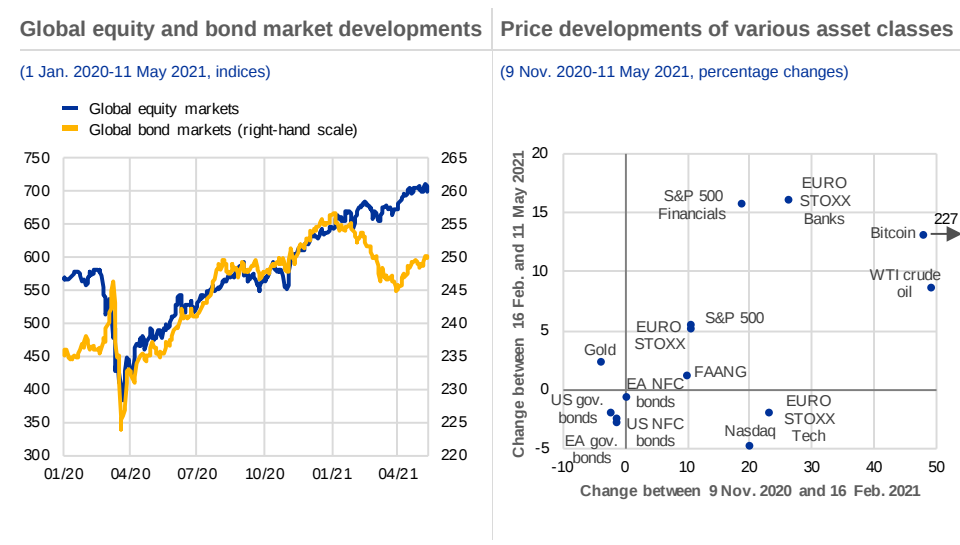
Improved economic prospects for the United States led to a notable increase in US long-term nominal interest rates, with global effects. A faster roll-out of vaccinations and agreement on a sizeable fiscal stimulus programme have led to a marked improvement in the US economic growth and inflation outlook (see [Chart 1](#), left and middle panels). The ensuing 60 basis point rise in US ten-year government bond yields since the start of 2021 (see [Chart 1](#), right panel), first driven by higher inflation expectations and later by rising real rates, led to some modest spillovers to the euro area (see [Chapter 2](#)). These spillovers were partially offset as the ECB's Governing Council reinforced its accommodative policy stance by significantly stepping up its asset purchases. Beyond the euro area, rising US yields coupled with an appreciation of the US dollar could generate larger shifts in global capital flows and, as indicated by past crises, may represent a source of risk for emerging market economies with external financing needs (see [Box 1](#) and [Chart 2.8](#), right panel).

Financial markets exhibited remarkable exuberance as US yields rose

As US interest rates rose and global bond markets sold off, equity markets saw a renewed rally. The rise in US benchmark bond yields led to a global sell-off in bond markets (see [Chart 2](#), left panel). At the same time, equity markets remained buoyant, supported by a recovery in expected earnings and robust risk sentiment (see [Chapter 2](#)). The recent rise in composite stock indices has been coupled with a somewhat stronger advance by financial stocks. These had previously underperformed technology stocks, which were among the best performers in 2020 (see [Chart 2](#), right panel).

Chart 2

Despite the recent rotation across and within asset classes, some market segments continue to show signs of elevated valuations and may be at risk of a correction



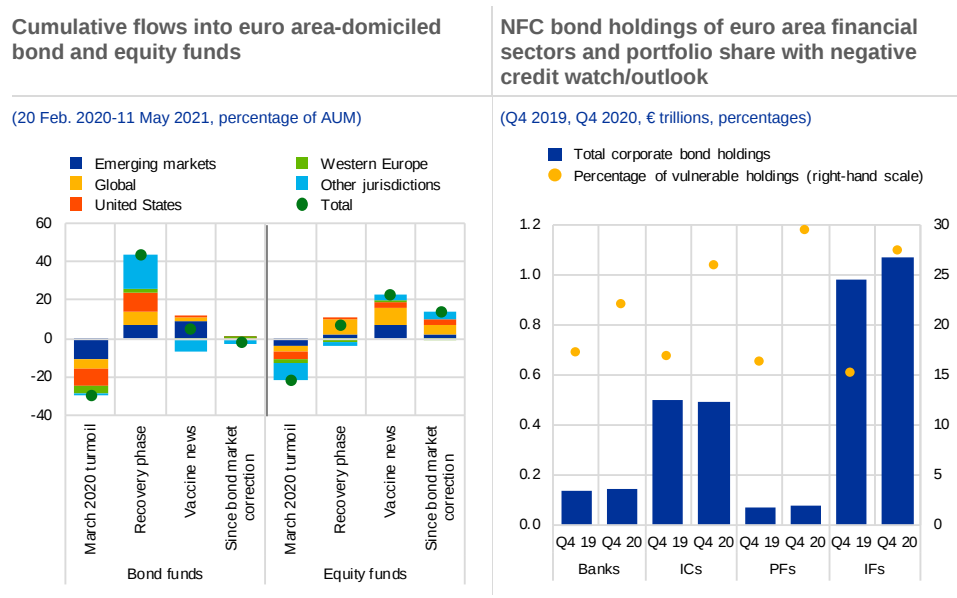
Sources: Bloomberg Finance L.P., IHS Markit and ECB calculations.
Notes: Left panel: global equity markets are reflected by the MSCI All Country World Index and global bond markets by the Bloomberg Barclays Multiverse Index. Right panel: FAANG: Facebook, Amazon, Apple, Netflix and Google; NFC: non-financial corporate.

The buoyancy of financial markets has stood in contrast to weaker economic fundamentals, while recent bouts of volatility highlight the risk of repricing.

Despite the recent stock price declines in some sectors, stock market valuations remain elevated. In the United States, valuations stand well above pre-pandemic levels, whereas they are at more moderate levels in the euro area. Spreads on euro area non-financial corporate (NFC) bonds remain at risk of an abrupt repricing, in particular for the high-yield segment, where they have fallen below pre-pandemic levels despite growing vulnerabilities. Overall, risk assets remain sensitive to changes in the benchmark yield curve and a reassessment of valuations could ensue if investor expectations regarding the likelihood and pace of monetary policy tightening were to change without an accompanying improvement in growth prospects (see [Chapter 2](#)).

Chart 3

Investment fund flows rebalanced from debt to equity, while non-bank financial institutions overall continue to have large exposures to firms with weak fundamentals



Sources: EPFR Global, S&P Global Market Intelligence, ECB securities holdings statistics and ECB calculations.
 Notes: Left panel: "March 2020 turmoil" covers the period from 20 February to 26 March 2020, "Recovery phase" the period from 27 March to 6 November 2020, "Vaccine news" the period from 9 November 2020 to 12 February 2021 and "Since bond market correction" the period from 15 February to 11 May 2021. "Other jurisdictions" refer to euro area funds with an investment focus in the Asia-Pacific region and Canada. AUM: assets under management. Right panel: vulnerable holdings are defined as holdings with a negative credit watch or outlook by Standard & Poor's. ICs: insurance corporations; IFs: investment funds; PFs: pension funds.

Many euro area investment funds, insurers and pension funds are exposed to a further rise in yields or a correction in credit markets. Investment fund flows have also rebalanced from debt to equity given rising yields (see [Chart 3](#), left panel). Still, in their search for yield over recent years, non-banks have increased the duration risk of their debt securities portfolios to multi-year highs. This increases the sensitivity of their assets to higher rates, though for insurers and pension funds asset valuation losses could be compensated for by a fall in the value of their liabilities given the sector's negative duration gap. Non-banks also have large exposures to firms with weak fundamentals, with more than a quarter of the sector's NFC debt holdings subject to a negative credit outlook or credit watch by rating agencies (see [Chart 3](#), right panel). Roughly half are also BBB-rated, only one notch above high-yield status.

In parallel, since last November, investment funds have further reduced their liquidity buffers. Cash buffers and liquid asset holdings are now below pre-pandemic levels and are approaching new lows, leaving the sector highly vulnerable to fire sales of assets in the event of large-scale redemptions. Investment funds' liquidity risk has increased amid a search for yield (see [Box 6](#)) over recent years. This underscores the importance of strengthening the resilience of the non-bank financial sector, including from a macroprudential perspective (see [Chapter 5](#)).

Corporate solvency challenges could weigh on sovereigns, households and creditors

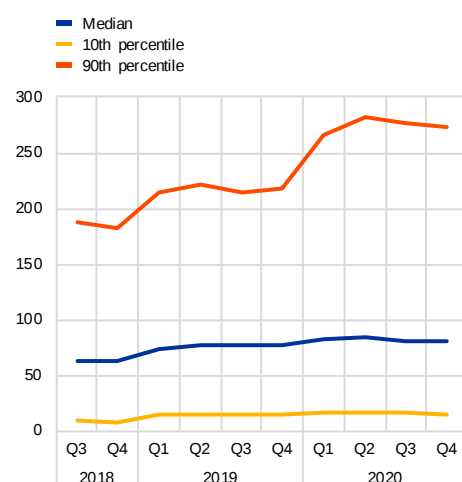
Reliance on debt has increased among vulnerable firms, amid higher rollover risks. Debt-to-equity ratios have increased considerably among the most leveraged firms, with the 90th percentile increasing from 220% at end-2019 to over 270% in the final quarter of 2020 (see [Chart 4](#), left panel). Corporate earnings expectations for the euro area have remained below pre-pandemic levels, while corporate funding conditions remained around the tightest levels since the pandemic started, especially for small and medium-sized enterprises (SMEs), highlighting elevated refinancing risks. Higher (risk-free) rates would increase debt servicing costs from historical lows and could raise medium-term risks in countries with elevated debt levels. The substantial increase in liquidity buffers among euro area firms may cushion corporate rollover risks, even though this appears to be particularly relevant for large listed firms.

Chart 4

Increased leverage, in particular by the most vulnerable corporates, may contribute to an increase in corporate insolvencies

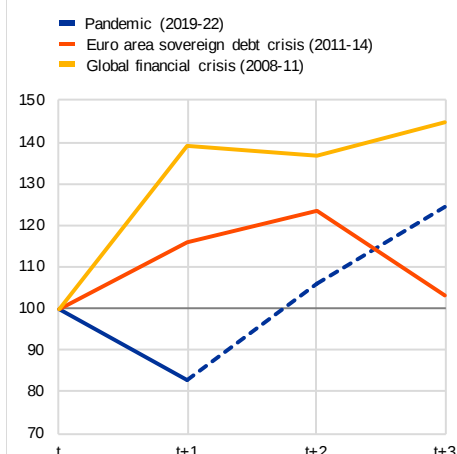
Distribution of debt-to-equity ratios across euro area firms

(Q3 2018-Q4 2020, percentages)



Developments in corporate insolvencies during different crisis episodes

(indices)



Sources: S&P Global Market Intelligence, Allianz Euler Hermes and ECB calculations.

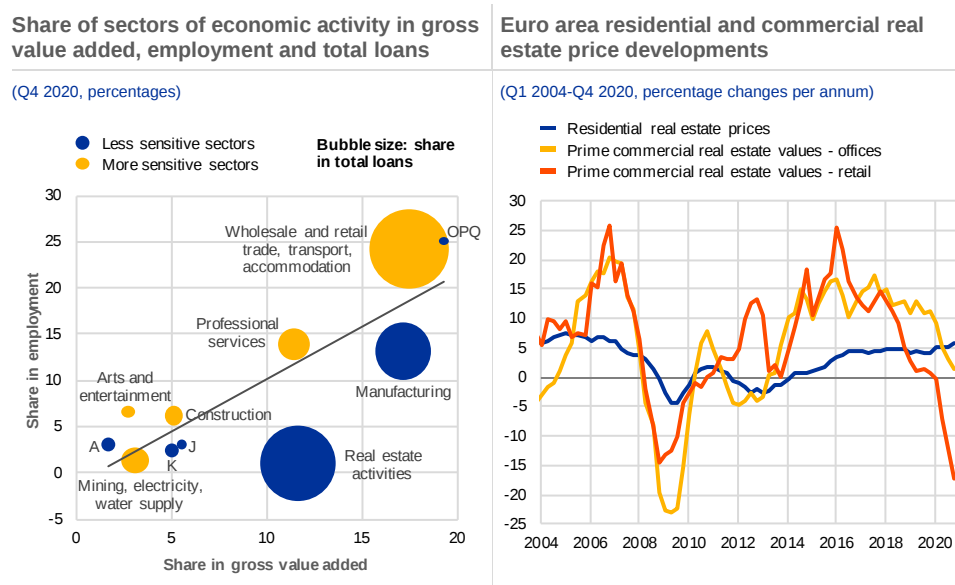
Notes: Left panel: a fixed sample of 1,183 euro area non-financial corporations with total assets larger than €50 million as at Q3 2019; data available for Q4 2020 are used. Right panel: the dashed line indicates projections. On the x-axis, "t" refers to the starting year of the respective crisis episode, i.e. 2008, 2011 and 2019 respectively; "t+1" refers to the year after, i.e. 2009, 2012 and 2020, and so on. Insolvency statistics and projections are taken from "Vaccine Economics", Euler Hermes, Allianz Research, 18 December 2020.

Solvency risks in the corporate sector are set to rise as public support measures fade.

Extensive policy support has kept corporate insolvencies unusually low in a period of extreme economic weakness, unlike during previous crisis episodes (see [Chart 4](#), right panel). The impact of the pandemic on corporates is increasingly concentrated in the services sectors and among SMEs. This implies that a sudden tightening of financing conditions or a further delayed economic recovery could have more severe implications for financial stability than the aggregate picture suggests, in particular in countries heavily reliant on pandemic-sensitive sectors. Therefore, even as the economy recovers, corporate insolvencies are expected to increase from the very low levels observed in 2020, partly driven by a backlog of insolvency cases. As a result, governments face a delicate balance between prematurely adjusting support measures, which may contribute to triggering a wave of corporate insolvencies, and maintaining support measures for too long and thus keeping unviable corporates alive (see [Special Feature A](#)).

Chart 5

Euro area households may be challenged by spillovers from corporates and a correction in residential property markets



Sources: Eurostat, ECB, Jones Lang LaSalle and ECB calculations.
 Notes: Left panel: sensitive sectors comprise mining, construction, retail and wholesale trade, transport, accommodation and food services, professional and administrative services, as well as arts and entertainment and other services. Sensitivity to the pandemic has been determined by the relative year-on-year loss in gross value added. Capital letters refer to NACE codes as follows: A – Agriculture; J – Communication; K – Financials; O – Public sector; P – Education; Q – Health services. The size of the bubbles refers to the sectors' share in total bank loans to all sectors. The grey line indicates the linear trend.

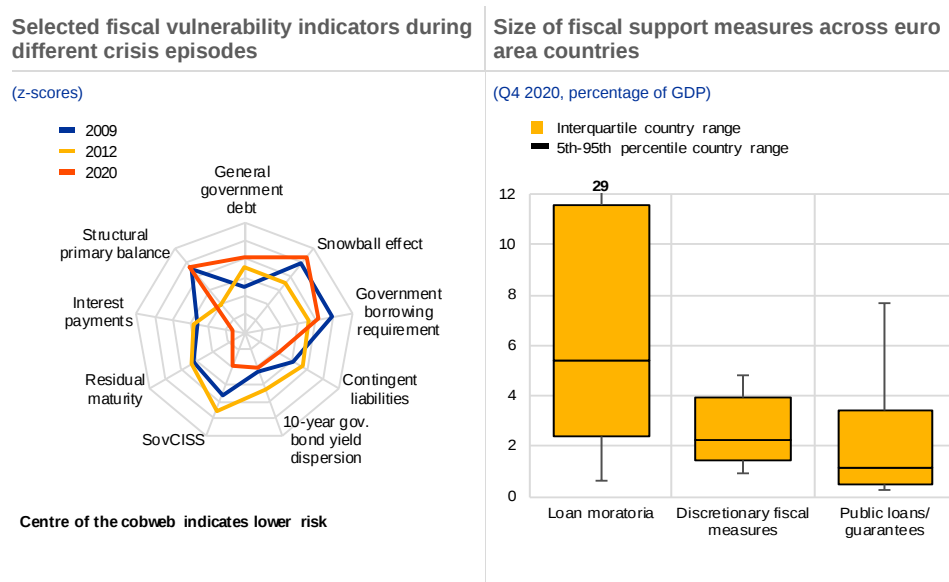
An increase in corporate insolvencies may impact households via employment prospects, so far prevented by policy support measures. On aggregate, household balance sheets have been cushioned so far, thanks to government income support schemes, record high saving rates, continued robust developments in euro area residential real estate markets and the recovery in stock markets. However, high dependence on government support schemes makes households vulnerable, and their financial and employment situation could worsen in the event of prolonged economic weakness, which may translate into job losses linked to a growing number of corporate insolvencies (see [Chart 5](#), left panel).

At the same time, continued strength in residential real estate markets and mortgage lending has increased household indebtedness and vulnerabilities.

The risk of a correction in residential real estate markets has increased amid signs of overvaluation for the euro area as a whole. In contrast to the resilience of residential real estate markets, commercial real estate markets are already facing a substantial market correction (see [Chart 5](#), right panel). A further decline in commercial real estate prices could feed through to the financial system via increased credit risk, decreased collateral values and losses on direct holdings, as well as to lower investment and economic activity by non-financial corporations.

Chart 6

Continued need for government support may challenge the sustainability of public finances in some countries and make the withdrawal of policy support more difficult



Sources: European Systemic Risk Board, European Commission, ECB and ECB calculations.
Notes: Left panel: data refer to euro area aggregates. Government contingent liabilities include the financial sector. The snowball effect relates to the interest rate-growth differential. SovCISS: composite indicator of systemic stress in euro area sovereign bond markets; for further information, see Garcia-de-Andoain, C. and Kremer, M., "Beyond spreads: measuring sovereign market stress in the euro area", *Working Paper Series*, No 2185, ECB, October 2018. Right panel: discretionary fiscal measures include direct grants as well as tax measures. Numbers refer to actual take-ups. For further information, see "Financial stability implications of support measures to protect the real economy from the COVID-19 pandemic", European Systemic Risk Board, February 2021.

The continued need for policy support may add to medium-term sovereign debt sustainability concerns in more vulnerable countries. The aggregate euro area sovereign debt-to-GDP ratio rose to 100% in 2020, up from 86% of GDP in 2019, as governments have financed extensive economic support to cushion households and firms. Fiscal policy support has been particularly large in some countries with a larger share of economic sectors most impacted by the pandemic and lockdowns (see [Chart 6](#), right panel). As a result, vulnerabilities from the outstanding stock of debt appear higher than in the aftermath of the global financial crisis and the euro area sovereign debt crisis, although debt servicing and rollover risks appear more benign given continued favourable sovereign financing conditions in terms of both pricing and duration (see [Chart 6](#), left panel). Contingent liabilities could increase sovereign debt levels further if the economic situation turns out to be weaker than expected and pandemic-related corporate loan guarantees are called on a broader scale (see

Box 2). The associated increase in public debt levels, further delays in the implementation of the EU recovery fund or the emergence of an adverse sovereign-bank-corporate nexus (see **Box 4**) could trigger a reassessment of sovereign risk by market participants and reignite market pressures on more vulnerable sovereigns. This may render the exit from policy measures more challenging in vulnerable countries with a higher reliance on fiscal support measures.

Improved market sentiment towards euro area banks, but profitability and asset quality concerns remain

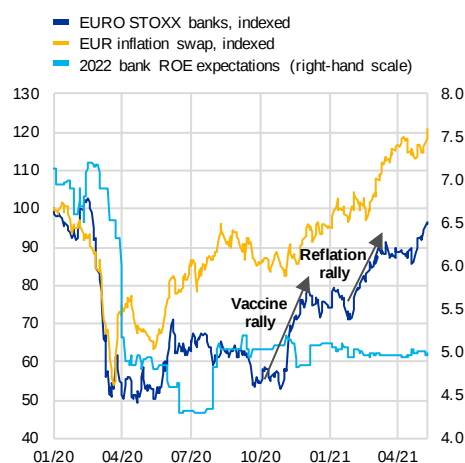
Euro area bank stock prices have recovered markedly from the low levels of October 2020. Bank equity prices have rallied in two waves on positive news about vaccines and reflation expectations. Banks outperformed the overall market, mirroring a wider recovery in previously underperforming stocks. While investors appear to anticipate that a steepening of the yield curve could support bank profitability, analysts' return on equity (ROE) expectations for 2022 have remained unchanged since last summer (see **Chart 7**, left panel). Nonetheless, euro area bank valuations remain depressed by both international and historical standards. Improved market sentiment towards banks, coupled with market expectations of an extension of the pandemic emergency purchase programme, have also translated into tighter spreads on bank bonds, further improving market funding conditions for euro area banks.

Chart 7

Market sentiment towards euro area banks has improved significantly, despite continued profitability challenges and growing asset quality concerns

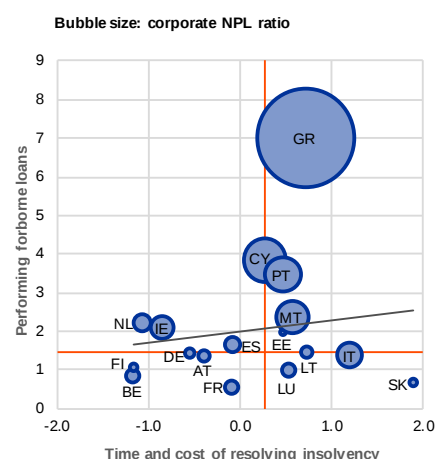
Euro area bank stock prices, analysts' 2022 ROE expectations and inflation expectations

(2 Jan. 2020–11 May 2021; percentages; index: 2 Jan. 2020 = 100)



Time and cost of resolving insolvency, forborne loans and corporate NPL ratios

(2019, Q4 2020, z-scores, percentage of total loans)



Sources: Bloomberg Finance L.P., World Bank Doing Business Indicators, ECB supervisory data and ECB calculations.

Notes: Left panel: "EUR inflation swap" refers to the euro area five-year forward inflation-linked swap rate five years ahead. Right panel: measures of time and cost of resolving insolvency are transformed into z-scores, i.e. they are presented as standard deviations from the sample mean and then averaged so that they can be jointly presented on one scale. Forborne loans refer to the share of total loans with forbearance measures. The bubble size corresponds to the NPL ratio for corporate loans. The red lines indicate sample medians. The grey line represents the linear trend. NPL: non-performing loan.

Nevertheless, the outlook for bank profitability remains weak and the prospects for loan demand are uncertain.

Euro area banks' ROE fell from 5.3% in 2019 to 1.3% in 2020 owing to pandemic-related loan loss provisions and ongoing margin compression in a low interest rate environment (see [Chapter 3](#)). Heterogeneity across countries was high, with banking sectors in some countries recording sizeable losses (see [Chart 3.4](#)). Despite recently improving market sentiment towards euro area banks, market analysts still expect profitability to recover only gradually, projecting an ROE of 3% and 5% for 2021 and 2022 respectively, given higher provisioning needs and lower expected operating income. The outlook for lending could be challenging as a result of both tighter credit standards and lower corporate credit demand. The former is related to banks' heightened risk perceptions, while the latter is associated with the adjustment of state guarantee programmes and the need to improve balance sheets.

Early signs of a rise in loan impairments are becoming increasingly visible.

Cushioned by large-scale fiscal, monetary and prudential support, bank asset quality has been preserved despite the sharp recession. In fact, the aggregate non-performing loan (NPL) ratio for the euro area reached its lowest level on record at 2.7% in 2020, as banks reduced legacy portfolios. Loan loss provision flows returned to pre-pandemic levels in the second half of 2020. But the normalisation may prove temporary, as early indicators of deteriorating asset quality are becoming increasingly visible, including a rise in forbearance. This is particularly the case in countries where lengthy and costly insolvency procedures inhibit claim enforcement (see [Chart 7](#), right panel). A weaker than expected economic recovery and growing vulnerabilities in the corporate sector may entail higher loan loss provisioning going forward. In addition, as moratoria and public guarantees are gradually adjusted (see [Chapter 1](#) and [Box 2](#)), credit risk may reappear with a lag, also implying increased loan loss provisions.

Climate change may pose material risks to financial stability

Climate-related risks to euro area banks, funds and insurers could be material, particularly if climate change is not mitigated in an orderly fashion.

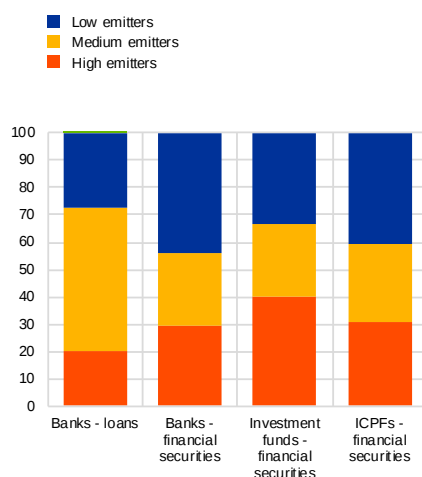
Banks and non-bank financial institutions alike are faced with the task of managing the implications of climate change over the medium to long term (see [Special Feature B](#)). Both need to manage their exposure to a transition to a low-carbon economy and their exposure to physical risks associated with extreme weather and climate-related events or more insidious changes in climate (see [Chart 8](#)). ECB analysis suggests that such risks appear to be particularly concentrated in certain sectors, geographical regions and individual banks, exacerbating the related implications for financial stability. At the same time, data and methodological gaps still need to be addressed to evaluate climate-related risks comprehensively. In addition, climate-related financial risks that may emerge from the interplay between banks and insurers need to be recognised, with insurance coverage likely deteriorating as extreme weather and climate-related events become more frequent.

Chart 8

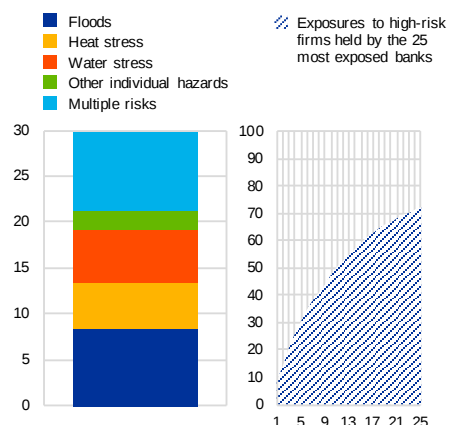
Climate-related risks, both transitional and physical, could be material for euro area banks, funds and insurers, given high risk exposures and concentration

Banks' and non-banks' exposure to transition risk in loan and securities portfolios **Euro area banks' exposures to firms subject to high physical risks**

(Dec. 2020, Q4 2019, percentages)



(Dec. 2020, percentages)



Sources: Four Twenty Seven, Urgentem, ECB (AnaCredit), ECB securities holdings statistics and ECB calculations.

Notes: The left panel shows the exposure of banks and non-bank financial institutions to firms that issue bonds or are listed in the equity market. The sample for loans consists of €4 trillion of exposures above €25,000 to non-financial corporations (NFCs) matched with emission data, corresponding to 80% of euro area loans to NFCs. The firms are classified as low, medium and high emitters according to their emission intensities in December 2019, i.e. the ratio of CO₂ emissions to revenues. Low emitters are firms with less than 309 CO₂-equivalent tonnes per million USD revenue (33rd percentile), while high emitters are firms with more than 1,068 CO₂-equivalent tonnes per million USD revenue (66th percentile). Right panel: "high-risk firms" include those firms that are located in areas already highly exposed, or increasingly exposed, to physical hazards. See also notes to Chart B.2 for further details.

Policy action may be required to ensure the resilience of the financial system to climate-related risks. Enhanced climate-related disclosure requirements, including in relation to companies' forward-looking emission targets, and deeper, more effective green financing are essential steps in a smooth transition towards a sustainable economy and a general reduction of climate-related vulnerabilities. At the same time, possible market failures can stem from data gaps, which would raise the risk of greenwashing. The upcoming ECB climate stress test will also analyse trade-offs in a forward-looking manner, thereby providing a further basis for future policy discussions. Ultimately, given the systemic dimension, considerations about how to mitigate climate-related risks in the financial system require a macroprudential perspective to be effective and to ensure cross-sector consistency.

Policies should continue to support the recovery, while targeting the build-up of vulnerabilities in selected areas

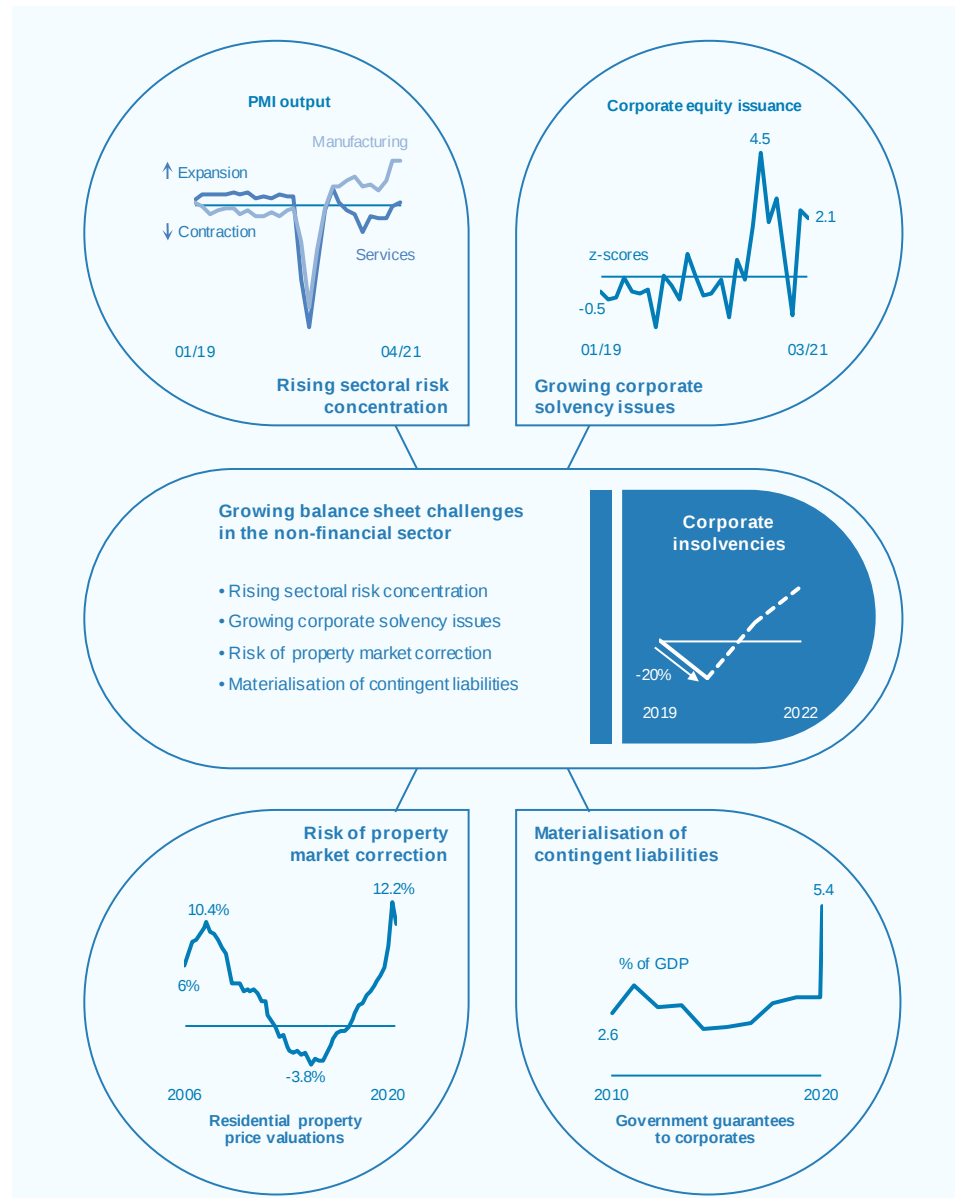
Extended policy measures have remained key in mitigating the economic costs of the pandemic, but vulnerabilities continue to build up in some areas. With many euro area countries facing renewed surges in infections, lockdown measures have been reinstated and economic support measures maintained. Divergence across countries and sectors has continued to increase, ultimately leading to a

concentration of risk that often coincides with pre-existing vulnerabilities in both the real economy and the financial sector. Looking ahead, medium-term vulnerabilities for euro area financial stability remain elevated and relate to: (i) a mispricing of some asset classes, raising the risk of corrections in markets; (ii) growing balance sheet challenges in the public and non-financial private sectors; (iii) weaker bank profitability amid high credit risk exposure; and (iv) further increases in duration, liquidity and credit risks of non-banks. The financial stability implications could be amplified by the emergence of an adverse feedback loop across various sectors of the economy.

Policies should remain broadly accommodative but could be more targeted to support a robust economic recovery amid remaining uncertainty and the potential for credit risk to materialise. Conditional on the economic impact of the pandemic, the extensive policy support, in particular for corporates, could continue to move gradually from being broad based to more targeted. In this context, fast and effective use of the €750 billion Next Generation EU (NGEU) recovery funds would complement national support measures and mitigate cross-country divergences in the coming years. Specifically for banks, capital relief measures should continue to prevent excessive deleveraging, while proper and timely recognition of credit risk would maintain confidence in balance sheets. In this context, it is worth noting the preliminary evidence which suggests that some banks may be reluctant to use available capital buffers, which could in turn affect credit conditions, especially for corporate lending. In the medium term, a higher share of releasable capital buffers could be considered, as it can enhance banks' ability to absorb losses and maintain the provision of key financial services in a crisis. In addition, concerns related to the expected asset quality deterioration in the banking sector reinforce the need for effective NPL solutions. Given the low interest rate environment and profitability challenges, efforts to address structural issues across banks should be stepped up. Finally, from a broader regulatory perspective, strengthening the banking union and the timely, full and consistent application of Basel III remain key policy priorities for the banking sector going forward.

Further progress towards developing a macroprudential framework for non-banks is expected and would be highly welcome. In particular, the Financial Stability Board is developing recommendations targeting structural vulnerabilities associated with money market funds, open-ended investment funds and margining practices in order to enhance the resilience of the non-bank financial sector. Once issued, they should be swiftly implemented in the European Union as appropriate.

1 Macro-financial and credit environment



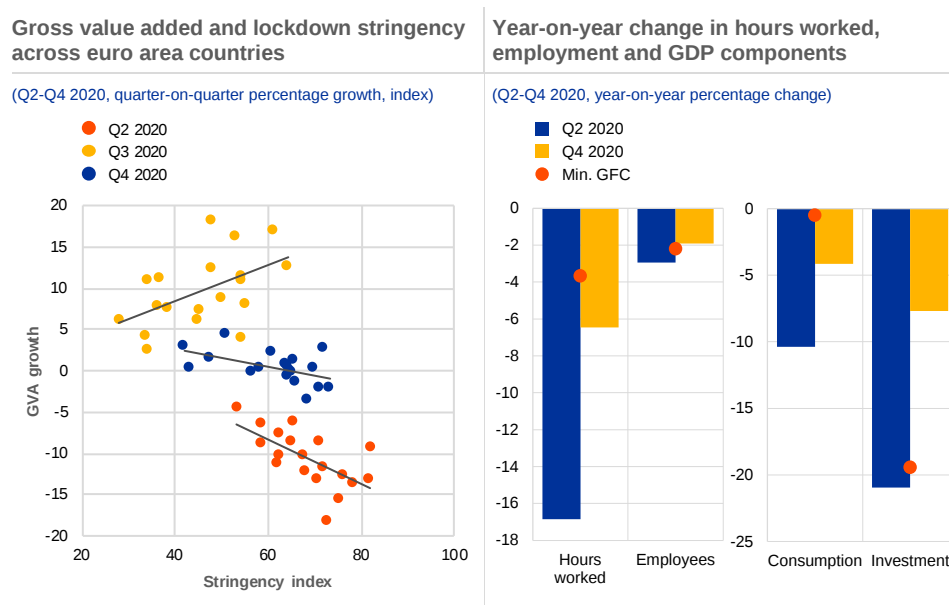
1.1 Increasing concentration of risk in more vulnerable sectors and countries

Economic activity fell amid renewed lockdown measures, but activity has proved more resilient than during the first lockdown. The resurgence of coronavirus cases last autumn caused euro area governments to reinstate tight containment measures, which weighed on economic activity in the euro area in the fourth quarter of 2020 and the first quarter of 2021. At the same time, the economic impact of the second lockdown remained more contained than that of the first

lockdown for two reasons. First, containment measures were on average less stringent than in the second quarter of 2020. Second, economic activity has become less sensitive to the stringency of lockdown measures, including across countries with different stringency levels, as firms and households have adapted to the new environment (see [Chart 1.1](#), left panel). This higher resilience is not only visible on average, but also when comparing countries with different levels of stringency.

Chart 1.1

Economy more resilient to lockdown measures, but considerable slack remains



Sources: ECB quarterly sectoral accounts, Hale et al., Eurostat and ECB calculations.
Notes: Left panel: the stringency index used is the [Oxford COVID-19 Government Response Tracker](#) from the Blavatnik School of Government, University of Oxford. It is based on 20 indicators, ranging from information on containment and closure policies (e.g. school closures, restrictions on movement) to economic (e.g. income support to citizens) and health system (e.g. coronavirus testing regime or emergency investments in health care) policies. It reports the strictness of lockdown-style policies that primarily restrict people's behaviour on a scale between 0 and 100. See Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S. and Tatlow, H., *A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)*, *Nature Human Behaviour*, 2021. GFC: global financial crisis; GVA: gross value added.

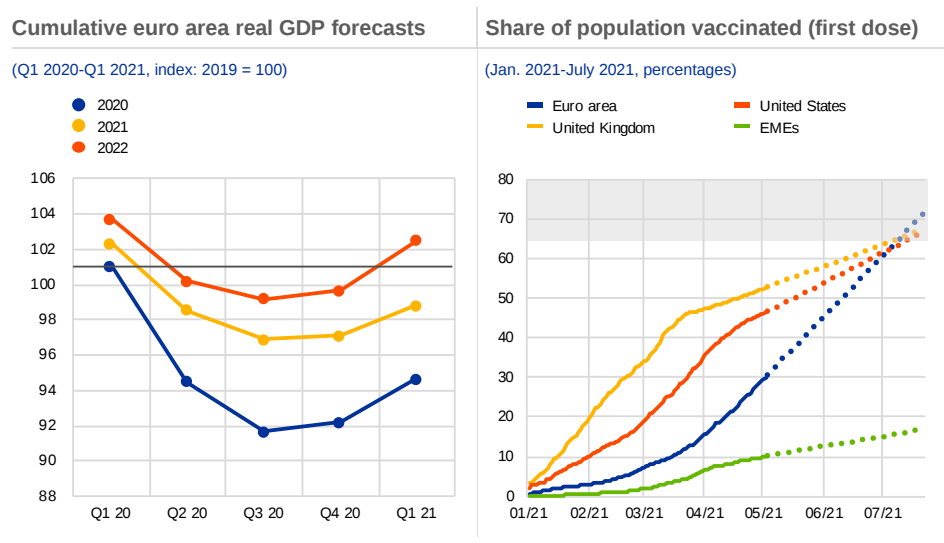
Slack in labour markets and subdued investment could point to a sluggish recovery. Although economic activity recovered to some extent in the second half of 2020, the number of employees and total hours worked remain substantially below pre-pandemic levels (see [Chart 1.1](#), right panel). While hours worked are likely to rebound once employees on short-time work return to full-time work, the high share of laid-off workers who left the labour force altogether could herald a more persistent disruption to labour markets. Non-employed workers, especially from sectors that face a more permanent drop in demand, could face difficulties in re-entering the labour market after the pandemic, which would weigh on economic growth. Similarly, investment remains subdued, reflecting firms' uncertainty about the timing of the pandemic and their own growth prospects after the pandemic subsides (see [Chart 1.1](#), right panel). Looking back at the global financial crisis as a precedent, a slow recovery of investment may also be a harbinger of a more sluggish recovery from the pandemic than the swift rebound in consumption suggests.

While the availability of vaccines has improved the medium-term economic outlook, uncertainties remain in the near term. The approval of multiple vaccines

in late 2020 and early 2021 improved the economic outlook for the euro area and reduced the uncertainty about the length of the pandemic. While this has boosted the growth prospects for 2022, the ongoing containment measures weigh on the near-term outlook (see [Chart 1.2](#), left panel). In addition, the slow start to the vaccine roll-out in the euro area makes it unclear when the euro area will reach herd immunity and return to normal economic activity. Moreover, the virus continuing to evolve poses considerable tail risks as vaccine-resistant mutations may yet emerge, necessitating a prolonged period of constrained social and economic activity.

Chart 1.2

Vaccines improve growth outlook, but slow roll-out and moderate fiscal support cause divergence from the United States and create tail risk of a prolonged pandemic



Sources: ECB Survey of Professional Forecasters (SPF) and Our World in Data.
Notes: Left panel: the horizontal axis displays the different quarterly SPF vintages containing the average real GDP expectations among professional forecasters. Growth rates are cumulative with 2019 = 100. Right panel: For more information on the data see the notes to chart 1 in the Overview. The linear projection is based on the average daily vaccination pace in the two weeks before the data cut-off date (11 May 2021). The shaded area indicates the levels of vaccinations typically associated with herd immunity (here excluding persons who have recovered from COVID-19). Emerging market economies (EMEs) are broadly consistent with the countries covered in Box 1 (subject to data availability) and comprise Argentina, Brazil, India, Indonesia, Mexico and Russia.

The slow start to the vaccination campaign and a more moderate fiscal stance may leave the euro area lagging its advanced economy peers. The euro area was initially much slower than other advanced economies to ramp up vaccination (see [Chart 1.2](#), right panel). As the pace of vaccination in the euro area picks up, however, this gap is narrowing. Nonetheless, the euro area may take longer than the United States or the United Kingdom to reach herd immunity depending on the further vaccination progress, which would allow for a return to normal. In addition, euro area governments have adopted a more moderate fiscal stance relative to GDP and compared with the respective output gap than the US administration in 2021. Although the “Biden package” of USD 1.9 trillion is expected to generate positive spillovers of up to 0.3% of real GDP for the euro area, the more accommodative fiscal stance in the United States could further increase the divergence between the two economic areas. Such a disparity in growth prospects could create upward pressure on real interest rates in the euro area and tighten overall financing conditions to the detriment of euro area corporates, households and sovereigns.

Global risks remain contained, and emerging markets proved resilient as policy uncertainty in the United Kingdom and the United States fell.

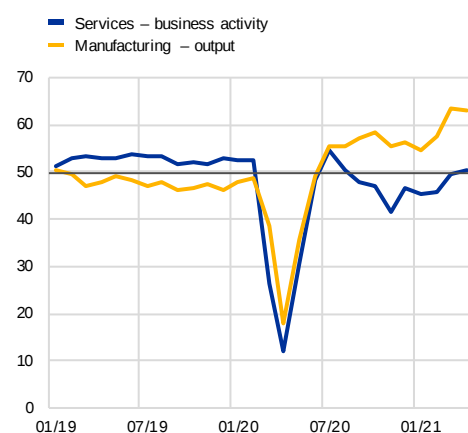
Despite the economic challenges and the slow global vaccination roll-out, financial conditions and capital flows in emerging markets have remained fairly resilient so far. These dynamics are, however, highly dependent on global risk appetite and monetary policy accommodation in advanced economies (see [Box 1](#)). The agreement of a trade deal between the United Kingdom and the European Union at the end of 2020 and the transition to a new administration in the United States have reduced policy uncertainty in both the United Kingdom and the United States. At the same time, the tensions relating to export controls on vaccines highlight the importance of trade in overcoming the pandemic, but also its fragility.

Chart 1.3

Increasingly asymmetric impact of the pandemic gives rise to tail risks in most affected sectors

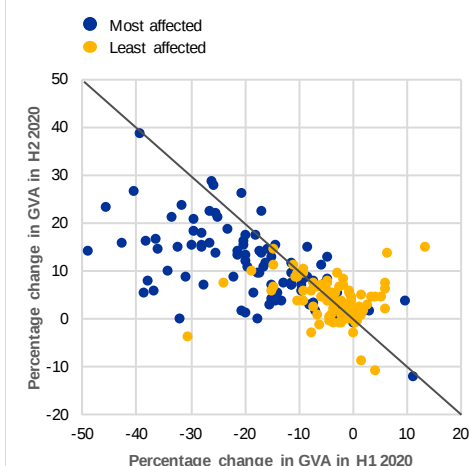
Survey-based economic activity by sector

(Jan. 2019-Apr. 2021; 50 = no change on previous month)



Drop and rebound in gross value added across countries and sectors

(Q1-Q4 2020, x-axis: relative percentage change Q4 2019-Q2 2020, y-axis: and Q2-Q4 2020)



Sources: IHS Markit and ECB quarterly sectoral accounts.

Notes: Right panel: the horizontal axis shows the percentage change in gross value added (GVA) between the fourth quarter of 2019 and the second quarter of 2020, whereas the vertical axis shows the difference between GVA in the second quarter of 2020 and the fourth quarter of 2020 in percentage points. Observations refer to country/sector observations at NACE Rev. 1 level. More sensitive sectors comprise mining, construction, retail and wholesale trade, transport, accommodation and food services, professional and administrative services, arts and entertainment, and other services. Sensitivity to the pandemic is determined by the relative year-on-year loss in gross value added.

The divergence across sectors widened as containment measures became more targeted.

The gradual reopening and the more targeted containment measures during the second lockdown allowed less badly affected sectors to widely resume normal activity, whereas services such as tourism, entertainment and travel to a large extent remained shut (see [Chart 1.3](#), left panel). Consequently, the most affected sectors were not only hit most in the first half of 2020, but also rebounded less relative to the initial drop in the second half of 2020, increasing the divergence across sectors (see [Chart 1.3](#), right panel). This divergence may widen further if the slow roll-out of vaccines necessitates continued containment measures over the summer tourism season, especially in southern European countries.

Continued cross-sectoral divergence could trigger a costly reallocation of resources. The widening sectoral divergence poses risks to financial stability for two reasons. First, the most affected sectors face more severe liquidity and solvency risks than aggregate economic indicators suggest, and the materialisation of these risks could trigger an unravelling of macro-financial imbalances with adverse spillovers to other sectors. Second, the continued divergence will at some stage lead to a reallocation of resources from the most affected sectors to sectors with better growth prospects. The costs associated with such a cross-sectoral reallocation of resources, for example due to retraining of workers, could further weigh on the strength and pace of the economic recovery in the short to medium term.

Box 1

Emerging markets' vulnerability to a reassessment of risk

Prepared by Irina Balteanu and Livia Chițu¹

Financial conditions in emerging market economies (EMEs) have weathered the COVID-19 crisis well so far, despite an intense but short-lived stress episode at the onset of the pandemic. Financial conditions in EMEs have rebounded strongly since March 2020; they currently stand at levels similar to before the pandemic thanks to lower bond spreads and higher equity prices. Capital flows have also recovered, with market segments typically judged to be riskier by foreign investors, such as equity and local currency debt, recording strong inflows in the second half of last year. This rebound helped to relieve pressures on financial systems and support activity in EMEs. Nevertheless, recent concerns about rising bond yields and higher than expected inflation in advanced economies have translated in a tightening of financial conditions and slowdown of capital flows to EMEs. In this context, this box assesses potential vulnerabilities facing large EMEs and the risks posed to euro area financial stability.

Many EMEs are benefiting from more solid fundamentals than in past crises, although high debt burdens and exposures to the US dollar and foreign investors may pose challenges for some countries. EMEs, with some notable exceptions, generally entered the pandemic on a sounder footing compared to past major crises (see **Chart A**, left panel). In recent years, EMEs have reduced their current account deficits, accumulated reserves, strengthened their banking systems and improved their institutions and policy frameworks.² At the same time, the fiscal support provided during the pandemic, which follows a recent trend in rising sovereign indebtedness, resulted in increasing fiscal vulnerabilities. Additionally, EME corporates have increasingly tapped international markets over the past decade, with the share of corporate USD-denominated debt to GDP more than doubling in a number of major EMEs. Larger debt levels may, to some extent, reflect the view of investors that greater market depth and improved policy institutions have increased many EME's capacity to carry debt. Yet, rolling over the debt crucially depends on maintaining market access at favourable financing conditions.

Global factors have been the most important driver of the recovery in EME capital flows over the past year, suggesting there is a risk of reversal. A structural decomposition of capital flows to EMEs shows that the main drivers of these flows are global risk sentiment and the US monetary

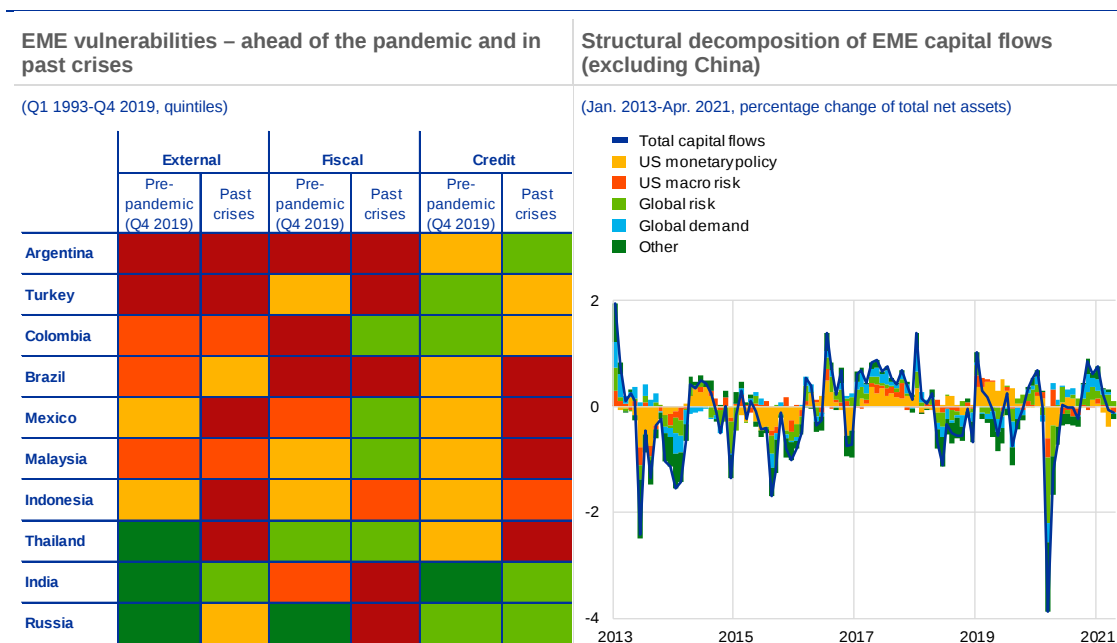
¹ With contributions from Pablo Andrés Anaya Longaric, Sungyup Chung, Johannes Gräb and Elena Vollmer.

² For a more detailed comparison with past crises episodes, see the box entitled "[Emerging market vulnerabilities – a comparison with previous crises](#)", Economic Bulletin, Issue 8, ECB, 2018.

policy stance (see **Chart A**, right panel).³ While capital outflows during the March 2020 turmoil were larger in those EMEs with higher shares of USD-denominated debt, this differentiation became blurred during the recovery phase, when capital flows to these countries recovered quickly and recorded large inflows, consistent with a search for yield behaviour (see **Chart B**, left panel). Nevertheless, this distinction returned in the first months of this year, when the slowdown of capital inflows appeared to be more substantial in more USD-exposed economies. The same picture emerges when countries are differentiated according to their external debt burden instead (i.e. debt held by foreign investors).

Chart A

EMEs entered the pandemic with better fundamentals, but capital flows are mainly driven by the global risk appetite and monetary policy stance in the United States



Sources: International Monetary Fund, Bank for International Settlements, World Bank, Institute of International Finance, Haver Analytics, EPFR Global and ECB calculations.

Notes: Left panel: country-specific vulnerability indices in each category (external, fiscal and credit) are colour-coded according to the quintile to which they belong in their respective distributions, where dark green denotes the 1st quintile (lowest risk) and dark red the 5th quintile (largest risk). Vulnerability indices in each category are constructed by averaging across the following variables: (1) two-year average of the current account/GDP, three-year average of external debt/GDP, three-year growth rate of short-term external debt in total external debt, and reserve adequacy (IMF-ARA metric); (2) three-year average of government debt/GDP, two-year average of fiscal deficit, three-year average of the share of non-resident holdings of government debt in total debt; (3) three-year growth of total credit to the private sector/GDP and two-year average of credit gap. Variables are first normalised by subtracting the respective mean and dividing by the standard deviation of the whole sample. Data are quarterly, Q1 1993-Q4 2019. Dates for past crises are: Q2 1993 for India; Q4 1994 for Mexico and Brazil; Q3 1997 for the Southeast Asian countries, Q2 1998 for Colombia, Q3 1998 for Russia; Q4 2000 for Turkey; Q4 2001 for Argentina. Right panel: total net assets are the total dollar amounts invested in EME-dedicated funds. The decomposition is derived from a structural Bayesian vector autoregression (BVAR) with sign and magnitude restrictions using the BEAR toolbox by Dieppe, A., Legrand, R. and van Roye, B., "The BEAR toolbox", Working Paper Series, No 1934, ECB, July 2016. The model decomposes capital flows into four shocks: i) US monetary policy (tightening) shocks are identified by a decline in equity prices as well as a rise in risk-free bond yields, EMBI spreads and the dollar; ii) US macroeconomic risk shocks are identified by a decline in equity prices, risk-free bond yields and the dollar, and an increase in the EMBI spread; iii) global risk shocks are identified by a decline in equity prices and risk-free bond yields as well as a strong rise in EME spreads and the dollar; iv) global demand shocks are identified by a decrease in risk-free bond yields and equity prices as well as an increase in the dollar and a weak increase in EMBI spreads. EME-specific shocks are captured in the residual "other" category.

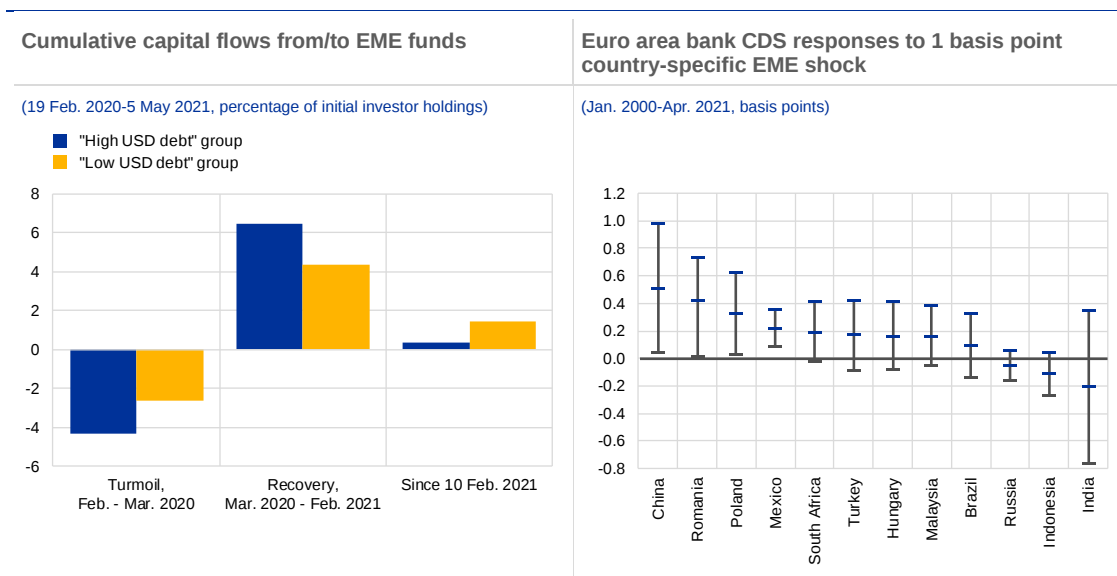
Looking ahead, risks to EME financial stability could arise from a reversal in global risk sentiment, as well as from rising yields in the United States and other advanced economies and an appreciating US dollar. Risks may re-emerge as bond yields and inflation expectations in advanced economies increase. The net impact of such increases is uncertain, depending on the nature of the underlying driver. Nevertheless, even in a positive scenario of yield increases due to an

³ This confirms the findings of the report by the Committee of the Global Financial System (CGFS) on "Changing patterns of capital flows" which shows that sudden stops in EME can be triggered by changes in global liquidity and risk appetite, and that the role of global factors has become larger since the global financial crisis (CGFS, 2021)

improving global outlook, more indebted EMEs could come under pressure, especially those that are more exposed to US dollar and foreign investors. In a negative scenario, an abrupt risk reversal driven by a reassessment of the global outlook or the monetary policy stance in major advanced economies might trigger a sharp tightening in financial conditions, renewed capital outflows and pressures on domestic currencies, as vividly illustrated by past experiences, such as the taper tantrum episode back in 2013. Moreover, a prolongation of the pandemic caused by slower vaccination progress could put strains on the policy space available to governments in EMEs to support activity and financial systems.

Chart B

Risk reversals rapidly translate into EME capital flow slowdowns. A shock affecting China could weigh on financial stability in the euro area, but other individual EME shocks appear less relevant



Sources: EPFR Global, Institute of International Finance, Haver Analytics, Bloomberg Finance L.P. and ECB calculations.

Notes: Left panel: bars show capital flows to/from EME-dedicated funds for 14 countries. The "high USD debt" group contains countries whose three-year average ratio of non-financial sector debt denominated in USD to GDP stands in the 4th and 5th quantiles of the distribution for this variable across the whole sample since 2005. These countries are Argentina, Brazil, Chile, Colombia, Indonesia, Mexico, South Africa and Turkey. The "low US debt" group contains India, Malaysia, Russia, South Korea, Taiwan and Thailand. The latest observation is for 5 May 2021 for capital flows (weekly data). The three periods over which capital flows are computed are: 19 February-25 March 2020, corresponding to the start of the financial market turmoil and its trough; 1 April 2020-3 February 2021, corresponding to post-crisis recovery; and 11 February 2021-latest (5 May 2021). The week of 11 February is the week in which concerns about rising yields in the United States started to show in capital flows to EMEs. Right panel: the chart depicts the peak/trough impulse response of the euro area bank CDS (average of nine euro area bank CDS) to a 1 basis point country-specific shock using local projections (Jordà, O., "Estimation and Inference of Impulse Responses by Local Projections", *American Economic Review*, Vol. 95, No 1, March 2005, pp. 161-182). Upper and lower bands depict 90% confidence intervals. The EME country shock is defined as the residual from a reduced-form regression model where the monthly country-specific EMBI sovereign spread is regressed on EMBI global sovereign spread and the US shadow rate (by Wu, J. and Xia, F., "Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound", *Journal of Money, Credit and Banking*, Vol. 48, No 2-3, March-April 2016, pp. 253-291), all in first differences. The impulse response functions of the average euro area banks' CDS to individual EME shock are estimated on a country-by-country basis taking a horizon of six months and controlling for the lagged dependent variable and the lagged values of the following variables: euro area industrial production, a measure of global risk appetite (the VIX), a measure of euro area and US monetary policy (the shadow rates of the euro area and the United States) and a measure of economic news (the Citigroup Economic Surprise Index for the euro area).

Euro area financial stability could be vulnerable to wider turbulence affecting a number of EMEs, although country-specific shocks would be unlikely to have a sizeable impact. The euro area's financial and trade links with most individual EMEs are typically small, despite large cross-country heterogeneity. The reaction of euro area bank CDS prices to country-specific shocks in EMEs suggests that, with the exception of China, such idiosyncratic shocks would not have a sizeable impact on financial stability in the euro area (see **Chart B**, right panel). Yet stress simultaneously affecting several EMEs or a crisis in a large EME could act as a catalyst for a wider reassessment of global risk via a loss of investor confidence, with broader consequences for the euro area and global financial stability.

1.2 Benign financing conditions limit debt sustainability risks

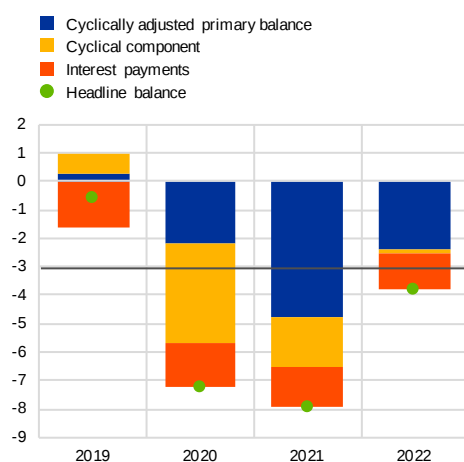
The pandemic continues to weigh on fiscal budgets in 2021 as governments extend support measures. When governments reinstated strict containment measures at the end of last year, they also extended existing support measures to cushion the economic impact on firms and households. As a consequence, fiscal deficits in 2021 will be higher than projected last autumn and are expected to exceed the deficit in 2020 for the euro area as a whole (see [Chart 1.4](#), left panel). In addition to existing liquidity support measures, governments started shifting more towards solvency support, for example by replacing government-guaranteed loans with grants or by injecting capital into larger, often state-associated companies. While the shift towards solvency support may be more effective in supporting weaker corporates which increasingly face solvency rather than liquidity problems, it also weighs on fiscal budgets more directly than indirect support measures that constitute contingent liabilities (see [Box 2](#)).

Chart 1.4

Fiscal deficits remain large due to pandemic-related expenses, but gross interest payments benefit from the low interest rate environment

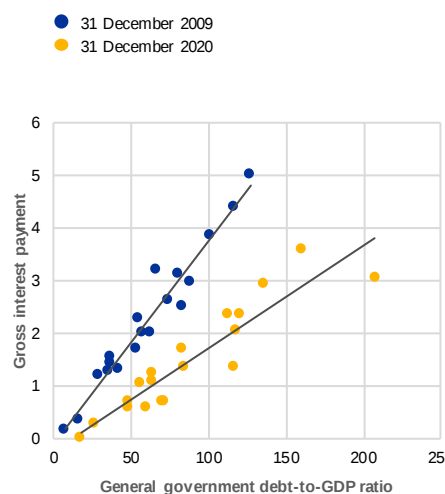
Fiscal budget projections

(2019-2022, percentages of GDP)



Gross interest payments and general government debt-to-GDP ratios

(2009, 2020; percentages of GDP)



Source: European Commission (annual macroeconomic database (AMECO)).

Notes: Left chart: the solid line depicts the 3% fiscal deficit threshold which delineates excessive government deficits according to the Maastricht Treaty. Right chart: consolidated debt and interest payments refer to the general government of the 19 euro area countries.

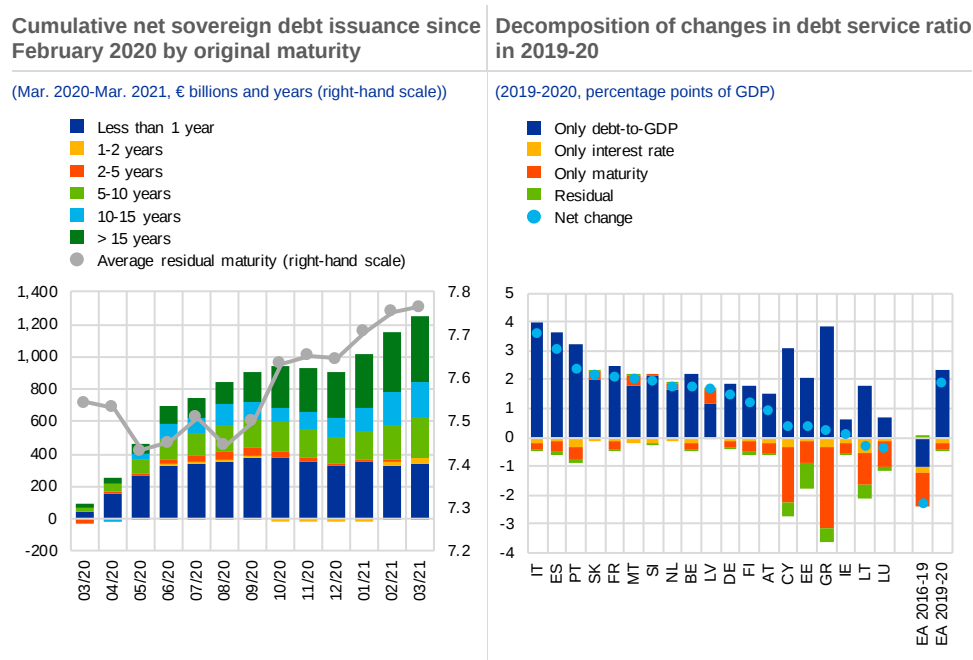
Extending the general escape clause of the Stability and Growth Pact until the end of 2022 could pre-empt a premature fiscal tightening. Current projections indicate that, due to the economic fallout from the pandemic, governments will continue to run up considerable fiscal deficits in 2022. As the deficits in more than half of the euro area countries are projected to exceed the 3% criterion in 2022, deactivating the escape clause at the end of 2021 might trigger a premature fiscal tightening in 2022. Extending the use of the clause this year already gives governments greater certainty about fiscal space going forward, which reduces the risk of an expectations-driven adverse spiral of reduced fiscal support, tighter

corporate financing conditions and a further contraction in economic activity (see [Box 4](#)). At the same time, a strong rebound in economic activity would alleviate the need for additional fiscal support and thereby cushion the impact of already reinstating the Stability and Growth Pact rules in 2022. In addition, some stabilisation measures may be phased out as the economy recovers without a major contractionary impact.

Even so, the recent increase in sovereign debt will have less of an impact on fiscal budgets than would have been the case in previous crises. The steady decline in government bond yields has reduced the average gross interest payments of euro area sovereigns despite higher debt-to-GDP ratios than in 2009 (see [Chart 1.4](#), right panel). Aside from this effect, lower interest rates also imply that gross interest payments are less sensitive to changes in debt-to-GDP ratios over time. In 2009, a country with a debt-to-GDP ratio that was 10 percentage points higher on average faced gross interest payments that were 0.4 percentage points higher. That elasticity has shrunk by half since 2009, to 0.2 percentage points. As a consequence, increases in sovereign debt levels due to unexpected events such as the pandemic impose a smaller burden on fiscal budgets, which implies that sovereign balance sheets are more resilient to exogenous shocks than at the time of the global financial crisis. Nevertheless, a sustained rise in sovereign bond yields could raise refinancing costs for governments, which would have a negative effect on sovereign debt sustainability in the medium to long run.

Chart 1.5

Low interest rates and longer maturities alleviate the fiscal footprint of higher sovereign debt



Source: Government Finance Statistics (ECB).

Notes: Left chart: cumulative net issuance refers to the cumulative issuance of government debt securities since February 2020 net of redemptions. Right chart: the calculation of the debt service ratio follows the methodology in Drehmann, M. and Juselius, M., "Do Debt Service Costs Affect Macroeconomic and Financial Stability?", *BIS Quarterly Review*, Bank for International Settlements, September 2012. The decomposition is based on changes in annual data.

Governments locked in low interest rates in the second half of 2020 and early 2021 by issuing longer maturity debt, thus reducing rollover risk. Between December 2019 and March 2021, average sovereign bond yields declined by 43 basis points in the euro area, supported by accommodative monetary policy. Following an initial surge in short-term debt issuance last spring, governments locked in these favourable financing conditions by shifting their net issuance towards longer-term debt, in particular bonds with maturities of more than five years (see [Chart 1.5](#), left panel and [Chapter 2](#)). This has not been affected so far by the recent rise in sovereign bond yields. Accordingly, the average residual maturity of sovereign debt increased by four months between May 2020 and March 2021.

Low interest rates coupled with longer maturities partially offset the adverse impact of higher debt levels on debt service ratios. The large increase in sovereign debt-to-GDP ratios in 2020 increased the debt service ratio⁴ relative to GDP for all euro area countries (see [Chart 1.5](#), right panel). At the same time, longer maturities and to a lesser extent lower rates alleviated the increase in debt service ratios for sovereigns, especially in countries where debt-to-GDP ratios have increased significantly. In addition, approximately 35% of the increase in the euro area debt-to-GDP ratio is driven by the drop in GDP. As the economy recovers, this denominator effect will subside, further easing the debt service ratio and the rollover risk of sovereign debt. In addition, governments continue to hold sizeable deposits with the Eurosystem, which further cushions short-term debt servicing needs.

The effectiveness of the EU recovery package is constrained by countries' absorption capacity and depends on the productive use of the funds. The €750 billion Next Generation EU (NGEU) package can complement national fiscal support measures in the coming years and help sustain the recovery without national budgets being directly negatively affected.⁵ However, historical absorption rates of structural EU funds show that Member States would need to absorb the NGEU funds at an unprecedented pace to make full use of the package (see [Chart 1.6](#), left panel).⁶ Based on the absorption rates of year 6 in the 2007-13 multiannual financial framework (MFF), up to 55% of the more than €300 billion in grants contained in the NGEU Recovery and Resilience Facility (RRF) may remain unused (see [Chart 1.6](#), right panel).⁷ The lack of absorption capacity in the worst affected countries in particular may impede the disbursement of the NGEU funds, which could further exacerbate the cross-country divergence following the pandemic and potentially spur

⁴ The debt service ratio captures the impact of debt, average interest rates and maturities by assuming that current debt is repaid in equal instalments over the average residual maturity of outstanding debt. It is defined as $DSR = \frac{D}{Y} * \frac{i}{1 - (1+i)^{-s}}$ where D/Y denotes debt-to-GDP, i denotes the interest rate and s the average residual maturity of sovereign debt. See Drehmann, M., Ilnes, A., Juselius, M. and Santos, M., "How much income is used for debt payments? A new database for debt service ratios", *BIS Quarterly Review*, Bank for International Settlements, September 2015.

⁵ Ultimately, the EU debt will be refinanced by European taxpayers as it is backed by Member States' contributions to the EU budget and EU own resources.

⁶ For more details, see the box entitled "Towards an effective implementation of the EU's recovery package", *Economic Bulletin*, Issue 2, ECB, 2021.

⁷ The MFF and RRF funds differ in terms of structural composition and the conditions associated with the usage of the funds. The absorption rates may therefore differ for the RRF funds compared to historical MFF absorption rates.

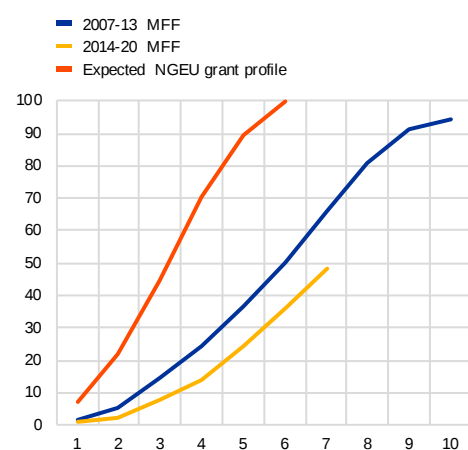
refragmentation pressures in sovereign bond markets. In addition, the need to absorb NGEU funds quickly may compromise the efficient and productive use of those funds.

Chart 1.6

Limited absorption capacity at national level may inhibit the take-up and effectiveness of NGEU funds

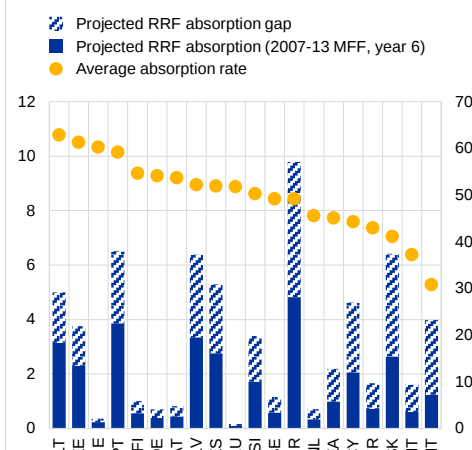
Public fund absorption rates over MFF and NGEU horizons

(percentages and years)



Projected absorption of RRF grants based on historical absorption rates of MFF funds

(percentages of GDP)



Sources: European Commission and ECB staff calculations based on Darvas, Z., "Will European Union countries be able to absorb and spend well the bloc's recovery funding?", *Bruegel Blog*, 24 September 2020.

Notes: Year 1 is the first year of the respective programme, i.e. 2007 for the 2007-13 MFF, 2014 for the 2014-20 MFF and 2021 for NGEU. The 2007-13 MFF covers the Cohesion Fund, European Regional Development Fund and European Social Fund, while the latter is excluded in the 2014-20 MFF. The MFF payout rate is the share of the total amount committed to a Member State in the EU budget that has been paid out by the Commission. The MFF-related calculations cover euro area countries only (unweighted average). The NGEU grant profile shows the disbursements expected by the Commission as at July 2020. Right panel: the volumes only refer to the grants component of the RRF and absorption rates are based on the absorption of MFF funds in year 6 of the MFF period 2007-13.

While favourable financing conditions mitigate short-term risks in the public sector, the continued need for fiscal support poses medium-term risks.

Although financing conditions have limited the impact of increased sovereign debt levels on fiscal budgets and debt service costs, the pandemic continues to take a substantial toll on fiscal budgets. The need to extend existing support measures and retain automatic stabilisers will keep fiscal budgets tightly linked to the evolution of the pandemic. In addition, the adverse impact of continued containment measures on corporate balance sheets increases the risk that contingent liabilities will materialise and further strain public budgets (see [Box 2](#)). Finally, a sudden rise in interest rates could raise concerns about the sustainability of sovereign debt over the medium term, although the impact on sovereigns' debt service needs would be alleviated by the extended average maturity of sovereign debt portfolios.

Box 2

Contingent liabilities: past materialisations and present risks

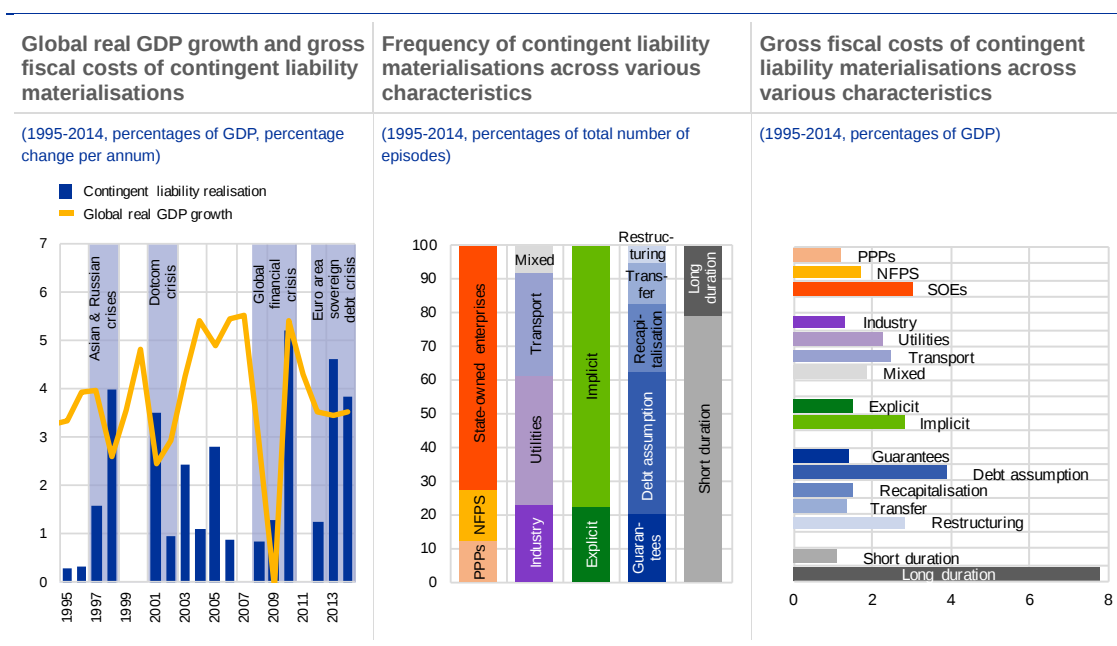
Prepared by Sándor Gardó, Benjamin Hartung, Mariusz Jarmuzek and Algirdas Prapiestis

Fiscal policy support has mitigated financial stability risks during the pandemic, but the vulnerabilities arising from contingent liabilities have increased for euro area sovereigns.
National policy responses to support households and firms during the pandemic directly increased

the aggregate euro area general government debt-to-GDP level by around 14 percentage points to around 100% of GDP in 2020. Additionally, public guarantee schemes that were introduced in 2020 constitute sizeable contingent liabilities for governments in most euro area countries, adding to the stock of both existing government guarantees and other implicit contingent liabilities, which reinforces concerns about the emergence of an adverse sovereign-bank-corporate nexus. Against this backdrop, this box presents historical evidence from contingent liability materialisations, investigates their commonalities and differences with the situation under the current pandemic-induced shock and assesses the ensuing risk for sovereigns.

Chart A

Historical evidence on contingent liability materialisations suggests that they can be a significant source of risk for sovereigns



Sources: Bova et al, ECB and ECB calculations.

Notes: The global sample covers 33 advanced and emerging market economies across the globe. Following Bova et al., gross fiscal costs are defined as gross government payouts associated with contingent liability materialisations, expressed as a share of GDP. Middle and right panels: NFPS: non-financial private sector; PPP: public-private partnerships. Right panel: average gross fiscal costs per category as a share of GDP. SOEs: state-owned enterprises.

Historically, contingent liabilities have materialised in waves and can be a significant source of risk for sovereigns.⁸ Data on global historical materialisation of government contingent liabilities for non-financial firms reveal that the fiscal costs incurred by sovereigns can be sizeable.⁹ In particular, the global financial crisis and the euro area sovereign debt crisis have demonstrated that associated fiscal costs may average around 5% of GDP, and have even exceeded 10% of GDP in

⁸ For an analysis of government involvement in non-financial corporate restructuring involving fiscal costs, see Grigorian, D. and Raei, F., "Government Involvement in Corporate Debt Restructuring: Case Studies from the Great Recession", *IMF Working Paper*, No 10/260, International Monetary Fund, 2010, while for fiscal costs associated with the financial sector bailouts, see Amaglobeli, D., End, N., Jarmuzek, M. and Palomba, G., "The Fiscal Costs of Systemic Banking Crises", *International Finance*, Vol. 20, Issue 1, 2017, pp. 2-25.

⁹ Bova et al., "The Impact of Contingent Liability Realizations on Public Finances", *International Tax and Public Finance*, Vol. 26, Issue 2, 2019, pp. 381-417, provide a comprehensive database with contingent liability materialisations since 1990, encompassing information for 80 advanced and emerging market economies across Europe, North and South America, Asia and Australia. One important aspect that is not covered by this database for non-financial corporates is the net fiscal cost, which would take into account asset recoveries, and typically reduce the cost for sovereigns over time.

some European countries. The costs have been exacerbated by the marked drops in GDP growth coinciding with the materialisation of contingent liabilities (see **Chart A**, left panel).¹⁰

In the past, the largest fiscal costs related to public bailouts of state-owned enterprises stemming from implicit commitments. In general, implicit contingent liabilities – not linked to an explicit legal commitment of the state – have materialised more frequently and have also incurred higher costs in the past (see **Chart A**, middle and right panels). Resolution measures, mainly in the form of debt assumption and restructuring, were generally associated with higher costs. By contrast guarantees coincided with the lowest costs. Also, it appears that support measures with a short duration entail lower fiscal costs (see **Chart A**, right panel), meaning that the speed with which policy actions are implemented can be an important consideration when designing policy responses.¹¹

In contrast to past crises, the recent pandemic-induced large-scale loan guarantee programmes constitute a novel source of contingent liabilities. State-guaranteed bank lending schemes have been a key pillar of the pandemic fiscal support measures. Public guarantee envelopes amount to around 14% of GDP, with take-up of around 4% of GDP for the euro area on aggregate so far. The euro area aggregate masks considerable heterogeneity between countries in terms of both envelopes and take-up levels. One explanation could be that, instead of adhering to direct support measures, fiscally more constrained governments opted for more generous guarantee schemes which do not affect fiscal balances immediately (see **Chart B**, left panel).

While pandemic-related loan guarantees have the benefit of sharing some risks with banks and spreading the exposure across many firms, they are concentrated in the most vulnerable sectors. In most euro area countries, government guarantees cover less than 100% of the underlying loan. Accordingly, banks not only share some of the risk ex post but also have direct incentives to help prevent losses arising ex ante. In addition, the vast majority of these schemes have been utilised by SMEs, which account for up to 80% of total guarantee take-up (see **Chart B**, middle panel). The average loan size is therefore relatively small, ranging from €80,000 in Italy to €380,000 in Germany. In contrast to past contingent liability materialisations which were characterised primarily by the resolution of large firms, the guarantees expose governments now to a more dispersed risk which depends on the overall health of the corporate sector rather than individual exposures. While this is inherently related to the pace and strength of the economic recovery, SMEs in the most affected sectors were more likely to take up guarantees as they were facing more severe liquidity needs and a more abrupt tightening of credit conditions.¹² As a consequence, the risk exposure of governments may be larger than the aggregate health of the corporate sector suggests.

The probability of default (PD) on guaranteed loans has fallen during the pandemic, which mitigates sovereigns' risk exposure but could conceal tail risks if PDs are too optimistic. According to banks' internal models, corporates which took up government-guaranteed loans were less likely to default, despite the challenging economic situation. On the one hand, this could reflect the benign effect of guarantees on corporate financing conditions, which allows firms to stay afloat for longer, despite the drop in revenues and profits. On the other hand, falling PDs could be driven by adjustments to banks' internal models, which might result in an overly optimistic assessments of firms'

¹⁰ This is in line with the findings of Bova et al. for the measure of contingent liability materialisations incorporating both non-financial and financial corporates using the multivariate regression framework. The results based on a similar framework but employing the measure of contingent liability materialisation covering only non-financial corporates, corroborate this finding.

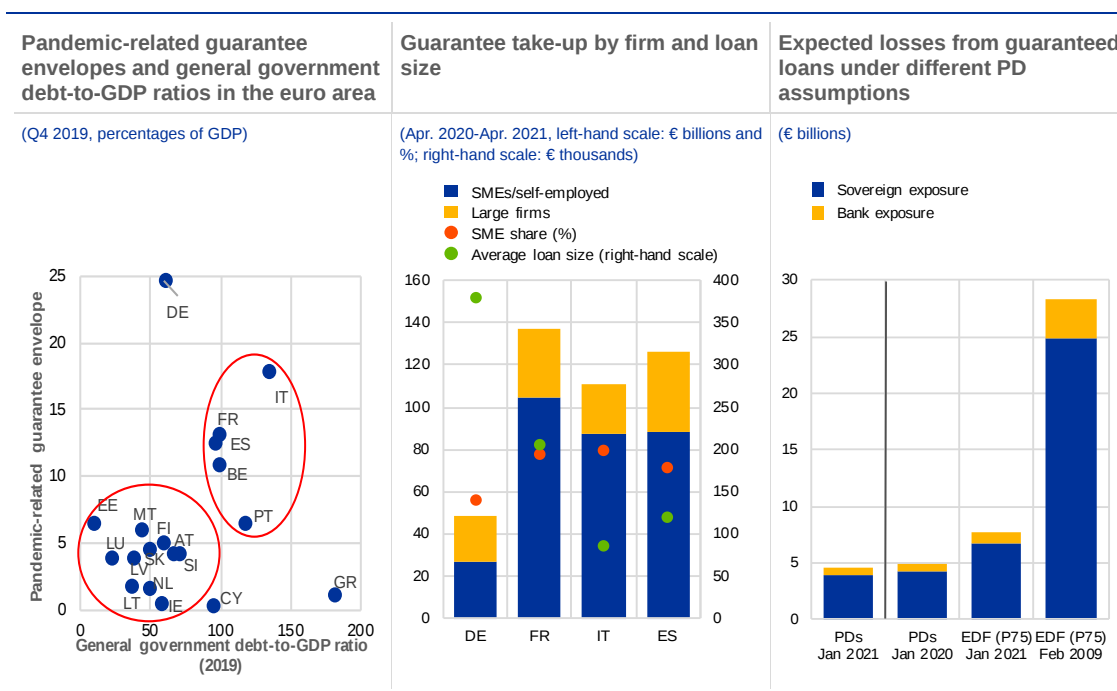
¹¹ This finding is broadly consistent with the evidence from Frydl, E., "The Length and Cost of Banking Crises", *IMF Working Paper*, No 99/30, International Monetary Fund, 1999, and Baldacci, E., Gupta, S. and Mulas-Granados, C., "How Effective is Fiscal Policy Response in Systemic Banking Crises?", *IMF Working Paper*, No 09/160, International Monetary Fund, 2009, for banking stress episodes.

¹² For more details on the drivers of cross-country differences in the take-up of government guarantees, see the box entitled "Public loan guarantees and bank lending in the COVID-19 period", *Economic Bulletin*, Issue 6, ECB, 2020.

likelihood of defaulting.¹³ Based on the bank-reported credit risk, lower PDs imply that the expected losses for governments on these guarantees are smaller than they would have been based on pre-pandemic PDs (see **Chart B**, right panel). At the same time, the actual exposure of sovereigns could be higher than internal bank models suggest. This would be the case if the current assessment turns out to be too optimistic and PDs are closer to the market-based expected default frequencies during historical stress episodes and among vulnerable corporates.

Chart B

SMEs benefit most from guarantee schemes despite the differences in take-up levels and envelopes of contingent liabilities across countries, while the risk for governments appears to be contained



Sources: Eurostat, ECB and ECB calculations based on AnaCredit, national sources and Moody's Analytics.

Notes: Right panel: expected losses are computed based on aggregate government guarantee take-up (from national sources) and different measures of one-year ahead probabilities of default. PDs are weighted average PDs of a fixed sample of debtors in AnaCredit who used government guarantees at least once since January 2020. Expected default frequencies (EDF) are obtained from Moody's and reflected the 75th percentile of the cross-firm distribution in January 2021 and its historical maximum in February 2009.

The risks arising from government guarantees appear manageable, while possible bailouts for state-owned enterprises pose a tail risk. Although estimated PDs may be too optimistic, the overall size of the sovereign risk exposure from guarantees appears to be contained. Even if PDs on guaranteed loans were to rise to levels last seen among the 25% most vulnerable firms during the global financial crisis, the expected losses for sovereigns would rise to only €25 billion or 0.2% of euro area GDP (see **Chart B**, right panel). At the same time, more conventional materialisations of contingent liabilities related to implicit commitments towards large corporates or state-owned enterprises may still occur going forward. Based on historical evidence, the fiscal impact of these contingent liabilities can be sizeable and therefore pose a larger tail risk for sovereigns than their direct exposure from guarantees.

¹³ For further details, see the introductory statement by Andrea Enria at the [press conference on the results of the 2020 SREP cycle](#), 28 January 2021.

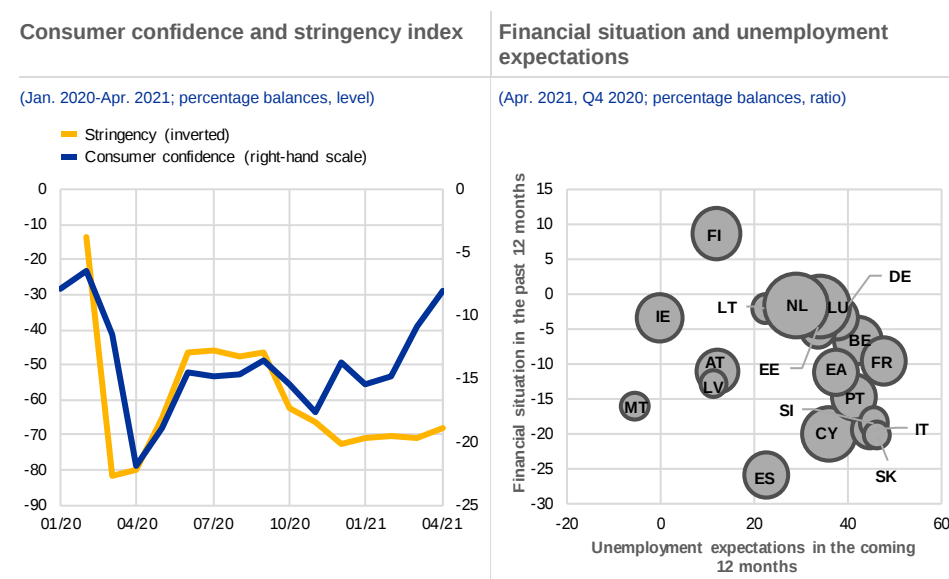
1.3

Aggregate household resilience masks uneven impact of the pandemic

Households' economic sentiment has improved on hopes of a swift economic recovery, although uncertainty about employment lingers. Survey-based measures of economic confidence started to improve at the end of 2020 when the vaccine roll-out began (see [Chart 1.7](#), left panel). Despite the overall improvement in sentiment, forward-looking measures of unemployment continue to signal a deterioration in employment prospects. The euro area aggregate sentiment masks considerable differences between euro area countries, reflecting the uneven impact of the pandemic on households across the euro area. Households that report the largest deterioration in their financial situation over the last year also show the highest unemployment expectations for the coming 12 months, leaving them in a vulnerable position when support measures are scaled back (see [Chart 1.7](#), right panel).

Chart 1.7

Sentiment improved on the prospects for a vaccine, but unemployment expectations remain high



Sources: ECB, European Commission and Hale et al.

Notes: Left panel: "Stringency" is presented using an inverted scale, i.e. an increase (decrease) in the indicator corresponds to more (less) stringent policy to contain the coronavirus. For more information see the notes to chart 1.1, left panel. Right panel: "Unemployment expectations" reflects consumer expectations for the number of people who will lose their jobs over the next 12 months. "Financial situation" reflects how households score the change in their financial situation over the last 12 months on a five-point scale. A negative score reflects a deterioration in their perceived financial situation. Bubble size reflects the household debt-to-disposable income ratio in the fourth quarter of 2020 or the latest available figure for the household debt-to-disposable income ratio.

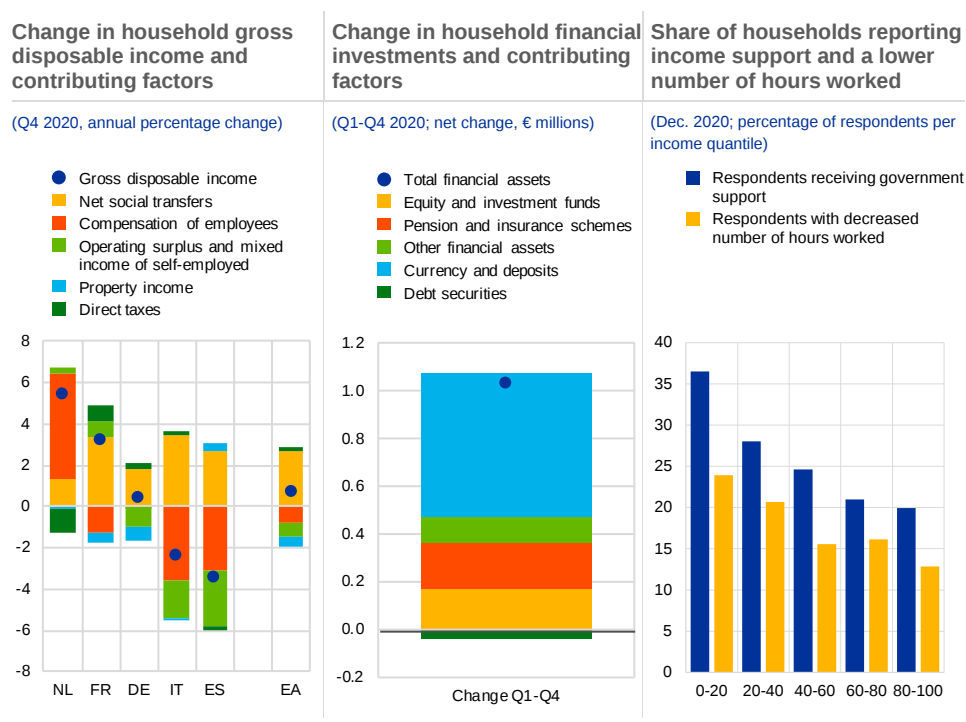
Cushioned household income, excess savings and record high net worth have increased the overall financial resilience of households. Despite recovering from the initial shock of the pandemic, disposable income remains reliant on government support in the form of higher net social transfers (see [Chart 1.8](#), left panel). Moreover, households saved a significant amount of their income as containment measures limited spending on durable goods.¹⁴ Cumulative excess savings compared to the

¹⁴ See also the box entitled "COVID-19 and the increase in household savings: precautionary or forced?", *Economic Bulletin*, Issue 6, ECB, 2020.

pre-pandemic savings rate stood at around 4% of GDP in the fourth quarter of 2020. Whether pent-up demand will translate into higher future consumption remains uncertain, despite a large share of the excess savings ending up in deposit accounts (see [Chart 1.8](#), middle panel). Excess savings are likely held by higher-income households, which have a lower marginal propensity to consume. Finally, robust house price growth and recovering stock prices continued to support net wealth, causing this metric to surge to 754% of disposable income in 2020 (see [Section 1.5](#)).

Chart 1.8

Household income gains flowed into deposit accounts and the stock market as containment measures reduced opportunities to consume



Sources: ECB, Eurostat, ECB Consumer Expectations Survey (CES) – December 2020 wave.

Note: Right panel: all reported numbers are aggregated using individual household weights. Euro area average reflects Belgium, France, Germany, Italy, the Netherlands and Spain.

The increase in aggregate household financial wealth masks considerable differences across countries and income groups.

Low-income individuals and countries that already exhibited slow economic growth before the pandemic are affected disproportionately. For this group of households, dependence on policy support measures remains high (see [Chart 1.8](#), right panel). Moreover, there are indications of tighter access to credit combined with cliff effects on their expenditure stemming from the phasing out of moratoria and other economic support policies. Strains on this group of households are likely to intensify if support is dialled back prematurely, resulting in lower consumption and a lower debt service capacity.

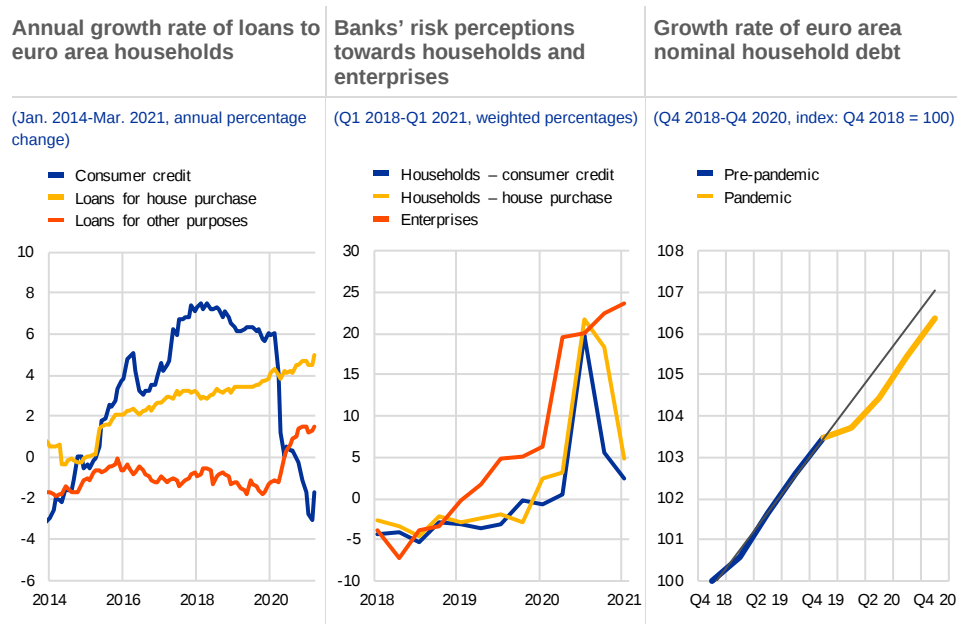
Household borrowing varies significantly across different types of credit (see [Chart 1.9](#), left panel).

Growth in aggregate bank lending to households stabilised at 3% from the start of 2020, mainly on account of a 5% increase in lending for house purchase. Consumer credit declined by 2%, reflecting the ongoing impact of the tighter

COVID-19 restrictions on consumer confidence and demand for durable goods. Going forward, a further moderation in banks' risk perceptions towards households might support looser credit standards and boost consumption when lockdown measures are scaled back and the economy fully reopens (see [Chart 1.9](#), middle panel).

Chart 1.9

Credit for consumption declined as households had less opportunity to spend



Sources: ECB and Eurostat.

Notes: Left panel: "Loans for other purposes" mainly reflects lending to sole proprietors. "Loans for house purchase" represents 77% of total lending, "Consumer credit" 12% and "Loans for other purposes" 11%. Lending figures are not corrected for securitised loans. Middle panel: "Risk perceptions" is the unweighted average of BLS survey questions on the "general economic situation and outlook", "housing market prospects, including expected house price developments" and "borrower's creditworthiness".

Government schemes and record low debt servicing costs have helped to make household debt more sustainable. So far, the pandemic has had a relatively modest impact on household debt ratios, as disposable income increased while spending opportunities were limited during lockdowns. As a result, nominal household debt increased at a slower pace in the first half of 2020 compared to the pre-pandemic path (see [Chart 1.9](#), right panel), while the debt-to-liquid assets ratio declined to 76% in the fourth of 2020. In addition, very low interest rates have driven debt servicing costs down to all-time lows, with interest payments as a share of disposable income falling to 2.2%. Households increasingly favoured fixed rate mortgages in new annual credit flows over variable rate alternatives, further contributing to lower overall vulnerability. As a result, the share of fixed rate mortgages had increased to 59% in March 2021 compared to just 47% in March 2016.

Overall, financial stability risks stemming from the household sector have been less pronounced than previously anticipated. With stronger balance sheets, robust net wealth and record low debt servicing costs, households have built up some capacity to weather economic headwinds. However, lower-income workers have not generally benefited from mitigating factors in the form of higher financial wealth, leaving them in a potentially vulnerable position when policy support is scaled back. In addition, household resilience remains highly contingent on the extent to which

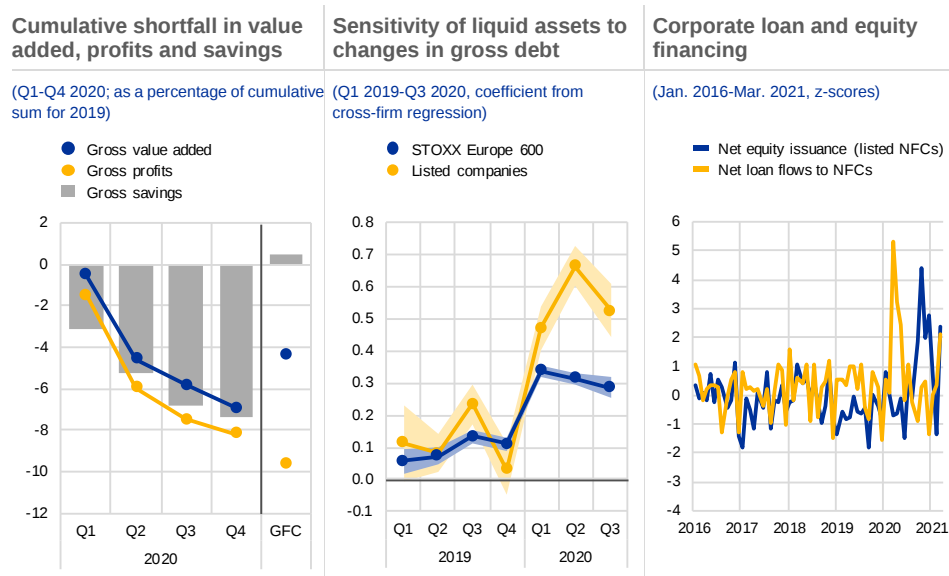
corporate insolvencies rise, as this could translate into significantly higher unemployment. Whether these risks materialise will depend on the ability of governments to keep supporting the households that have been hardest hit by the pandemic, especially in those countries where the take-up of policy support is substantial, residential properties are overvalued and debt levels are elevated.

1.4 Corporate solvency risks on the rise

Weak revenues and low profit margins continue to weigh on corporate profits, gradually raising the pressure on corporate solvency. Similar to previous recessions, gross corporate profits declined more than gross value added in 2020, as squeezed profit margins added to the fall in corporate revenues (see [Chart 1.10](#), left panel). Although both profits and revenues were more resilient in the second wave than during the initial phase of the pandemic, their continued decline added to the total shortfall compared with 2019 levels. In total, corporate profits in 2020 were 8.1% below gross profits in 2019. Consequently, retained earnings (measured by gross savings) dropped substantially, unlike in the global financial crisis when they recovered during the first year of the recession. This sharp and persistent drop in corporate savings limits the scope for new investment going forward, although firms may use available cash buffers to support capital accumulation.

Chart 1.10

Falling profits weigh on liquidity and leverage ratios at the most vulnerable firms



Sources: ECB and Eurostat (quarterly sectoral accounts, securities issues statistics); middle panel: Refinitiv and ECB calculations. Notes: Middle panel: data do not include unlisted firms and are therefore likely to be biased towards larger corporates. Right panel: both time series are z-scores based on the respective sample from January 2012 to January 2021. Note that net equity issuance refers to listed non-financial corporates whereas net loan flows covers all non-financial corporates.

Aggregate liquidity and capital buffers conceal a divergence across corporates, as risks rise for cash-strapped and overindebted firms. On aggregate, the considerable increase in gross debt has so far largely been offset by a similar rise in corporate holdings of liquid assets. Granular data for listed firms confirm that

corporates took on more debt to build up precautionary liquidity buffers as the correlation between changes in gross debt and changes in cash buffers across firms increased (see [Chart 1.10](#), middle panel). However, this effect is particularly prominent for large listed corporates whereas SMEs, which were more heavily affected by the pandemic and are less likely to have access to market-based funding, face more severe liquidity challenges. The concentration of liquidity risk among the most vulnerable corporates implies that a sudden tightening of financing conditions or a protracted economic recovery could have more severe consequences for financial stability than the aggregate picture suggests. In addition, liquidity problems increasingly morph into solvency issues – while the first wave of the pandemic was characterised by bond issuance and bank borrowing to meet liquidity needs, firms have recently issued more equity (see [Chart 1.10](#), right panel). Among listed firms, however, equity issuance has been concentrated in a few firms, especially in the technology sector, which tend to have benefited from the pandemic.

More recently, corporate credit growth has slowed, reflecting both corporates deferring investment and banks tightening lending conditions. In the second half of 2020, demand for bank loans slowed abruptly as bank lending conditions tightened and the need to bridge working capital needs subsided (see [Chart 1.11](#), left panel), especially in the worst affected sector, services. Besides the drop in demand for liquidity and the more cautious risk perceptions of banks, the slowdown in bank lending to corporates also reflects the reduced willingness of firms to invest in fixed capital while uncertainty remains about the timing and pace of the economic recovery. However, the subdued investment activity could also indicate a more structural pessimism about the viability of certain business models or the limited scope for new investments amid elevated debt levels. That in turn would have a more lasting impact on the economic recovery and corporate balance sheets. Moreover, building up liquidity buffers in the early stages of the pandemic has shielded some firms from revenue shortfalls and reduced the subsequent need for additional external financing.

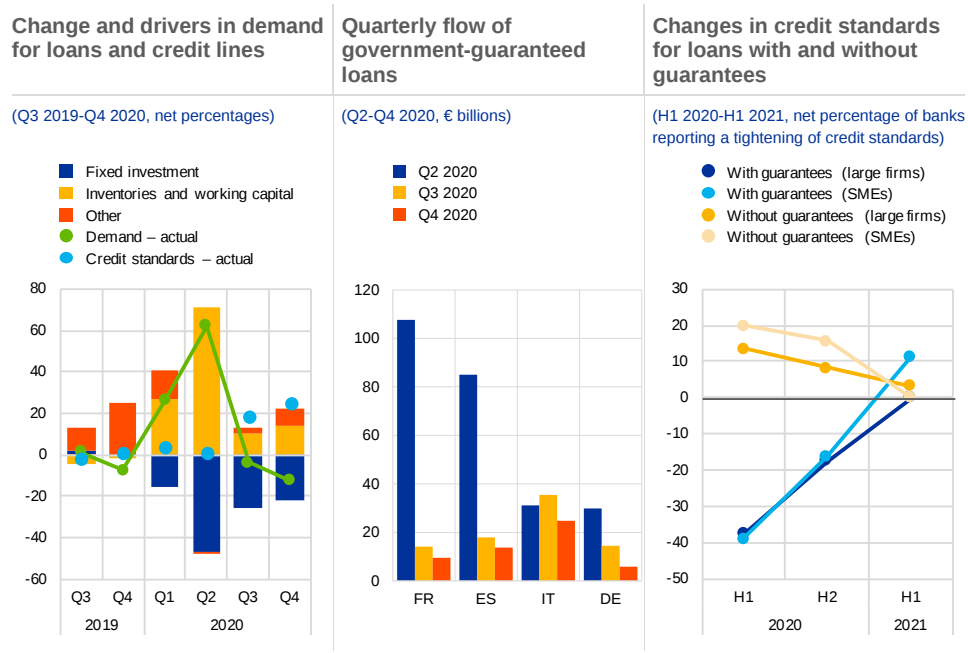
Government-guaranteed loans may have become less effective in supporting corporate financing conditions. Following the large take-up of guaranteed loans in the second quarter of 2020, the demand for such loans has dropped sharply in tandem with the slowdown in new bank loans to corporates in the second half of 2020 (see [Chart 1.11](#), middle panel). Looking ahead, the take-up of government-guaranteed loans is likely to fall further, as guarantees appear to have become less effective in supporting corporate financing conditions. Throughout 2020, credit standards eased considerably for guaranteed loans while tightening for non-guaranteed loans (see [Chart 1.11](#), right panel). However, this gap in credit standards between guaranteed and non-guaranteed loans is projected to narrow in the first half of 2021. Also, overindebted corporates may be unwilling to take on additional debt, given the uncertain outlook.

Smaller firms benefited most from government guarantees but are particularly affected by a recent tightening of bank lending conditions. SMEs have been more likely to resort to government-guaranteed loans than larger firms, given their reliance on bank lending and the disproportionate impact of the pandemic on smaller enterprises. They have also been more likely to benefit from the benign effect of

guarantees on credit standards, as they faced a sharper tightening of credit conditions for non-guaranteed loans (see [Chart 1.11](#), right panel). The projected tightening of credit standards on guaranteed loans therefore disproportionately affects SMEs.

Chart 1.11

Corporate loan demand has faded as external financing needs moderated, credit conditions tightened and guarantees became less attractive for SMEs



Sources: ECB bank lending survey and national sources.

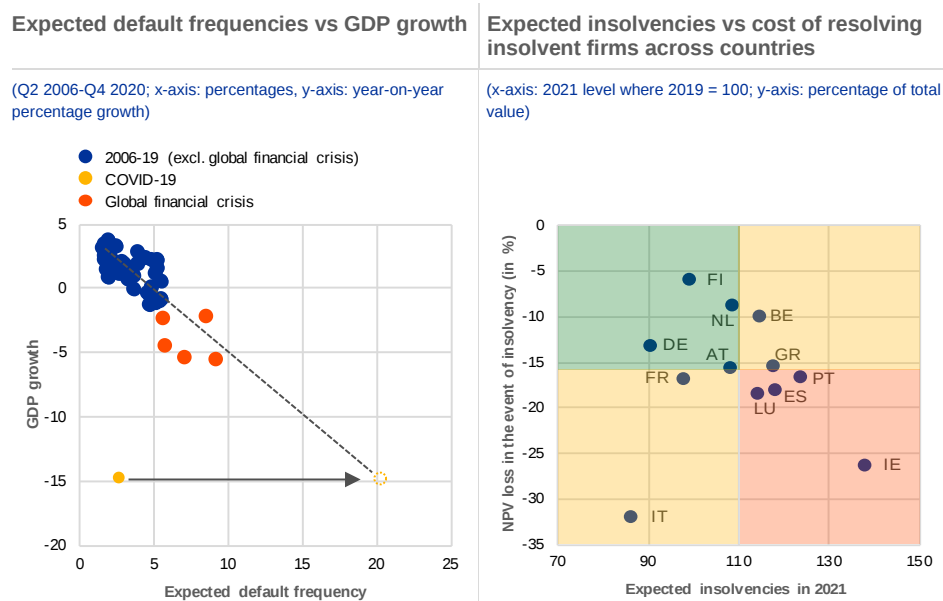
Notes: Right panel: the net percentage refers to the difference between the sum of the percentages for “tightened considerably” and “tightened somewhat” and the sum of the percentages for “eased somewhat” and “eased considerably”. Data for H1 2021 reflect expectations indicated by banks in the latest round of the bank lending survey.

An abrupt increase in bankruptcies could challenge insolvency frameworks and impede the efficient reallocation of resources.

Despite the unprecedented fall in corporate revenues and profits, bankruptcies in the euro area decreased by approximately 20% in 2020 relative to 2019 levels as public authorities provided policy support and in some cases suspended mandatory insolvency filings. Dealing with such a backlog of delayed bankruptcies would prove a challenge for judicial systems even in normal times. Although corporate solvency is likely to be more resilient than historical comparisons suggest, given the relatively swift recovery and the sizeable policy support, the number of insolvencies-in-waiting could still be higher than the current expected default frequency suggests (see [Chart 1.12](#), left panel). Once support measures end, bankruptcy courts could therefore see an abrupt increase in insolvency filings, which could lead to the legal system becoming congested and insolvent firms taking longer to be resolved. That in turn could result in an inefficient and delayed reallocation of resources to more viable businesses, with adverse macroeconomic consequences in the medium term. Public authorities should therefore ensure that insolvency frameworks are sufficiently resourced to deal with a higher number of corporate insolvencies (see [Chart 1.12](#), right panel).

Chart 1.12

Backlog of insolvencies could lead to challenges in countries with inefficient insolvency frameworks



Sources: Moody's Analytics and Eurostat; right panel: EBA and Allianz Euler Hermes (see notes to Chart 4 in the Overview for details). Notes: Left panel: the yellow dotted circle shows the counterfactual expected default frequency (EDF) based on the historical relation between GDP growth and EDFs for the second quarter of 2020. Right panel: expected insolvencies are relative to 2019 levels, based on projections provided by Euler Hermes in December 2020. The net present value (NPV) loss associated with insolvencies encompasses the direct administrative costs and the time until the insolvency is resolved. It does not contain the additional NPV loss if the underlying loan is sold to an investor.

Given the uncertain outlook for the viability of business models, targeting policy support towards viable firms remains challenging. Ideally, the

broad-based liquidity support measures that shaped the early phase of the pandemic would be superseded by more targeted measures that help viable firms remain solvent. However, assessing corporate viability remains challenging in the light of the uncertain economic outlook and the post-pandemic prospects of different business models. While broad-based measures may lead to some misallocation of resources to non-viable firms (see [Special Feature A](#)), the alternative of withdrawing support to viable firms too early may have even more adverse consequences.

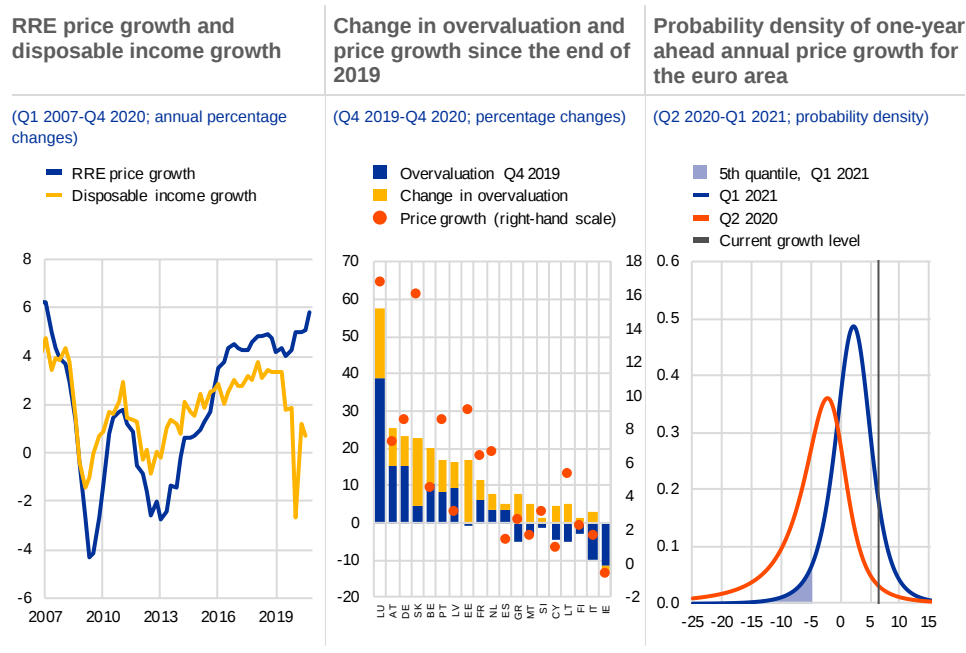
1.5 Euro area property market cycles diverge further

Euro area residential real estate (RRE) prices continued rising throughout the fourth quarter of 2020. At the euro area level, nominal house prices increased by 5.8% in the last quarter of 2020 (see [Chart 1.13](#), left panel). While on aggregate prices continued to trend upwards in the euro area, growth rates varied widely across countries (see [Chart 1.13](#), middle panel). The overall resilience observed in housing markets reflects several factors. First, household income has largely recovered as a result of the continued policy support and a rebound in economic activity. Second, the low interest rate environment and elevated macro uncertainty continue to put a floor under demand, as housing is perceived as a safe investment. Third, subdued

construction activity in the second half of 2020 weighed on housing supply, adding upward pressure on prices, especially in markets with already tight housing supply.

Chart 1.13

House price growth remains buoyant, but risks of a price correction remain elevated, especially for markets with high overvaluation



Sources: ECB and ECB calculations.

Notes: Middle panel: the valuation estimate is the simple average of the price-to-income ratio and an estimated Bayesian vector autoregression (BVAR) model. For details of the methodology, see Box 3 in *Financial Stability Review*, ECB, June 2011, and Box 3 in *Financial Stability Review*, ECB, November 2015. Overall, estimates from the valuation models are subject to considerable uncertainty and should be interpreted with caution. Alternative valuation measures can point to lower/higher estimates of overvaluation. Right panel: results from a house price-at-risk model based on a panel quantile regression on a sample of 19 euro area countries over the period from the first quarter of 1999 to the first quarter of 2021. Explanatory variables: lag of real house price growth, overvaluation (average of deviation of house price-to-income ratio from long-term average and econometric model), systemic risk indicator, consumer confidence indicator, financial market conditions indicator capturing stock price growth and volatility, government bond spread, slope of yield curve, euro area non-financial corporate bond spread, and an interaction of overvaluation and a financial conditions index.

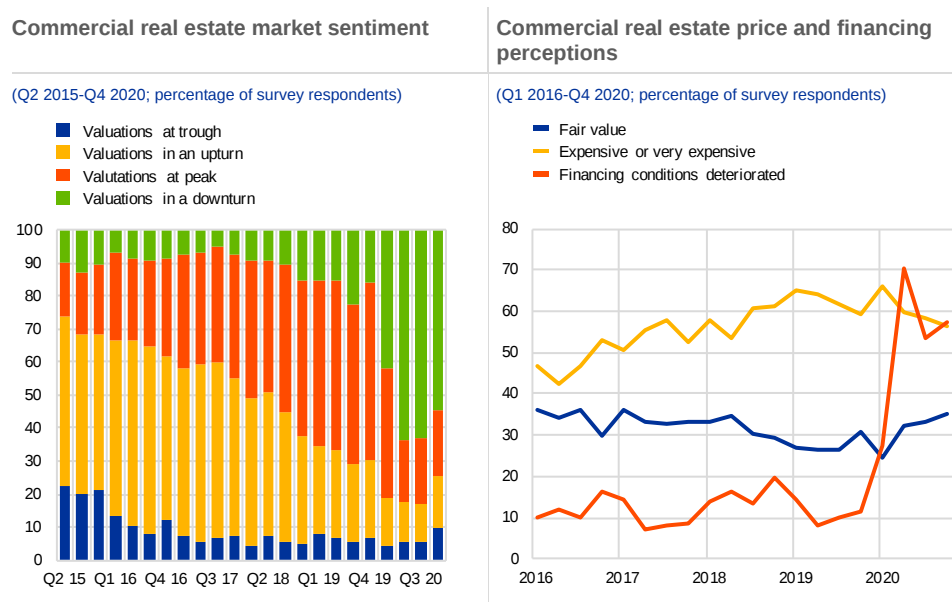
A combination of buoyant house price growth and the uncertain macro backdrop kept measures of overvaluation elevated. Moreover, house price growth during the pandemic has generally been higher for those countries that were already experiencing pronounced estimated overvaluation prior to the pandemic (see [Chart 1.13](#), middle panel). While providing a consistent set of benchmarks across countries, measures for overvaluation are surrounded by significant uncertainty and may be sensitive to country-level specificities, such as tax treatment or structural property market characteristics. In addition to elevated valuation measures, risks related to household indebtedness remain high for some countries, as credit for house purchase has continued to increase (see [Section 1.3](#)). This adds to the already elevated vulnerabilities that had accumulated in some euro area countries before the pandemic started.

Estimates of downside risk to house prices signal an expected slowdown of price growth in the coming year (see [Chart 1.13](#), right panel). Despite high measures of overvaluation in some euro area countries, house price growth is expected to moderate, but prices are not expected to decline in the coming year. This

expectation mainly reflects the improved economic outlook and overall more robust household balance sheets. Moreover, results from the bank lending survey also indicate credit standards for loans to households for house purchase eased slightly in net terms in the first quarter of 2021, possibly further supporting demand. However, future RRE price developments remain highly dependent on the recovery path and the ability of policymakers to prevent cliff edges by not abruptly ending support measures, especially given much of the resilience observed in household balance sheets is a direct result of policy support measures (see [Section 1.3](#)).

Chart 1.14

Prime commercial real estate prices declined as the market entered a downturn and financing conditions deteriorated



Sources: ECB, ECB calculations and RICS Global Commercial Property Monitor.

Note: The RICS Global Commercial Property Monitor is a quarterly guide to the trends in the commercial property investment and occupier markets. Respondents are asked to compare conditions over the latest three months with the previous three months and to give their views as to the outlook.

In contrast to the residential market, the pandemic sparked a price correction in the commercial real estate (CRE) market. Prices for prime CRE declined in the fourth quarter of 2020, albeit with large difference between those sectors hit hardest by the pandemic (retail) and those less affected (office) (see [Overview](#) chapter). Moreover, market intelligence suggests that prices in prime locations might also have been impacted less, as high-quality assets are typically easier to adapt to changing demand. Survey data indicate that the CRE market entered a downturn in the second quarter of 2020. Moreover, rising overvaluation in recent years has left room for a substantial price correction, as a majority of investors indicate that valuations have not bottomed out yet (see [Chart 1.14](#), left panel). Also, activity remained at levels around half of the long-run average, potentially masking a further decline in property prices.

A sharper CRE market correction could have implications for bank balance sheets and introduce negative economic feedback loops. A further decline in CRE prices could feed through to the financial system via increased credit risk, decreased collateral values and losses on direct holdings. Bank lending to the CRE

segment accounts for 7% of exposure to the non-financial private sector in the euro area, although levels vary substantially across countries. A significant drop in CRE prices could result in lower investment and economic activity by non-financial corporates, as CRE is often used as collateral to obtain finance. Survey data show that over half of survey participants have seen financing conditions deteriorate each quarter since the outbreak of the pandemic (see [Chart 1.14](#), right panel). In addition, a further price correction may also spark procyclical behaviour within the financial system when risk exposure is reduced, loan loss provisions fall, and lending standards tighten. Moreover, a combination of low market liquidity and high redemption pressure on CRE investment funds could amplify the price decline and lead to fire sales, further increasing negative feedback loops.

Risks to financial stability stemming from real estate markets remain elevated.

A sharper than expected decline in CRE valuations might set off negative economic feedback loops, while the RRE market might prove vulnerable to a withdrawal of policy support measures. Against this background, the financial sector may be exposed to the risk of corrections in the real estate market, especially in those countries where debt levels are elevated and policy support measures contribute significantly to household income.

2 Financial markets



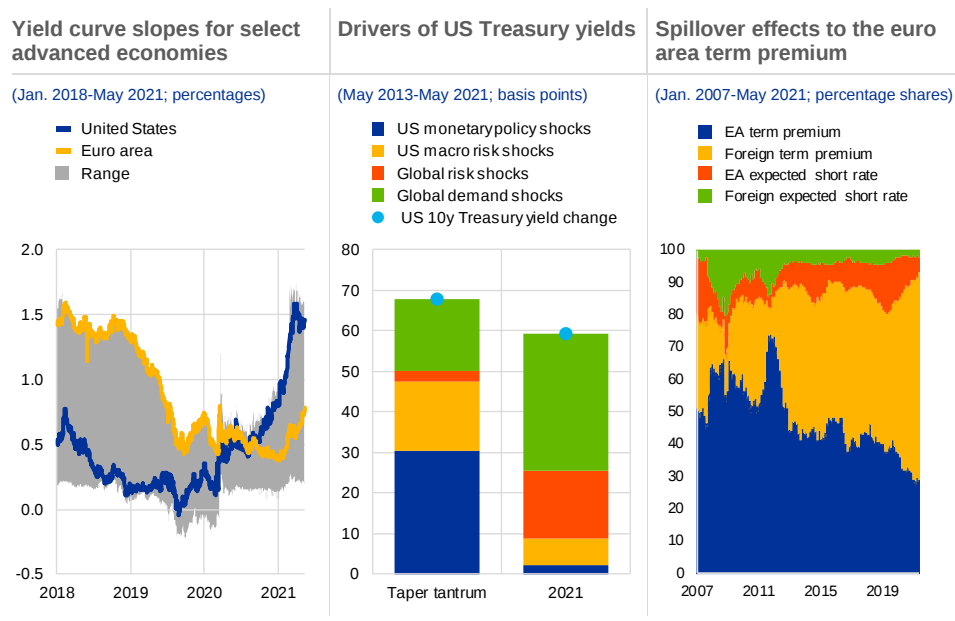
2.1 Partial spillover of risks from rising US rates

A rise in US government bond yields led global sovereign bond yields higher, with euro area yield curves also steepening mildly. Rising US yields in recent months reflected the combination of a substantial fiscal stimulus package and optimism around vaccine roll-outs. The bond market sell-off also spilled over to some degree to other advanced economies, resulting in a mild steepening of the euro area GDP-weighted yield curve (see [Chart 2.1](#), left panel). 2021 has seen the largest upward move in the ten-year US Treasury yield since the “taper tantrum” in 2013. However, the drivers of the yield change in 2021 appear more benign than in 2013, as

a much smaller share relates to uncertainty on the outlook for US monetary policy (see [Chart 2.1](#), middle panel). Foreign spillovers also explain a structurally increasing share of the euro area term premium (see [Chart 2.1](#) right panel). Excessive increases in yields not motivated by domestic fundamentals threaten to unduly tighten financial conditions, if a rise in US yields has a large spillover effect on the euro area.

Chart 2.1

Steeper yield curves in advanced economies with structurally increasing spillovers



Sources: ECB, Refinitiv, Haver Analytics and ECB calculations.

Notes: Left panel: "Range" refers to advanced economies including Australia, Denmark, Canada, Japan, Norway, Sweden, the euro area, the United Kingdom, the United States and Switzerland. Euro area aggregate is based on GDP shares. Middle panel: the decomposition is derived from a structural Bayesian vector autoregression (BVAR) model with sign and magnitude restrictions, Dieppe, A., Legrand, R. and van Roye, B., "The BEAR toolbox", *Working Paper Series*, No 1934, ECB, July 2016, and refers to May-June 2013. Right panel: the estimation builds on the methodology proposed by Nyholm K., "US-euro area term structure spillovers, implications for central banks", *Working Paper Series*, No 1980, ECB, November 2016, and Diebold, F.X. and Yilmaz, K., "Measuring Financial Asset Return and Volatility Spillovers, with Application to Global Equity Markets", *The Economic Journal*, Vol. 119, Issue 534, January 2009, pp. 158-171, and Diebold, F.X. and Yilmaz, K., "Trans-Atlantic Equity Volatility Connectedness: U.S. and European Financial Institutions, 2004-2014", *Journal of Financial Econometrics*, Vol. 14, Issue 1, Winter 2016, pp. 81-127. A 250-day rolling window VAR(2) including term premia and expected short-term rates for G10 + Australia markets is estimated, where term premia and expected short-term rates are the averages of dynamic Nelson-Siegel, dynamic Svensson-Soderlind and rotated dynamic Nelson-Siegel model estimates. Generalised impulse response functions (Pesaran, H.H. and Shin, Y., "Generalized impulse response analysis in linear multivariate models", *Economics Letters*, Vol. 58, Issue 1, January 1998, pp. 17-29) allowing for correlated shocks are used to estimate the variance decomposition of the forecast error with a ten-day horizon, which in turn is used to compute spillover indices.

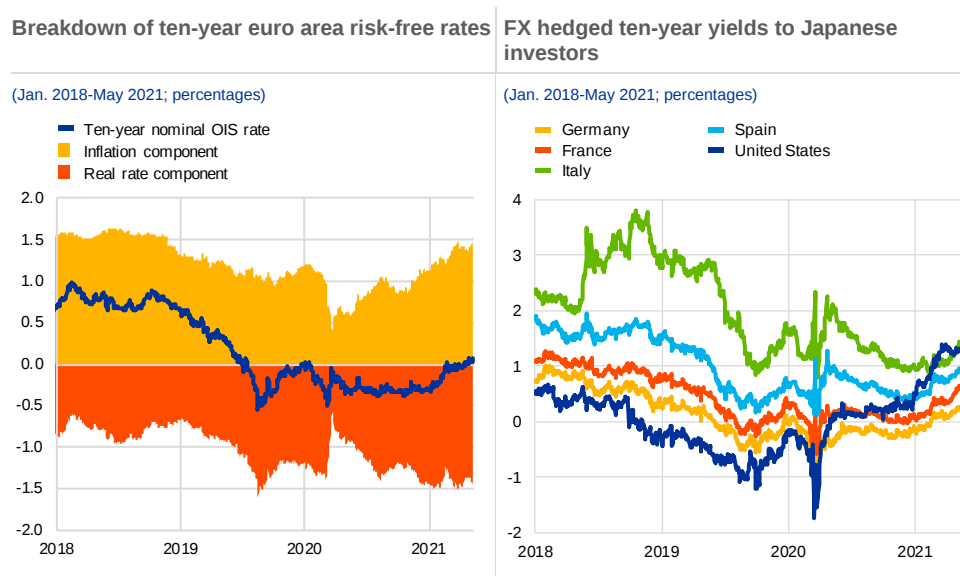
Euro area risk-free rates have risen only mildly, partly reflecting continued emphasis on accommodative monetary policy. Ten-year euro area risk-free rates moved back to pre-pandemic levels as the inflation component of risk-free rates increased to its highest level since the end of 2018 (see [Chart 2.2](#), left panel). This reflects an improved economic outlook and a reassessment by investors of the balance of risks around the inflation outlook. In December 2020, alongside other monetary policy measures the Governing Council decided to recalibrate TLTRO III conditions and also to expand the pandemic emergency purchase programme envelope, where bond purchases were to be significantly stepped up in the second quarter of 2021.¹⁵ The monetary policy measures help preserve favourable financing conditions, which are vital as countries take steps to re-open their economies.

¹⁵ See ECB [press release dated 11 March 2021](#) and [press release dated 10 December 2020](#).

The strong rise in US yields compared with euro area yields may affect global capital flows in the medium term. In recent years, FX hedged yields on ten-year US Treasuries have been relatively unattractive. However, the rise in US Treasury yields, which in February was reinforced by the largest foreign outflows since April 2020, has made this asset class more appealing. For Japanese investors, US Treasuries currently offer a higher FX hedged yield and a better credit rating than some of the largest euro area sovereign bond markets (see [Chart 2.2](#), right panel).¹⁶ This change could generate wider shifts in investor and capital flows and may lessen overseas demand for euro area sovereign bonds.

Chart 2.2

Mildly higher euro area risk-free rates and shift in attractiveness of FX hedged yields



Sources: Refinitiv, Bloomberg Finance L.P. and ECB calculation.

Notes: Left panel: the real rate is calculated by subtracting the inflation-linked swap (ILS) rate from the nominal overnight index swap (OIS) rate. Right panel: ten-year sovereign bond yield less the three-month JPY FX hedge cost.

A sustained rise in interest rates would expose investors to valuation losses on their bond holdings. The aggregate amount of duration risk in the bond market has risen steadily in recent years on the back of increasing amounts of outstanding bonds, longer maturities and declining interest rates (see [Chart 2.3](#), left panel). Sustained rises in interest rates would have a larger negative impact on the value of investors' debt holdings, with major implications for institutional investors (see [Chapter 4](#)).

Current sovereign CDS spreads across a range of advanced and emerging market economies may indicate some complacency relative to credit ratings.

The current long-term credit rating mapping with five-year CDS spreads is somewhat flatter than in the period after the global financial crisis, suggesting more benign pricing of sovereign risk (see [Chart 2.3](#), right panel). This reflects a longer-term global trend which has seen the credit quality of many sovereigns decline, but their CDS spreads compress further at the same time. Further downgrades cannot be ruled out

¹⁶ Japanese investors form an important part of the global investor community and represented almost 18% of foreign holdings of US Treasury securities in February 2021 according to the Treasury International Capital reporting system.

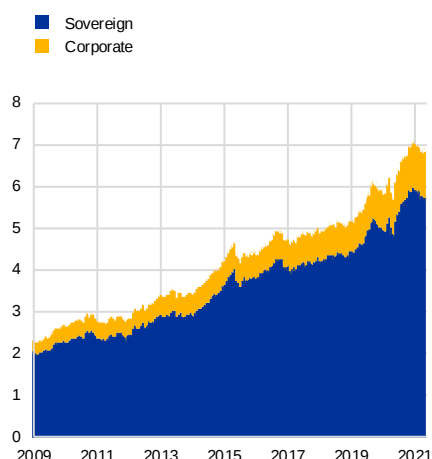
in an adverse scenario, with possible non-linear effects on credit risk pricing. At the same time, the current benign financing conditions have eased debt sustainability risks for many sovereigns in the short term, and the EU recovery package may further mitigate such risks for euro area countries (see [Chapter 1](#)).

Chart 2.3

Elevated rate sensitivity in bond markets and benign sovereign credit risk pricing

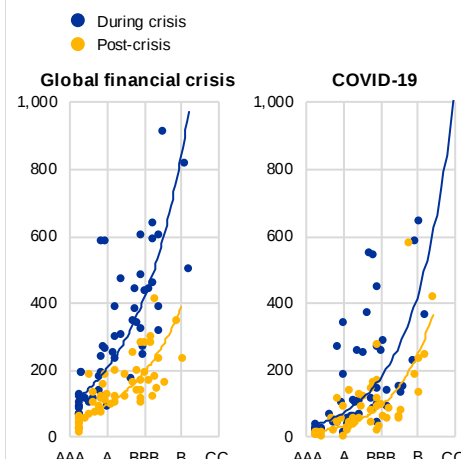
Amount of duration risk in euro area bond markets

(Jan. 2009-May 2021; € billions)



Sovereign CDS spreads and credit ratings for 52 advanced and emerging market economies

(Apr. 2009 -May 2021; y-axis: basis points, x-axis: credit ratings)



Sources: IHS Markit, Bloomberg Finance L.P. and ECB calculations.

Notes: Left panel: estimated absolute aggregate value change in bond prices to 1 basis point change in yields (DV01) on iBoxx EUR series. Right panel: five-year CDS spreads of 52 advanced and emerging market economies implied by the Bloomberg Sovereign Default Risk Model 'Likelihood of Default'. During crisis: 1 April 2009 for the global financial crisis and 1 April 2020 for COVID-19. Post-crisis: 1 October 2010 for global financial crisis and 11 May 2021 for COVID-19.

2.2 Robust risk sentiment with pockets of market exuberance

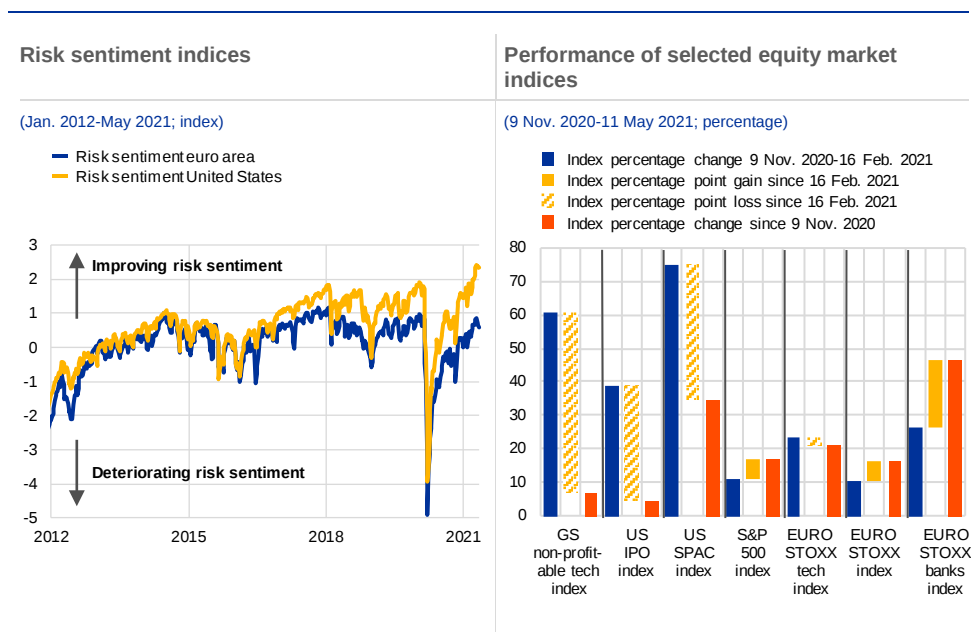
Risk sentiment remained robust as the global growth outlook improved. Risk sentiment indices continued to recover in 2021 on the back of higher expected growth rates and optimism surrounding vaccine roll-outs (see [Chapter 1](#)), especially in the United States. While both the United States and the euro area are benefiting from continued accommodative monetary policy, risk sentiment in the United States has moved further ahead, boosted by the sizeable fiscal stimulus programmes (see [Chart 2.4](#), left panel). Recent corporate earnings data appear to partly validate this optimism. However, some degree of uncertainty lingers, for example around the corporate earnings outlook and the pace of re-opening of some economies. This may leave room for disappointment.

The rise in interest rates weighed on some more exuberant equity market segments, while broad-based equity indices continued to advance. Indices tracking newly listed entities (IPOs), special purpose acquisition companies (SPAC) and non-profitable technology firms saw large price gains during the market recovery. A shared trait of these companies is that their profit expectations are more uncertain, and/or concentrated more in the future, than for the average firm. Their share prices

have benefited from historically low interest rates, as this increases the net present value of their cash flows and pushes investors to riskier segments in their search for yield. However, as the rise in US Treasury yields accelerated in February, these equity indices declined. By contrast, equity indices covering more established companies – including the S&P 500 and EURO STOXX – continued advancing overall, less impacted by the rise in risk-free discount rates with bank stocks outperforming technology stocks (see [Chart 2.4](#), right panel). This distinction highlights the disparate impact from rising rates across the stock market universe.

Chart 2.4

General risk sentiment continues to advance, with the rise in interest rates weighing on the more exuberant equity market segments



Sources: Goldman Sachs Global Investment Research, Bloomberg Finance L.P. and ECB calculations.

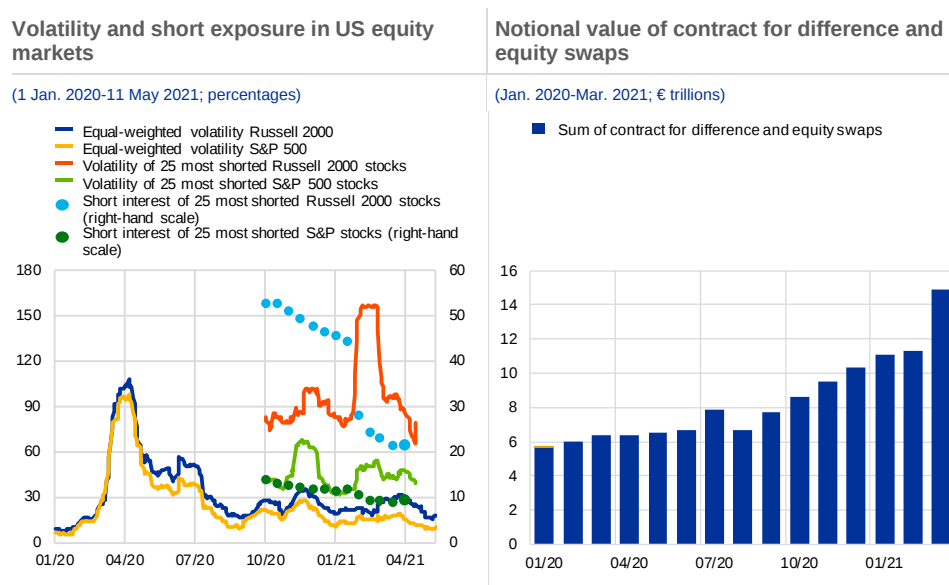
Notes: Left panel: the negative first principal component score is used to condense the information from several market risk measures via principal component analysis, estimated on weekly data from 2003. Euro area includes: the EURO STOXX 50 volatility index, the euro area corporate BBB spread against ten-year euro area government bonds, and the equity-to-bond market return ratio capturing overall risk perception, hedging demand, investor sentiment and valuation concerns. United States includes: the CBOE VIX index, the US corporate BBB spread and the ratio of the S&P 500 return to the US bond market return, where each component is z-standardised. Right panel: 9 November 2020 is the date when an effective vaccine was first announced. "GS non-profitable technology index" refers to a basket of non-profitable US listed companies in innovative industries, provided by Goldman Sachs Global Investment Research. "US IPO index" refers to the Renaissance IPO index, a benchmark of US-listed newly public companies. "US SPAC index" is a special purpose acquisition company index, a benchmark for entities created specifically to pool funds in order to finance a merger or acquisition opportunity within a set timeframe.

Some pockets of speculative activity emerged amid the robust risk sentiment, prompting extraordinary price volatility in specific sections of US equity markets. At the end of January 2021, groups of retail investors bought several US small cap stocks where leveraged investors had large short exposures. Their actions, coordinated on social media, pushed those stock prices to high levels, thereby imposing substantial losses on short sellers such as hedge funds that were forced to buy the underlying shares to close their positions. Equity call options, the volumes of which have increased noticeably in the United States since 2019, possibly further contributed to the price surges, as sellers typically hedge by buying the underlying stocks as well. While the price volatility was extraordinary in individual stocks, likely amplified in some cases by the unwinding of option hedges and resulting in restrained trading activities on some retail brokerage platforms, it had limited spillover effects to

broader market volatility (see [Chart 2.5](#), left panel). Separately, Archegos Capital Management (ACM) had built up large positions in several US and Chinese stocks through equity derivatives with built-in leverage. In March ACM defaulted on margin calls following a failed stock offering and associated equity price fall. Several of ACM's prime brokers were forced to liquidate stocks, with a few non-US banks suffering large losses. These episodes serve as a reminder that intense speculation, especially if leveraged, can cause financial institutions to suffer concentrated losses.

Chart 2.5

Pockets of market exuberance had limited spillover to broader equity markets but raises questions about the degree of leverage in equity markets



Sources: Bloomberg Finance L.P., European Market Infrastructure Regulation (EMIR) data and ECB calculations.
Notes: Left panel: volatility metrics are calculated on equal-weighted basis for both indices and on the 25 most shorted stocks in the S&P 500 and the Russell 2000. Data on volatility of 25 most shorted stocks ranging between 1 October 2020 and 15 April 2021. "Short interest" refers to the 25 most shorted stocks in S&P 500 and Russell 2000 and is shown as the average of the short interest of a given stock divided by its freely floating shares, with data ranging between 1 October 2020 and March 2021. Right panel: sum of notional value of contract for difference and equity swaps at the beginning of each month, as reported by euro area counterparties.

The significant price volatility raises questions about the transparency and degree of leverage in financial markets. The overall leverage used by some non-bank market participants sometimes falls outside the regulatory perimeter. While data limitations make it impossible to gain a full picture of stock market leverage, available data suggest it has been increasing. In the United States, the debit balances in customers' securities margin accounts reported to the Financial Industry Regulatory Authority (FINRA) increased by 72% over the last year to a record USD 823 billion in March 2021. However, margin debt as a proportion of stock market capitalisation remains well below previous peaks. EMIR data reported by euro area counterparties show an increase in the notional value of equity swaps and contracts for differences to nearly €15 trillion (see [Chart 2.5](#), right panel). Survey-based evidence also suggests that hedge funds are increasingly using previously unutilised leverage capacity in euro-denominated securities financing and over-the-counter derivatives markets.¹⁷

¹⁷ See ECB press release dated 14 April 2021 for the March 2021 "Survey on credit terms and conditions in euro-denominated securities financing and OTC derivatives markets".

Signs of exuberance have also been observed in the renewed interest in crypto-assets, although financial stability risks appear limited. The surge in bitcoin prices has eclipsed previous financial bubbles like the “tulip mania” and the South Sea Bubble in the 1600s and 1700s.¹⁸ While this has largely been driven by retail investors, some institutional investors and non-financial corporations are also demonstrating a growing interest. Its price volatility makes bitcoin risky and speculative,¹⁹ while its exorbitant carbon footprint and potential use for illicit purposes are grounds for concern. Crypto-assets are still not used widely for payments, and euro area institutions have little exposure to crypto-linked financial instruments, so financial stability risks appear limited at present.

2.3 Sharp increases in interest rates may reveal vulnerabilities in risk assets

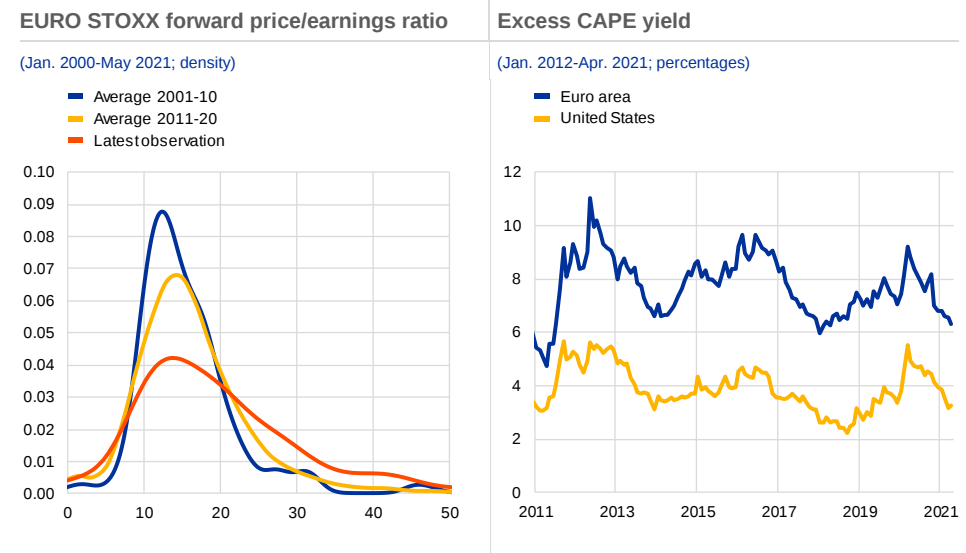
A sharp rise in interest rates could prompt an adjustment in risk asset valuations, with possible adverse implications for financial stability. Standard price/earnings (P/E) ratios are more stretched in the United States than the euro area. This partly reflects sectoral compositions, as US equity indices have a larger share of technology companies with higher P/E ratios, for example. There is also a marked skewness in the distribution of forward P/E ratios across firms in both the United States and the euro area, with a larger share of firms exhibiting stretched valuations than in the past (see [Chart 2.6](#), left panel). When the opportunity cost of holding risk-free assets is taken into account, valuations look less stretched. They remain near long-term averages, as investors do not yet appear to have reduced their risk-compensation preferences substantially (see [Chart 2.6](#), right panel). Real risk-free rates have declined to historically low levels over the last two decades and current valuations may rely in part on expectations that risk-free rates will remain very low for a protracted period. That said, the rise in yields this year has produced some headwinds for equities. Risk asset valuations may become vulnerable in a scenario where risk-free rates increase sharply and sustainably as a result of investors reassessing the likelihood and pace of monetary policy tightening without an accompanying improvement in real growth (see [Box 3](#)).

¹⁸ See the box entitled “Financial stability implications of crypto-assets” *Financial Stability Review*, ECB, May 2018.

¹⁹ The European Securities and Markets Authority (ESMA) recently renewed its [warning to investors](#) about the risks of investing in crypto-assets.

Chart 2.6

Euro area stocks exhibit a wider range of valuations, but a sharp rise in interest rates could make them vulnerable



Sources: Refinitiv, Consensus Economics Inc. and ECB calculations.

Notes: Left panel: density plot of EURO STOXX 12-month forward price/earnings ratio. The latest observation is for 7 May 2021. Right panel: monthly data on the cyclically adjusted price/earnings ratio (CAPE). Excess CAPE yield is calculated as inverse of the CAPE, from which the real ten-year risk-free rate is subtracted. The ten-year real risk-free rate is calculated as the nominal rate (ten-year nominal rate for the United States is the ten-year Treasury note (UST) and the euro area rate is the OIS, back-casted with the ten-year Bund yield prior to 2005) minus longer-term Consensus inflation expectations (ten-year spot approximation).

Box 3

Risk of spillovers from US equity market corrections to euro area markets and financial conditions

Prepared by Magdalena Grothe, Tobias Helmersson, Dominic Quint and Danilo Vassallo

US equity market prices have surged over the last year, prompting concerns about stretched valuations and the potential risk of market corrections. Cyclically adjusted price/earnings (P/E) ratios for the United States have reached historically high levels over the last year (see **Chart A**, left panel). In the past, periods of elevated valuations relative to earnings have tended to be followed by substantial market downturns. In view of these developments, this box examines the implications of a possible correction in US stock prices for euro area financial conditions and financial stability.

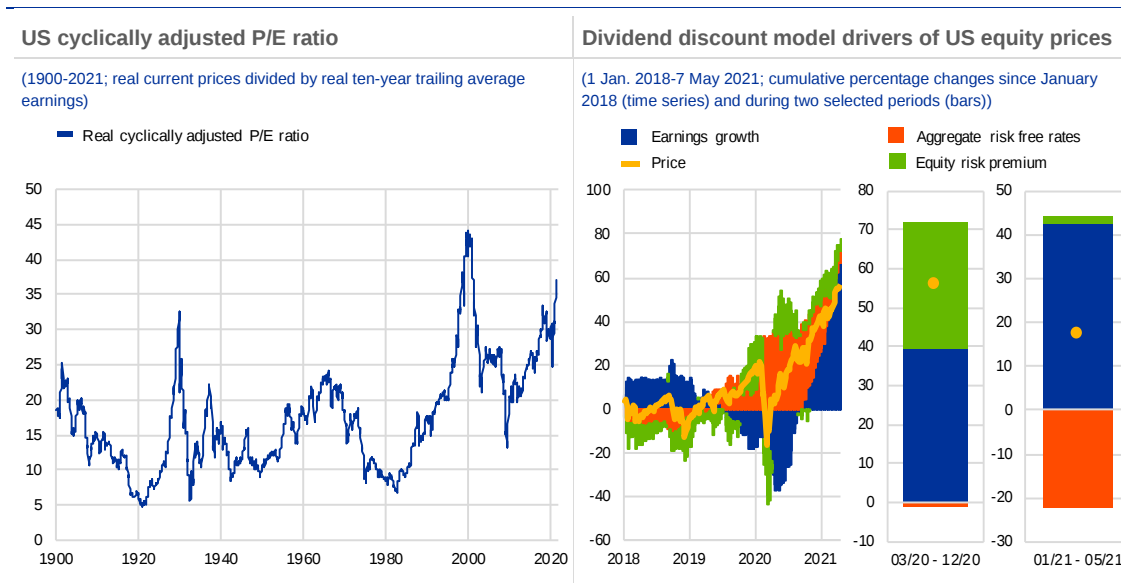
The recovery in stock prices since March 2020 has been supported by rising earnings expectations, accommodative interest rates and a significant increase in risk appetite. The rise in US equity prices to over 20% above the pre-pandemic level has been driven by an increase in earnings expectations as well as buoyant risk appetite (see **Chart A**, right panel). While the rise in earnings expectations did mirror strong realised earnings recorded for the fourth quarter of 2020, relatively elevated uncertainty around the earnings outlook points to risks surrounding further equity market developments.

US equity prices could decline substantially, should US Treasury yields increase further on expectations of tighter monetary policy without significantly stronger real growth. The increase in US nominal Treasury yields at the beginning of 2021 dampened some of the momentum in equity markets. But this did not lead to an equity price correction, as the higher yields reflected an improved macroeconomic outlook, which also supported earnings expectations and risk-taking (see **Chart A**, right panel). In a scenario where investors reassess the likelihood and pace of monetary

policy tightening, investor risk appetite is likely to decline, leading to a fall in equity prices. Such a scenario could arise, for example, in response to a series of upward surprises in inflation figures that leads investors to expect an earlier withdrawal of US monetary policy accommodation. The shift in yields could induce a risk asset correction, with potential spillover effects on markets outside the United States.

Chart A

US equity prices, although supported by rising earnings expectations and accommodative interest rates, appear relatively high, with evidence of strong investor risk appetite



Sources: Robert Shiller [database](#), Bloomberg Finance L.P., Refinitiv and ECB calculations.

Notes: Left panel: real cyclically adjusted P/E ratio for the S&P 500 (real prices over real ten-year trailing average earnings). Right panel: decomposition of cumulative percentage changes in the S&P 500 price index, based on a dividend discount model (see Geis, A., Kapp, D. and Kristiansen, K., "Measuring and interpreting the cost of equity in the euro area", *Economic Bulletin*, Issue 4, ECB, 2018). The model includes share buybacks, discounts future cash flows with interest rates of the corresponding maturity and includes five expected dividend growth horizons. Contributions from payouts/dividends are not shown in the chart. The selected periods in the right panel show the change between the trough reached in the week ending 20 March 2020 and the end of 2020, as well as the change since the beginning of 2021.

The spillovers to euro area equity markets from a potential US equity market correction could be substantial. For example, past empirical relationships imply that a 10% correction in US equity prices that is associated with a US monetary policy tightening shock might lead to a fall of around 9% in euro area equity prices (see **Chart B**). One channel could emerge from interest rate spillovers, with greater uncertainty about the future path of US short-term interest rates leading to an increase in euro area bond term premia, which would, in turn, put downward pressure on euro area equities.

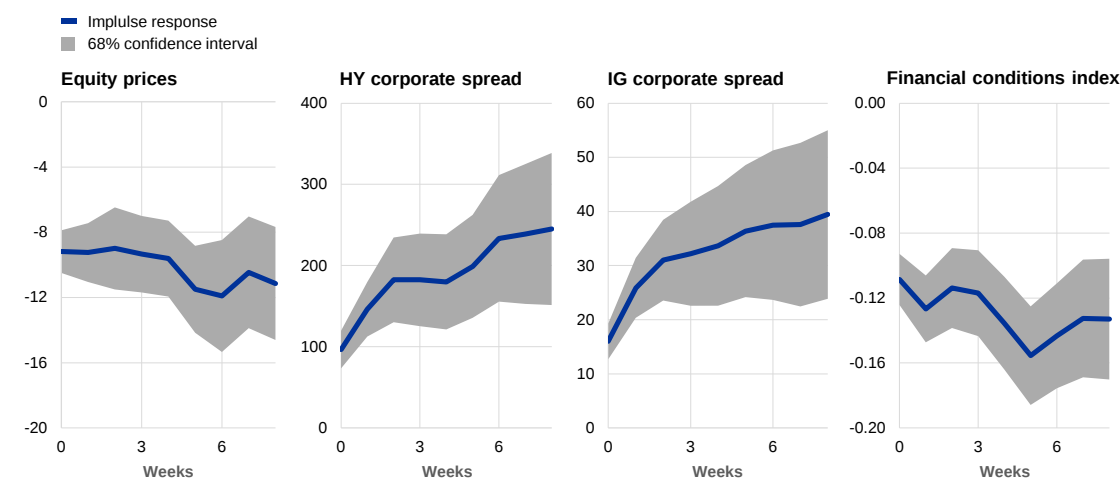
An equity market correction would also likely have a broader tightening effect on euro area financial conditions. Past US equity market corrections have also been associated with increases in euro area corporate bond spreads for both investment-grade and non-investment-grade sectors. Overall, a 10% correction in US equity markets could therefore lead to a significant tightening of euro area financial conditions, similar to around a third of the tightening witnessed after the coronavirus shock in March 2020 (see **Chart B**). These results suggest that spillovers from US equity market repricing could be substantial – with significant repercussions for euro area financial conditions and financial stability.

Chart B

Spillovers to euro area markets from a potential US monetary policy tightening shock could be substantial

Effect of a US monetary policy tightening shock calibrated to a 10% decline in US equity prices on euro area equities, corporate bond spreads and financial conditions

(percentage changes (left panel), basis points (middle panels) and change in standardised index (right panel); calibrated to a 10% decline in US equity prices)



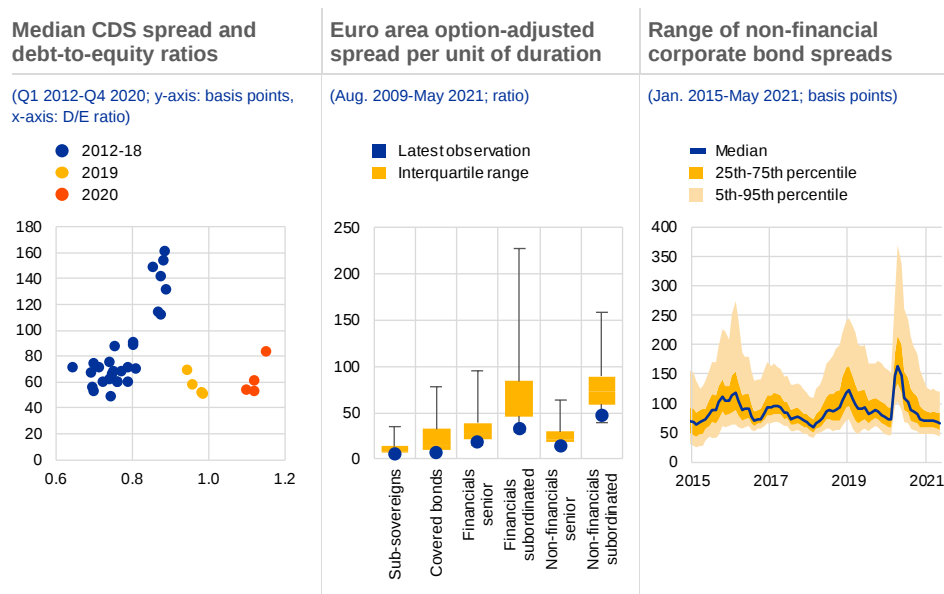
Sources: Refinitiv and ECB calculations.

Notes: The chart shows estimated impulse responses following a decline in US equity prices driven by a US monetary policy tightening shock. The estimation is based on local projections over the period 2003-21 using weekly data, controlling for a lagged VIX index, macro surprises and two-year yields. The shock series are derived from a structural BVAR for the United States with sign and magnitude restrictions using the BEAR toolbox, see Dieppe, A., Legrand, R. and van Roye, B., "The BEAR toolbox", Working Paper Series, No 1934, ECB, July 2016. The financial conditions index is computed as a weighted average of five financial variables. For further details, see Arrigoni, S., Bobasu, A. and Venditti, F., "The simpler the better: measuring financial conditions for monetary policy and financial stability", Working Paper Series, No 2451, ECB, August 2020. HY: high-yield; IG: investment grade.

Easy credit market pricing may also be vulnerable to price corrections. Median euro area corporate CDS spreads are near multi-year lows, while corporate leverage has increased to cyclical highs (see [Chart 2.7](#), left panel). Large listed corporates took on more debt and built cash buffers, which may be a sign of financial strength to weather the pandemic. If corporate leverage remains elevated, however, market pricing may become vulnerable in the event of a renewed economic downturn. Moreover, bond spreads across euro-denominated bond instruments per unit of duration remain at the low end of the historical range after the global financial crisis, providing investors with low compensation for the degree of risk they assume (see [Chart 2.7](#), middle panel) (see also [Chapter 4](#)). Furthermore, the range of corporate bond spreads around the median has also narrowed to near the tightest levels seen since 2009, indicating a continuation of the search for yield that has characterised financial markets in recent years (see [Chart 2.7](#), right panel). European leveraged loan markets show a similar picture, with tight secondary market spreads close to pre-pandemic lows and low spreads per turn of leverage (see [Chart A.4](#), left panel in Special Feature A). The average leverage ratio of newly originated loans remains near its highest level since the global financial crisis, with the share of loans with high leverage (>6x) increasing further. Default rates peaked in the third quarter of 2020 but remained benign and well below levels seen in previous crises. However, they may rise as fiscal support is withdrawn.

Chart 2.7

Tight corporate bond spreads in relation to risk metrics

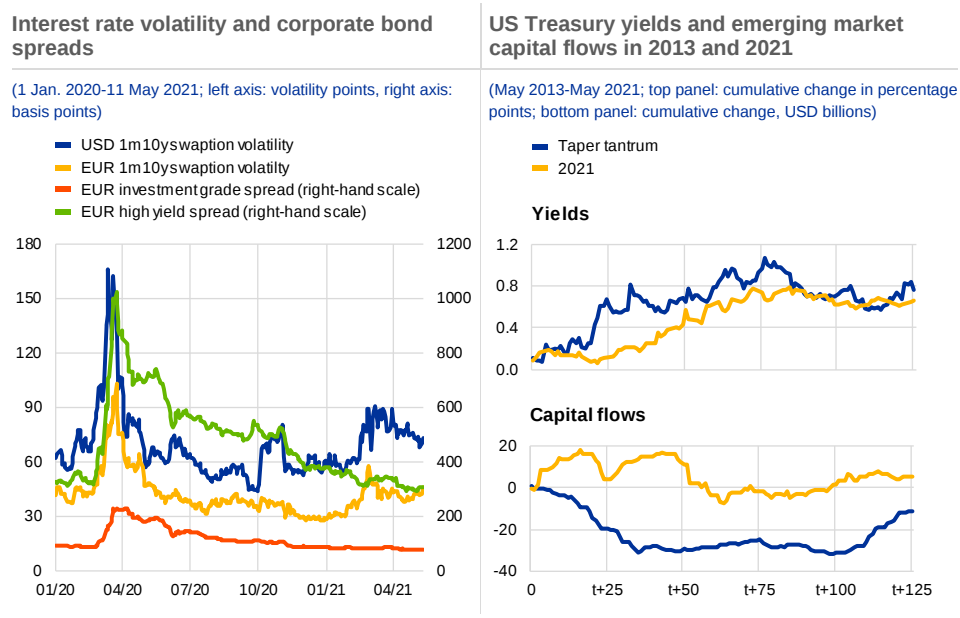


Sources: S&P Global Market Intelligence, Credit Market Analysis (CMA), IHS Markit and ECB calculations.
Notes: Left panel: median five-year credit default swap spread each quarter and the corresponding median debt to equity ratio for a dynamic matched sample comprising at least 90 non-financial corporates in the euro area. Middle panel: the ratio of the option-adjusted spread divided by the annual modified duration in iBoxx EUR series on weekly averages with a historical range back to August 2009. "Sub-sovereigns" refers to bonds issued by entities with explicit or implicit government backing due to legal provision, letters of comfort or the public service nature of their business. The latest observation is the average for the week of 3-7 May 2021. Right panel: range of 5th-95th, 25th-75th percentile and median of euro area investment grade non-financial corporate bond option-adjusted spreads.

Corporate bond spreads have been supported by an improvement in the economic outlook together with supportive monetary policy. A number of forward-looking credit risk metrics have improved since the last Financial Stability Review, on the back of the improved macroeconomic outlook. For example, the share of non-financial corporations on the brink of a downgrade to non-investment grade has fallen back from the peak in the last quarter of 2020, and expected default frequencies have declined as well. The flexibility of purchases under the ECB's pandemic emergency purchase programme (PEPP) is helping to support the smooth transmission of monetary policy. Furthermore, corporate bond spreads proved resilient to somewhat higher volatility in interest rate markets at the beginning of 2021 (see [Chart 2.8](#), left panel). In addition, the favourable terms and large take-up of TLTRO III are supporting bank lending to non-financial corporations which, together with precautionary bond market funding, has helped to reduce funding rollover risk. At the same time, sentiment may be vulnerable to a deterioration in the economic outlook, as the solvency concerns for many companies may only fully surface once fiscal support measures are phased out (see [Chapter 1](#)).

Chart 2.8

Corporate bond spreads resilient to higher volatility and emerging market flows resilient to higher US interest rates



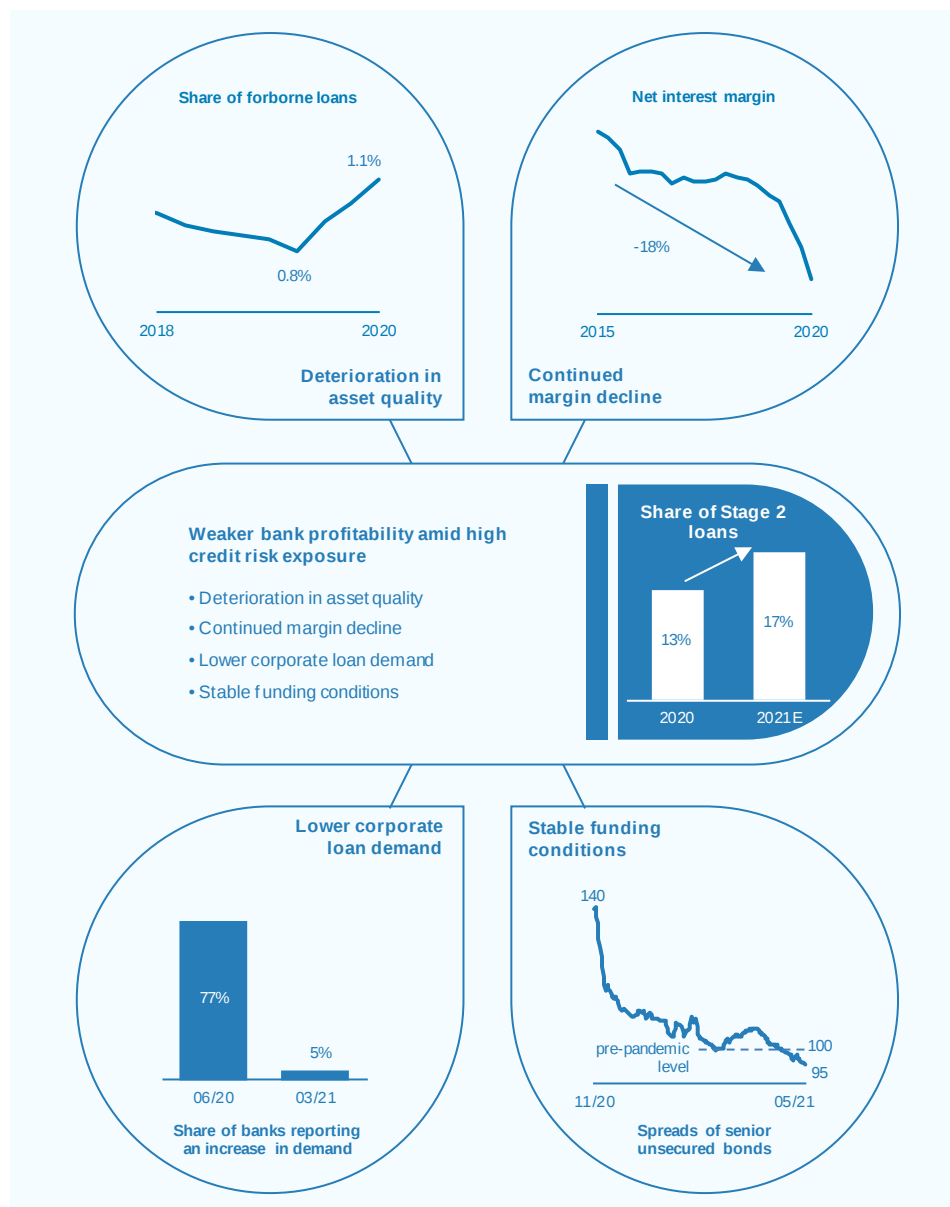
Sources: Bloomberg Finance L.P., IHS Markit, Haver Analytics, IIF and ECB calculations.

Notes: Left panel: swaption volatility refers to the at-the-money volatility of an option with one-month expiry, ten-year swaption tenor. The bond indices are market value weighted option adjusted spreads of euro denominated non-financial corporate bonds with euro area countries as issuer domicile. Right panel: cumulative increases in US Treasury yields (top) and capital flows (bottom) since the onset of the "taper tantrum" (22 May-12 November 2013) and in 2021 (5 January-10 May 2021).

Emerging market capital flows have so far been relatively resilient to the rise in yields. Many emerging market economies (EMEs) entered the coronavirus crisis with stronger fundamentals and a better cyclical position than before the global financial crisis. EME financial conditions have also improved markedly since the pandemic shock, and the recovery in capital flows since March 2020 has primarily been driven by the turnaround in global risk appetite. So far, capital flows have been relatively resilient to the rise in yields this year, particularly in contrast with the taper tantrum episode in 2013 (see [Chart 2.8](#), right panel). This appears to confirm the observation that even though the yield moves have been similar in size, the composition of drivers this time paint a more benign economic picture (see [Chart 2.1](#), middle panel). In addition, most EMEs are less dependent on external financing than in 2013, which mitigates the impact of a potential capital flow reversal.²⁰ However, push factors such as monetary policy in advanced economies, as well as contagion from market turbulence in neighbouring countries, are typical triggers of sudden stops in EME capital flows. This means that major challenges related to a tightening in financial conditions and associated capital flow volatility cannot be ruled out for countries with large external financing needs and elevated debt levels, should advanced economy monetary policies tighten faster than expected (see [Box 1](#)).

²⁰ [OECD Economic Outlook, Interim Report](#)

3 Euro area banking sector



3.1 Increasing signs of asset quality deterioration

The aggregate non-performing loan (NPL) ratio of euro area banks fell further to 2.7% in the fourth quarter of 2020, mainly reflecting the disposal of legacy NPL assets. In the midst of the pandemic, banks in countries more affected by previous crises (Cyprus, Greece, Italy and Portugal) have managed to continue reducing their NPL ratios by up to 9 percentage points. NPL ratios are the highest for loans to small and medium-sized enterprises (SMEs) (6.7%) and the lowest for mortgage lending (2.7%).

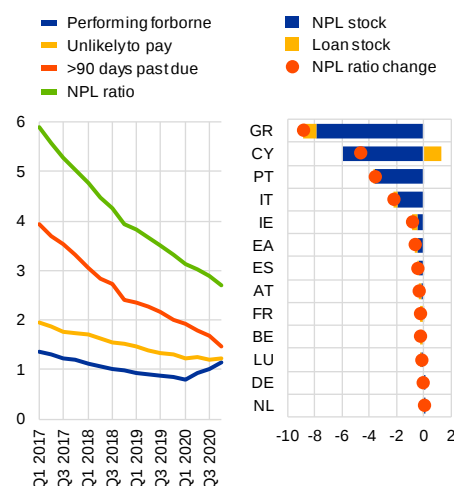
Forward-looking metrics, however, indicate a significant weakening of asset quality, although actual loan losses remain modest. The share of performing loans with forbearance measures increased and the fraction of loans classified as unlikely to pay bottomed out in the course of 2020 (see [Chart 3.1](#), left panel). While still small relative to total loans, loans regarded as showing significantly increased credit risk (so-called Stage 2 assets) increased steadily over 2020, with net inflows into Stage 2 assets being six times higher than before the pandemic by the end of the year. Flows into actual credit-impaired (i.e. Stage 3) assets increased more modestly, rising by 1.3 times (see [Chart 3.1](#), right panel). Due to the large scale of government support measures in the form of statutory moratoria and public guarantees, the time between the contraction in economic activity and NPL formation might be longer than seen in past recessions. Moreover, banks' practices with respect to the identification of the significant increase in credit risk and forbearance vary, which raises the risk of a delayed recognition of asset quality issues by some banks.²¹ Sizeable provisions were set aside in 2020 to cover higher expected loan losses, although there remain downside risks to provisioning as policy support expires. According to results from first quarter earnings releases of listed euro area banks a smaller amount of loan loss provisions was booked in the first quarter compared to the levels seen in 2020.

Chart 3.1

Increasing signs of a materialisation of credit risk from the pandemic in euro area bank balance sheets, even if NPL ratios declined further in 2020

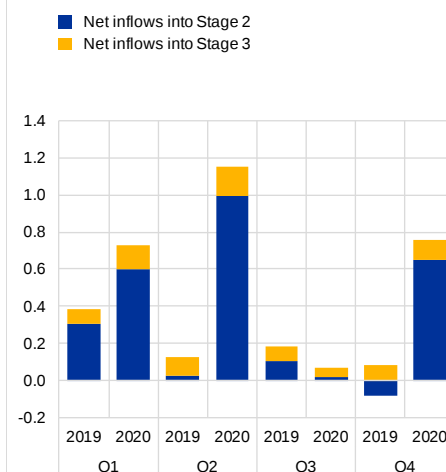
Evolution of euro area banks' loan performance and annual change in NPL ratios across countries

(left chart: Q1 2017-Q4 2020, percentage of total loans; right chart: Q4 2020, percentage points)



Net inflows into IFRS Stage 2 and 3 assets

(Q1 2019-Q4 2020, percentage of total loans)



Sources: ECB supervisory data and ECB calculations.

Notes: Based on a balanced sample of 93 significant institutions (SIs). Left panel: where the number of SIs in a country is less than three, the country is not shown for confidentiality reasons. Right panel: the net inflows refer to the difference between actual inflows and outflows as observed in the respective quarter and are expressed as a share of total loans. IFRS: International Financial Reporting Standards; NPL: non-performing loan.

²¹ For additional details, see the [communication](#) to the banking industry dated 4 December 2020 regarding the identification and measurement of credit risk during the pandemic.

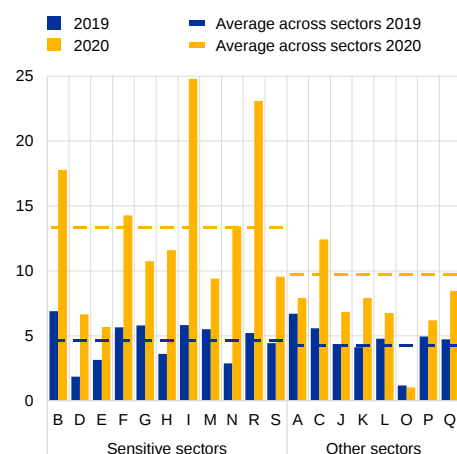
The increase in credit risk is most visible in sectors more affected by the pandemic. Loan-level credit register data (AnaCredit data) indicate that the share of loans which migrated from Stage 1 to Stage 2 increased more substantially over 2020 in pandemic-sensitive sectors. This was most pronounced in the accommodation sector where the risk migration increased fivefold from 5% to 25% (see [Chart 3.2](#), left panel). The deterioration has also been somewhat greater in sectors which already had a higher share of non-performing loans (see [Chart 3.2](#), right panel). Assuming that the transitions between IFRS stages by sector observed during 2020 also apply in 2021, the stock of Stage 2 assets would increase from 13% in the fourth quarter of 2020 to 17% at the end of 2021 for euro area banks on aggregate.

Chart 3.2

Asset quality in coronavirus-sensitive sectors deteriorated substantially during 2020 and sectors with previously higher NPL ratios saw stronger asset quality declines

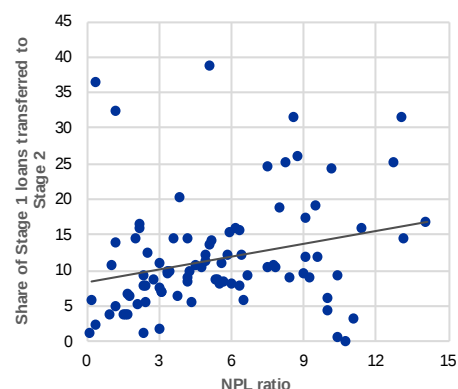
Share of Stage 1 loans transferred to Stage 2 in each year, by sector of activity

(Q4 2019, Q4 2020, percentage of Stage 1 loans)



Share of Stage 1 loans transferred to Stage 2 vs. NPL ratios, by sector of activity

(Q4 2020, percentages)



Sources: ECB AnaCredit and ECB calculations.

Notes: For both charts, the loans transferred from Stage 1 to Stage 2 are scaled by all Stage 1 loans in Q4 2019. This implies that the denominator includes only IFRS exposures. Left panel: capital letters refer to NACE codes as follows: A – Agriculture; B – Mining; C – Manufacturing; D – Electricity; E – Water supply; F – Construction; G – Trade; H – Transport; I – Accommodation; J – Communication; K – Financials; L – Real estate; M – Professional services; N – Administrative services; O – Public sector; P – Education; Q – Health services; R – Arts and entertainment; and S – Other services. Coronavirus-sensitive sectors include mining, electricity, water supply, construction, retail and wholesale trade, transport, accommodation and food services, professional and administrative services, arts and entertainment and other services. Right panel: each dot in the scatter plot represents a NACE level 2 sector at the euro area aggregate level. IFRS: International Financial Reporting Standards; NACE: Nomenclature statistique des activités économiques dans la Communauté Européenne (Statistical classification of economic activities in the European Community); NPL: non-performing loan.

The eventual expiry of public measures implies that bank asset quality is likely to deteriorate further over 2021. Fiscal, monetary and prudential measures have supported bank asset quality during the pandemic, but the effect of these measures is expected to recede over time. With the expiry of public support measures, credit risk dependencies of sovereigns, financials and corporates in the euro area are expected to decline (see [Box 4](#)). Government-guaranteed loans offered vulnerable corporates access to finance, but may expose firms to medium-term rollover risks, in particular where guarantee schemes have a short residual maturity and bank lending standards have tightened (see [Chapter 1](#)). Statutory moratoria have provided relief to firms and households affected by the containment measures, but they have likely masked some

asset quality risks. For the euro area on aggregate, three-quarters of the moratoria had expired by January 2021, but in some countries active moratoria still represent a sizeable share of total loans (see [Chart 3.3](#), left panel). Loans emerging from moratoria have performed only slightly worse than the rest of the loan book thus far. However, loans remaining under moratoria are likely to be particularly vulnerable to asset quality deterioration, as they tend to be concentrated in the pandemic-sensitive sectors of the economy and already show a higher NPL ratio than loans which have emerged from the moratoria.

Box 4

Credit risk transmission during the pandemic: the sovereign-bank-corporate nexus

Prepared by Christian Gross and Cosimo Pancaro

It has been argued that the coronavirus pandemic has strengthened what is known as the sovereign-bank-corporate nexus, also intensifying the transmission of credit risk shocks across sectors.^{22,23} An increase in interdependencies among sovereigns, banks and corporates may mean that if vulnerabilities arise in one sector, they become more likely to spill over to other sectors. This box sheds light on how the structure of cross-sectoral credit risk transmission has evolved since the start of the pandemic. It does so by using high-frequency, firm-level data on expected default frequencies (EDFs) to estimate the direction and intensity of credit risk spillovers between the sovereign, bank, non-bank financial and corporate sectors.²⁴

The credit risk interdependency of euro area financials and corporates with sovereigns has increased markedly in the wake of the pandemic, and the corporate sector has become more central to the network. Before the pandemic started, there was a strong clustering of credit risk links between banks, non-bank financials and non-financial firms (see [Chart A](#), left panel), which reflected their substantial dependencies in terms of credit risk. However, euro area sovereigns formed their own cluster, visibly separated from the rest of the network, reflecting the limited risk transmission between sovereigns and the other sectors of the economy. After the coronavirus outbreak (see [Chart A](#), right panel), the majority of nodes moved closer to each other, suggesting higher contagion risk across sectors, with the non-financial corporate sectors of major euro area economies at the centre of the network. Most notably, sovereigns increased their integration with the rest of the network, indicating that a transfer of risk to sovereigns took place.

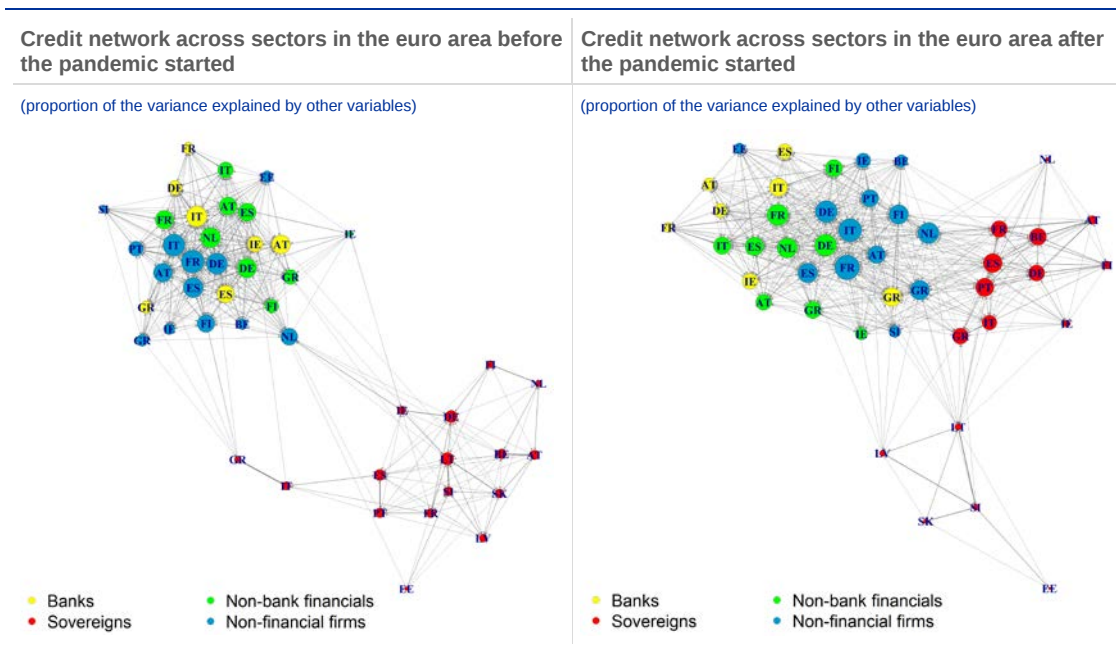
²² See the speech entitled “[The sovereign-bank-corporate nexus – virtuous or vicious?](#)” by Isabel Schnabel at the LSE conference on “Financial Cycles, Risk, Macroeconomic Causes and Consequences”, Frankfurt, 28 January 2021.

²³ The term sovereign-bank-corporate nexus refers to the tight interdependencies between these sectors which are linked by multiple interacting channels. See, for example, Dell’Ariccia, G., Ferreira, C., Jenkinson, N., Laeven, L., Martin, A., Minoiu, C. and Popov, A., “[Managing the sovereign-bank nexus](#)”, *Working Paper Series*, No 2177, ECB, September 2018.

²⁴ This analysis relies on the methodology developed by Diebold and Yilmaz (2014) and Gross and Siklos (2020) and uses Moody’s EDFs at daily frequency for up to 16 euro area countries for four sectors (sovereigns, banks, non-bank financials and non-financial firms). The methodology enables the derivation of estimates of directional connectedness based on variance decompositions in large-scale vector autoregressions (VARs) that trace the impact of individual shocks on all variables considered in the system of equations. Results are visualised by means of graphical network representations which portray the empirical estimates in an informative manner. See Diebold, F.X. and Yilmaz, K., “On the network topology of variance decompositions: Measuring the connectedness of financial firms”, *Journal of Econometrics*, Vol. 182, Issue 1, 2014, pp. 119-134, and Gross, C. and Siklos, P., “Analyzing credit risk transmission to the nonfinancial sector in Europe: A network approach”, *Journal of Applied Econometrics*, Vol. 35, Issue 1, 2020, pp. 61-81.

Chart A

The shape of the cross-sectoral credit risk network changed after the pandemic started



Sources: Moody's Analytics and ECB calculations.

Notes: The network visualisation was derived on the basis of the methodology proposed by Diebold and Yilmaz (2014) and Gross and Siklos (2020), which is based on forecast error variance decompositions in large-scale VARs. A 150-day rolling-window approach was adopted to estimate time variation. The underlying data are five-year EDFs for firms and sovereigns, which act as a proxy for probability of default. EDFs of individual firms have been aggregated to form weighted country-level indices for the three corporate sectors. The chart in the left panel shows the credit risk network across sectors in the euro area on 19 February 2020, before the coronavirus outbreak (i.e. the 150-day estimation window ends on this date). The chart in the right panel shows the credit risk network across sectors in the euro area on 11 March 2020, when the World Health Organization declared the coronavirus a global pandemic (i.e. the 150-day estimation window ends on this date). Node size in the network is proportional to credit risk contributions. Sectors that contribute relatively more credit risk to other sectors are represented by bigger nodes. Node location is determined by a force-directed algorithm which positions the nodes according to pair-wise links between two sectors. EDF sectors that are linked through high pair-wise connectedness are thus positioned close to each other, whereas EDF sectors that are linked through low pair-wise connectedness are shown further apart. As a result, EDF sectors with many strong links to other sectors are located in the network's centre (these entities are more systemically important), whereas nodes for EDF sectors with weak links to other sectors are located in the network's periphery (less systemically important). Link thickness is a linear function of pair-wise connectedness, with a thicker link between two nodes indicating strong pair-wise connectedness.

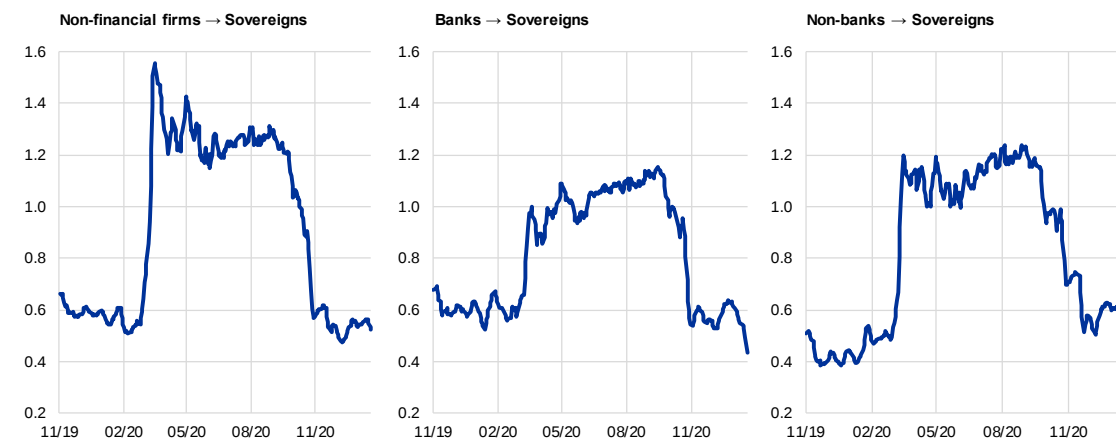
Risk transmission from the corporate sector to sovereigns increased substantially and remained elevated between March and October 2020 (see Chart B, left panel). During the first months of the pandemic, the increase in the transmission of risk from non-financial firms and non-bank financials to sovereigns was more pronounced than from banks to sovereigns. This would be consistent with fiscal and prudential measures adopted to support corporates, implying a substantial transfer of credit risk from the other sectors to sovereigns. The transmission of risk began to wane in autumn 2020, coinciding with the announcements of effective coronavirus vaccines and the finalisation of the agreement on the Next Generation EU recovery fund (see **Chart B**). By early 2021, risk transmission to sovereigns had fallen to near pre-pandemic levels.

Chart B

The transmission of risk from non-financial and non-bank financial sectors to sovereigns was more pronounced than from banks to sovereigns

Credit risk transmission from non-financial firms, banks and non-bank financials to sovereigns in the euro area during the coronavirus pandemic

(average proportion of the variance of sovereign EDFs explained by the variance of individual EDFs in each sector (five-day moving average))



Sources: Moody's Analytics and ECB calculations.

Notes: The charts show smoothed estimates (five-day moving average) of aggregate directional connectedness between various segments of the corporate sector and sovereigns during the period from 1 November 2019 to 19 January 2021. The underlying VAR model was estimated using a rolling window of 150 days, building on the methodology introduced by Diebold and Yilmaz (2014) and extended by Gross and Siklos (2020).

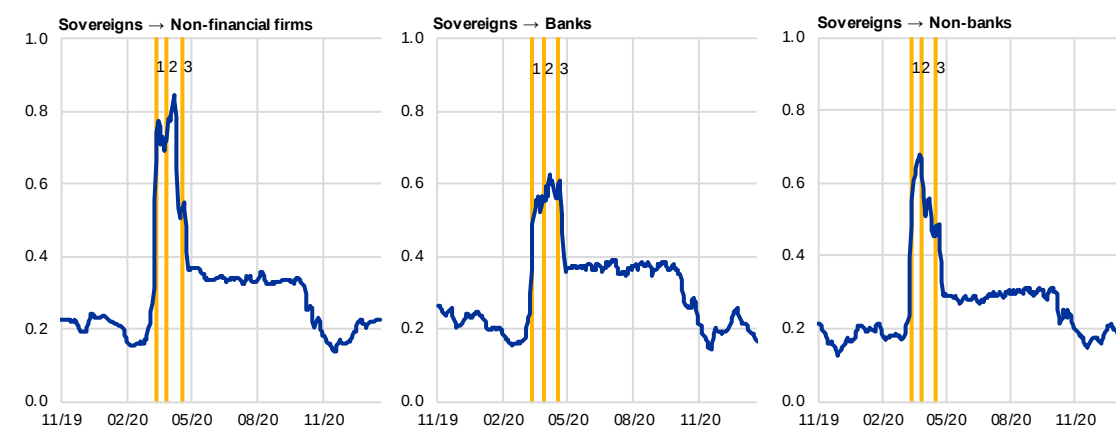
Elevated sovereign risk contributed to higher credit risk in the financial and non-financial sectors for a brief period at the start of the pandemic. Risk transmission from sovereigns to other sectors spiked immediately after the pandemic first appeared (see **Chart C**).

Chart C

The transmission of risk from sovereigns to the private sector was relatively more contained and short-lived

Credit risk transmission from sovereigns to the other sectors in the euro area during the coronavirus pandemic

(average proportion of the variance of non-financial and financial EDFs explained by the variance of sovereign EDFs (five-day moving average))



Sources: Moody's Analytics and ECB calculations.

Notes: The charts show smoothed estimates (five-day moving average) of aggregate connectedness between sovereigns and various segments of the corporate sector during the period from 1 November 2019 to 19 January 2021. The underlying VAR model was estimated using a rolling window of 150 days, building on the methodology introduced by Diebold and Yilmaz (2014) and extended by Gross and Siklos (2020). The vertical lines denote policy actions or announcements by the ECB in response to the pandemic: 1. Announcement of new longer-term refinancing operations (LTROs), the third series of targeted longer-term refinancing operations (TLTRO III) and the expansion of the asset purchase programme (APP), 12 March 2020; 2. Start of the PEPP, 26 March 2020; 3. ECB says it will do "everything necessary", 16 April 2020.

However, in contrast to the credit risk transmitted to sovereigns, risk transmission from sovereigns to the private sector was relatively more contained and short-lived. The decline in the transmission of risk from sovereigns coincided with major policy action, including the launch of the pandemic emergency purchase programme (PEPP). By May 2020, the transfer of risk from sovereigns to the other sectors had already significantly declined. These findings suggest that the ECB policy actions helped mitigate the spread of sovereign contagion risk, thereby preventing the emergence of an adverse feedback loop similar to that seen during the 2010-12 euro area sovereign debt crisis, which would have further exacerbated the credit risk of the European corporate sector.²⁵

Examining the credit risk dependencies of sovereigns, financials and corporates in the euro area shows how interlinkages increased at the start of the pandemic but have fallen since, reflecting improved economic prospects. While increased interlinkages might be regarded as a source of concern for contagion risk, the increased transmission of credit risk seen from the start of the pandemic often coincided with the launch of policy measures which transferred risk away from corporates to other sectors, supported economic growth and protected financial stability.²⁶

But, overall, future asset quality depends on the timing and strength of the economic recovery, and the exposure of banks to sectors most affected by the pandemic. Since the previous FSR, forecasts for euro area real GDP growth in 2021 have been revised downwards from 4.7% to 4.2% as the vaccination roll-out had a slow start and several countries prolonged lockdowns to contain a third wave of infections. Therefore, bank asset quality is likely to deteriorate further, especially where there is greater exposure to sectors most heavily affected by the pandemic. Within the category of coronavirus-sensitive sectors, some countries' banks are more exposed to the accommodation sector, where loan performance may be particularly affected by prolongations of travel restrictions (see [Chart 3.3](#), right panel).

²⁵ The emergence of an adverse feedback loop similar to that seen during the 2010-12 euro area sovereign debt crisis was averted also due to the stronger resilience of the banking sector, which has in recent years strengthened its capital position as a result of the post-financial crisis regulatory reforms.

²⁶ For example, fiscal policies limited the economic fallout due to the containment measures through direct measures to protect firms and workers in the affected industries and provided liquidity to firms to avoid liquidity shortages. Prudential measures helped banks to maintain a sustainable supply of credit to the economy and limited the scope for the banking sector to amplify the effects of the coronavirus pandemic.

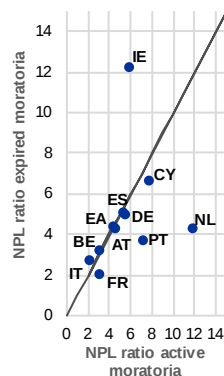
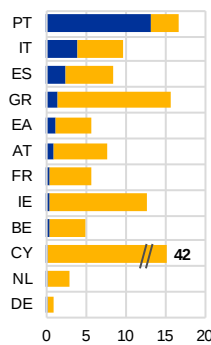
Chart 3.3

Sizeable active moratoria in some countries and exposure to coronavirus-sensitive sectors higher in countries more affected by past crises

Share of moratoria in total loans and NPL ratios of loans subject to moratoria

(Feb. 2021, percentages)

■ Active moratoria
■ Expired moratoria

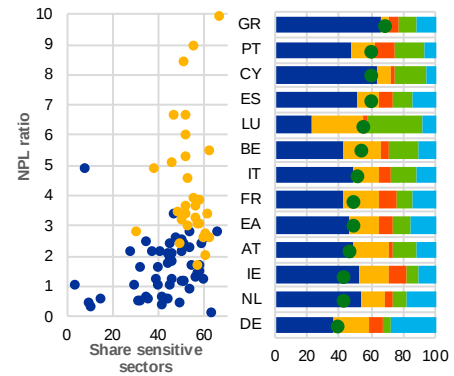


NPL ratio vs. exposure to sensitive sectors across banks and sectoral split across coronavirus-sensitive sectors

(Q4 2020, percentages)

● Less affected
● More affected

■ Trade, transport and accommodation services
■ Arts, entertainment and other services
■ Construction
■ Mining, electricity and water supply
● Share sensitive sectors



Sources: ECB supervisory data and ECB calculations.

Notes: Based on a balanced sample of 93 SIs. Where the number of SIs in a country is less than three, the country is not shown for confidentiality reasons. Coronavirus-sensitive sectors include mining, electricity, water supply, construction, retail and wholesale trade, transport, accommodation and food services, professional and administrative services, arts and entertainment and other services. NPL: non-performing loan.

3.2 Profitability of euro area banks set for a slow recovery

The profitability of euro area banks sank in 2020 on the back of pandemic-related loan loss provisions and lower revenues.

The aggregate return on equity (ROE) of euro area significant institutions declined from 5.3% at the end of 2019 to 1.3% in the fourth quarter of 2020²⁷, with large differences between the first and second half of the year as well as across countries (see [Chart 3.4](#), left panel). The first half of 2020 was characterised by substantial loan loss provisions to cover the fallout from the pandemic, while the second half saw a pronounced decline in income, partly due to weaker corporate loan demand. The ROE drop was larger in countries more affected by past crises as both core revenues and other profit and loss (P&L) components declined strongly in the first half of the year, while they rose in other countries. The return on equity reported by banks for 2020 was positive, with the exception of Cyprus, Greece, Ireland, Italy, Portugal and Spain where the losses were

²⁷ With bank profitability declining strongly in 2020, the ROE figure for the fourth quarter of 2020 depends on the way net income is annualised. In the FSR, the four-quarter average of total equity is used in the denominator, while net income is annualised using four-quarter trailing sums. ECB Banking Supervision annualises quarterly data by multiplying them by four, resulting in a different headline profitability number.

driven largely by loan loss provisions and other P&L items.²⁸ Based on listed banks' first quarter earnings releases, the profitability of euro area banks improved significantly reflecting gains from cost-cutting and stronger trading income, but their trailing return on equity remained below pre-pandemic levels on aggregate.

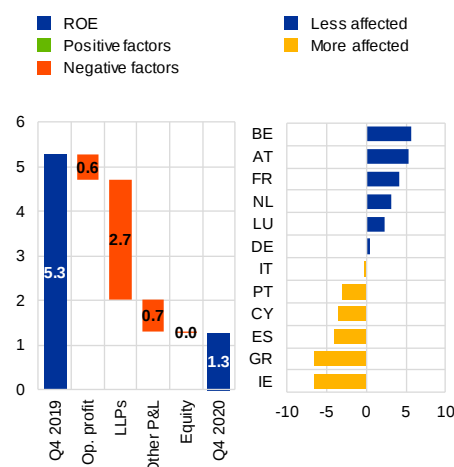
Euro area bank profitability is anticipated to recover slowly, with models based on market expectations projecting aggregate ROE of 3% at the end of 2021 and 6% in 2022 (see Chart 3.4, right panel). These forecasts depend crucially on the path of the overall economic recovery and ultimately on the progress in rolling out vaccines across euro area countries. While the time span until interest rates are expected to return to positive territory has shortened recently from 2030 to 2026, this implies that rates will still remain low for a substantial period, thereby putting pressure on banks' interest income.

Chart 3.4

Bank profitability in 2020 was strongly affected by loan loss provisions and is expected to recover only gradually as vaccines are distributed more widely

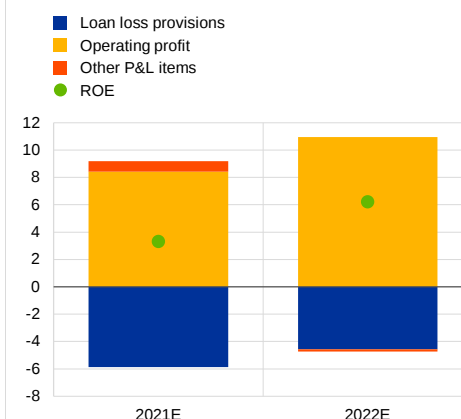
Euro area banks' ROE and factors contributing to its change as well as ROE across countries

(left graph: Q4 2019, Q4 2020, percentages, percentage points; right graph: Q4 2020, percentages)



ROE projections and contributing factors for 2021 and 2022

(percentages, percentage points)



Sources: ECB supervisory data, Bloomberg Finance L.P., Fitch, Refinitiv, ECB and ECB calculations.

Notes: Left panel: figures are on a trailing four-quarter basis. Based on a balanced sample of 93 SIs. Where the number of SIs in a country is less than three, the country is not shown for confidentiality reasons. Op. profit: operating profits; LLPs: loan loss provisions; more/less affected: countries more/less affected by past crises. Right panel: the projections for 2021 and 2022 are an average of ECB staff time-series VAR and panel regression models as of early April. The sample of banks in the time-series VAR models is 41 banks for which analysts' expectations are available and 100 banks for the panel regression model. E: estimate; P&L: profit and loss; ROE: return on equity; VAR: vector autoregression.

Operating profits weakened mainly on the back of lower net interest income, especially towards the end of the year. As the economic fallout from the pandemic intensified, banks' operating profits faced a decline in both net interest income (NII) and net fee and commission income (NFCI). While the negative contributions from these two components were offset by cost-cutting and non-core operating profit items

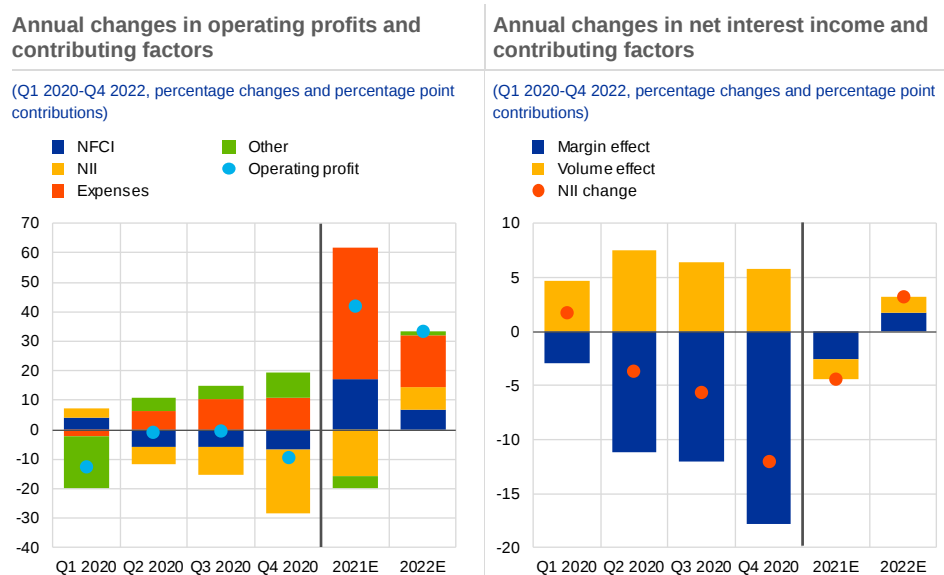
²⁸ In some countries, the number of significant institutions included in the sample is smaller than the total number of banks operating in the country which might affect the results. The negative ROE reported by Spanish banks was driven by one institution, which recorded goodwill impairments.

in the second and third quarters, the decline in net interest income increased in the fourth quarter and resulted in a lower operating profit for the full year (see [Chart 3.5](#), left panel). Going forward, operating profits are expected to recover only slowly and to be supported by additional cost-cutting and higher NFCI. NII declined in 2020 by 12% and thereby continued the downward trend that started in 2018. While the volume of interest-earning assets was about 6% larger than in 2019, the margin decline became more pronounced in the second half of 2020 (see [Chart 3.5](#), right panel). The pressure on NII is expected to decline only in 2022.

Trading income supported the profitability of euro area banks with a stronger investment banking focus. Higher trading activity in volatile markets especially during the second and fourth quarters helped some euro area banks with a stronger focus on capital market activities to beat analysts' earnings expectations due to higher revenues in equity and fixed income trading. Since capital market activity during 2020 was at levels not seen since 2009, the positive impulse from trading activities might be smaller going forward. While some non-euro area investment banks incurred substantial losses on margin calls due to the default of Archegos Capital Management (see [Chapter 2](#)), euro area banks were only marginally affected. The incident, however, highlights the risks related to the prime brokerage business.

Chart 3.5

The decline in banks' operating income during 2020 was largely driven by margin compression and the recovery in profitability is supported by cost-cutting and NFCI



Sources: ECB supervisory data, Bloomberg Finance L.P., Fitch, Refinitiv, ECB and ECB calculations.

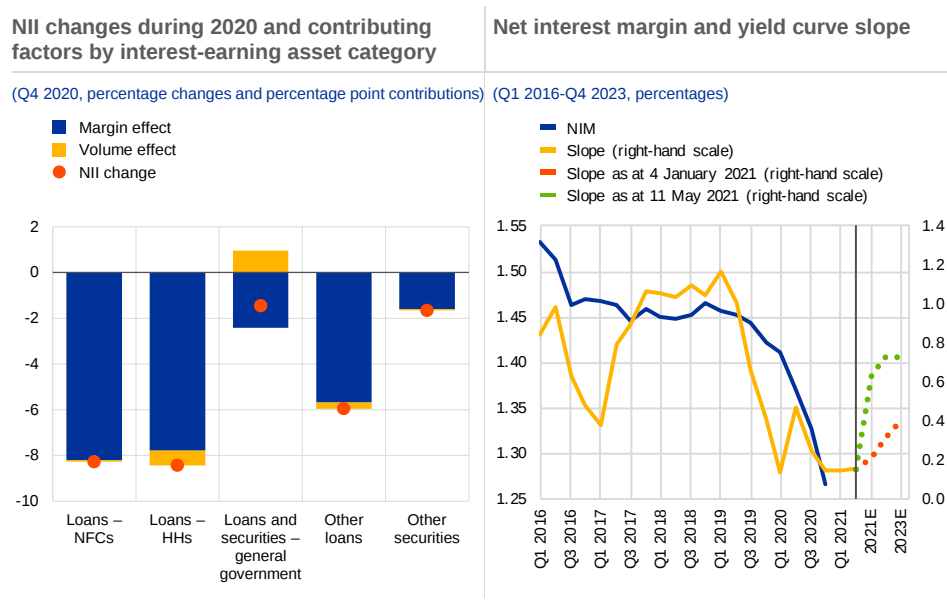
Notes: Based on a balanced sample of 93 SIs. To compare quarterly developments better with pre-pandemic values, quarterly flows are annualised by multiplying them by four instead of using four-quarter trailing sums. The projections for 2021 and 2022 are an average of ECB staff time-series VAR and panel regression models as of early April. The sample of banks in the time-series VAR models is 41 banks for which analysts' expectations are available and 100 banks for the panel regression model. E: estimate; NFCI: net fee and commission income; NII: net interest income; VAR: vector autoregression.

Looking ahead, some of the pressures weighing on interest margins in 2020 are expected to ease, notably if yield curves steepen. A flattening of the yield curve in early 2020, followed by a reduced pass-through of negative rates to corporate depositors in the second half of 2020, contributed to lower interest margins of euro

area banks. The larger NII decline for the loan book relative to fixed income securities can be mainly attributed to smaller risk premia on state-guaranteed non-financial corporate (NFC) loans and weaker demand for consumer lending (see [Chart 3.6](#), left panel). Looking ahead, forward rates suggest that the yield curve slope has bottomed out and is expected to rise until 2023. Against the backdrop of rising inflation and growth expectations since February, the ten-year swap rate expected at the end of 2023 increased by 40 basis points. As net interest margins co-move with the slope of the yield curve, the opportunities for banks to generate higher margins from maturity transformation on new lending should hence improve over the next years (see [Chart 3.6](#), right panel). But as the existing stock of loans is only repricing gradually, the margin recovery of the entire loan book will take time.

Chart 3.6

Interest margins fell markedly in 2020, especially for loans, but income from maturity transformation is expected to improve somewhat in the coming years



Sources: Bloomberg Finance L.P., ECB supervisory data and ECB calculations.

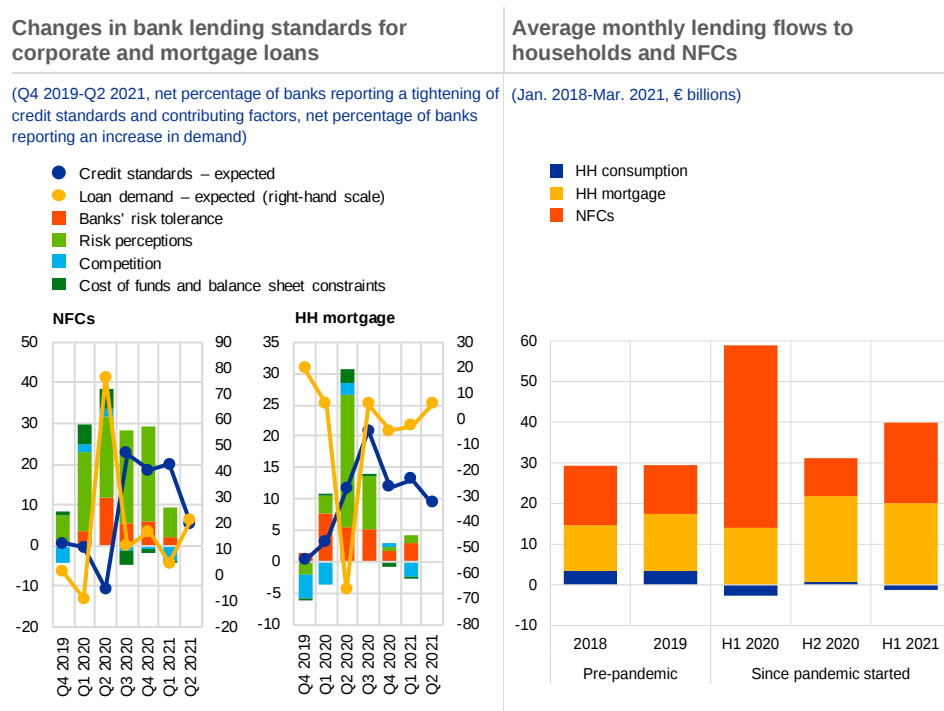
Notes: Based on a balanced sample of 93 SIs. Figures are on a trailing four-quarter basis. Right panel: the slope of the yield curve is computed as the difference between the yields of the euro overnight index swap with a ten-year and three-month maturity, respectively. The yield curve slope is lagged by two quarters. The expected yield curve slope is backed out from forward rates. E: estimate; HHs: households; NFCs: non-financial corporations; NII: net interest income; NIM: net interest margin.

A recovery in lending income relies on the economic rebound improving corporate and consumer confidence, as well as easier lending standards. In the second half of 2020 banks tightened lending standards, in particular for corporate loans, as risk perceptions rose and the take-up of guaranteed loans moderated (see [Chart 3.7](#), left panel). The tightening was more pronounced for loans to SMEs and for loans with longer maturities. Reflecting the ongoing uncertainties surrounding the development of the pandemic and the speed of the roll-out of vaccines in the euro area, banks expect an additional tightening of credit standards in the first half of 2021. As a consequence of reduced corporate loan demand since September 2020 and despite tighter housing credit standards, lending volume was mainly driven by mortgage lending on the back of low interest rates (see [Chart 3.7](#), right panel). So far in 2021, average monthly lending flows to the non-financial private sector have

exceeded pre-pandemic levels due to higher corporate lending in March. This was largely driven by borrowing in Germany which could be related to a robust manufacturing sector and the financing of working capital. While industrial confidence has recovered, an improvement in consumer confidence is required for high-margin consumer lending to pick up and thereby support bank profitability going forward.

Chart 3.7

Banks tightened lending standards substantially in the second half of the year and since September lending volume has been mainly driven by mortgage loans



Sources: ECB MFI balance sheet statistics, ECB euro area bank lending survey and ECB calculations.

Notes: HH consumption: consumer credit and other lending to euro area households; HH mortgage: loans to euro area households for house purchase; MFI: monetary financial institution; NFCs: non-financial corporations.

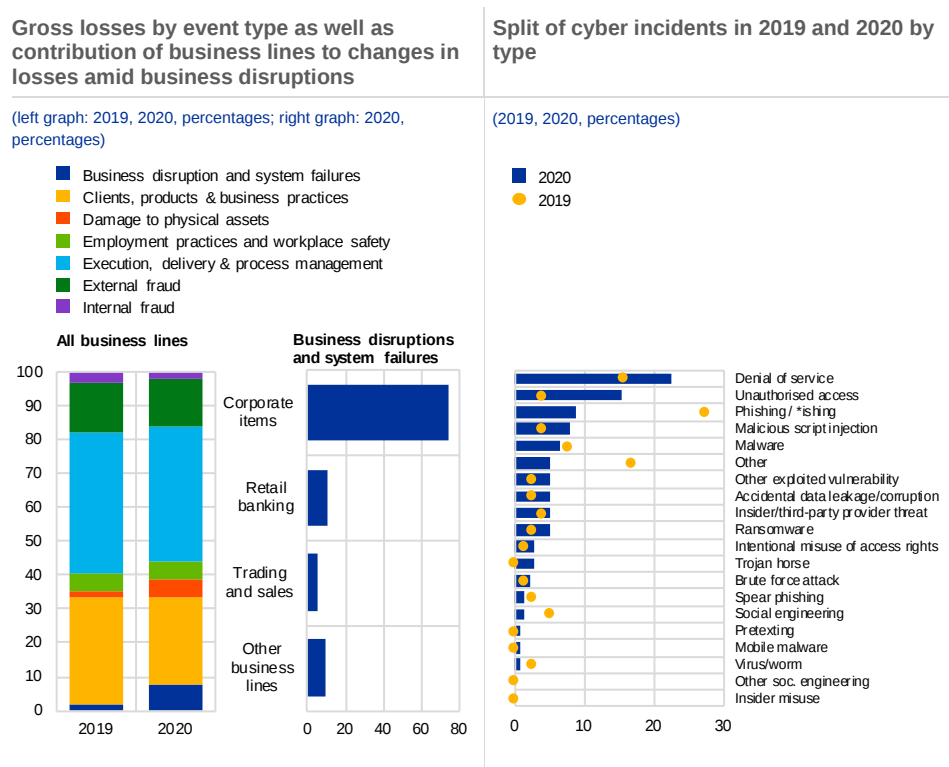
Business disruptions at euro area banks have increased during the pandemic, but losses have remained limited compared with other operational risk events.

The higher usage of online banking and the increase in remote work during the pandemic have led to losses as a consequence of business disruptions and system failures, but these losses have remained limited relative to other operational risk events. A closer look at the affected business lines reveals that the bulk of losses related to business disruptions were attributed to the entire institution, retail banking or trading and sales (see [Chart 3.8](#), left panel).

While cyber incidents reported by euro area banks have increased during the pandemic, institutions have not been severely impacted so far. Cyber incidents reported to the ECB by significant institutions in 2020 have increased compared with the previous year, mainly driven by incidents with a malicious intent. Distributed denial of service (DDoS) attacks in particular are trending upwards, including ransom DDoS by large threat actors (see [Chart 3.8](#), right panel).

Chart 3.8

Losses related to business disruptions and system failures have increased during the pandemic and denial of service attacks are the most frequent type of cyber incident



Sources: ECB supervisory data, ECB cyber incident reporting framework and ECB calculations.

Notes: Left panel: based on a balanced sample of 93 SIs. Loss events which affect the entire institution are captured by the business line "corporate items". Right panel: insider misuse: intentional misuse of access rights by an insider.

Fortunately, these attacks have caused only very limited interruptions mostly due to the unavailability of smaller third parties. An upward trend can be observed in the incidents related to third parties due to an increasing reliance of the industry on third-party services. No major incidents related to cyber attacks on euro area financial market infrastructures have been reported yet. But persistent deficiencies in basic ICT (information and communication technology) hygiene, complex ICT architecture and a growing amount of end-of-life ICT systems in many banks still need to be addressed. Some large-scale ICT projects to address these vulnerabilities could be delayed due to the pandemic, but banks may also put off addressing these weaknesses because of the economic outlook and likely lower profitability.

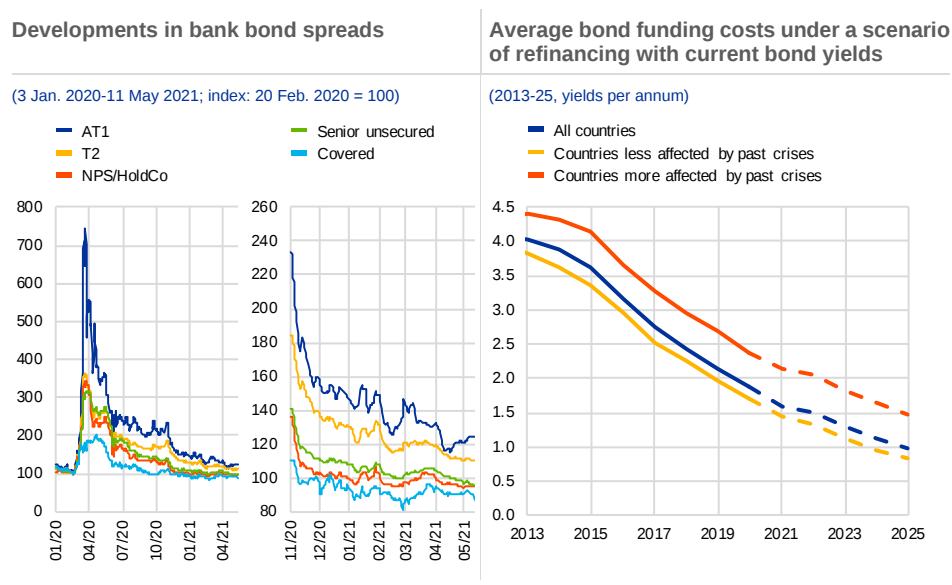
3.3 Banks' bond spreads tightened and capital ratios rose

After declining markedly towards the end of 2020, bond spreads of euro area banks tightened further but at a slower pace. For the euro area on aggregate, bank bond spreads declined significantly during November and December, mirroring the equity price rally. The increase in the spreads of bank bonds observed in March 2021 (see [Chart 3.9](#), left panel) can be attributed to the increase in government bond yields and was more pronounced for senior bonds such as covered bonds (+10 basis points)

and non-preferred senior and holding company debt instruments (+6 basis points). As around half of the outstanding bank bonds mature by 2025 and the yields for refinancing these bonds are expected to still remain below those yields agreed at issuance, banks are likely to continue benefiting from favourable market funding costs over the next years (see [Chart 3.9](#), right panel). The ECB's longer-term refinancing operations provide additional funding support for euro area banks.

Chart 3.9

Bank bond spreads continued to tighten and market funding costs are expected to decline further as maturing bonds still carry higher yields



Sources: Dealogic, IHS Markit and ECB calculations.

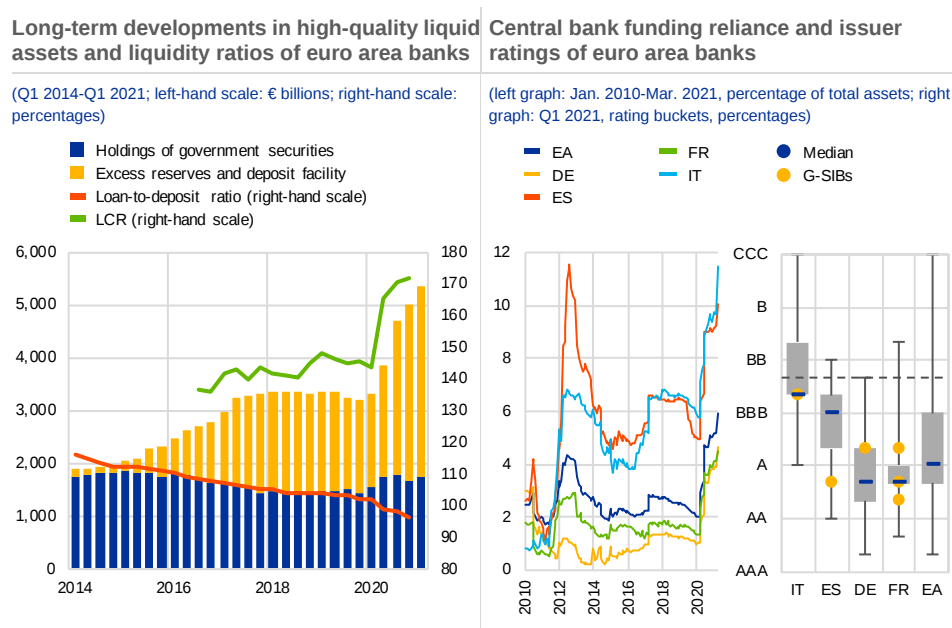
Notes: Left panel: z-spreads, which have been indexed to pre-pandemic levels, are shown and are defined as the difference (in basis points) between the yield to maturity of a bank's bond and the yield of a maturity-matched euro swap. Spreads are weighted by the outstanding volume of the respective bonds. Right panel: the funding cost scenario (indicated by the dashed lines) assumes that maturing bonds are refinanced at a yield to maturity observed in the secondary market in March. All funding costs are volume-weighted (covered, senior unsecured, NPS/HoldCo and Tier 2 bonds are included, being the main seniorities maturing in 2021). AT1: additional Tier 1; NPS/HoldCo: non-preferred senior and holding company debt; T2: Tier 2.

As private issuance has fallen substantially in recent years, banks need to prepare for an eventual return to market funding in the medium term. Due to the pandemic, the ECB has provided substantial longer-term funding to banks which led to a significant increase in liquidity buffers during 2020. The combined amount of excess reserves and deposit facility holdings has increased since end-2019 by €1.9 trillion (see [Chart 3.10](#), left panel). The latest targeted longer-term refinancing operation (TLTRO) auction in March 2021 saw one of the largest take-ups due to its more favourable terms. As a consequence, the central bank funding reliance of euro area banks on aggregate has increased strongly and bond issuance volumes of non-G-SIBs have fallen to historical lows, amid some heterogeneity across euro area countries. Normalised by banks' total assets, central bank funding reliance was the highest in Italy and Spain and banks in these two countries out of the four largest euro area economies are also closer to the non-investment-grade rating space (see [Chart 3.10](#), right panel). Among other aspects, size also seems to play a role as mid-sized banks, i.e. banks with total assets between €20 billion and €200 billion, exhibit the highest central bank funding reliance. To avoid that banks face challenges

in a few years when trying to return to market funding, it is essential that they work on resolving some of their balance sheet weaknesses and structural issues, for example by improving cost-efficiency; this is especially the case for some smaller banks, which might face limited market access and might therefore have to progressively rebuild an investor base.

Chart 3.10

Euro area banks increased their liquidity buffers significantly during 2020, but the reliance on central bank funding might pose risks for some banks in the medium term



Sources: ECB supervisory data, ECB MFI balance sheet statistics, ECB internal liquidity management statistics, DBRS, Fitch Ratings, Moody's Analytics, S&P Global Market Intelligence and ECB calculations.
Notes: Right panel: the ratings and outlooks shown represent the worst of the long-term issuer ratings assigned to each bank by S&P Global Market Intelligence, Moody's Analytics, Fitch Ratings and DBRS. Cooperative and savings banks have been excluded. The whiskers in the box-plot refer to minimum and maximum rating values of the banks in the respective country. The dashed line in the box-plot chart refers to the non-investment-grade threshold. LCR: liquidity coverage ratio; G-SIBs: global systemically important banks.

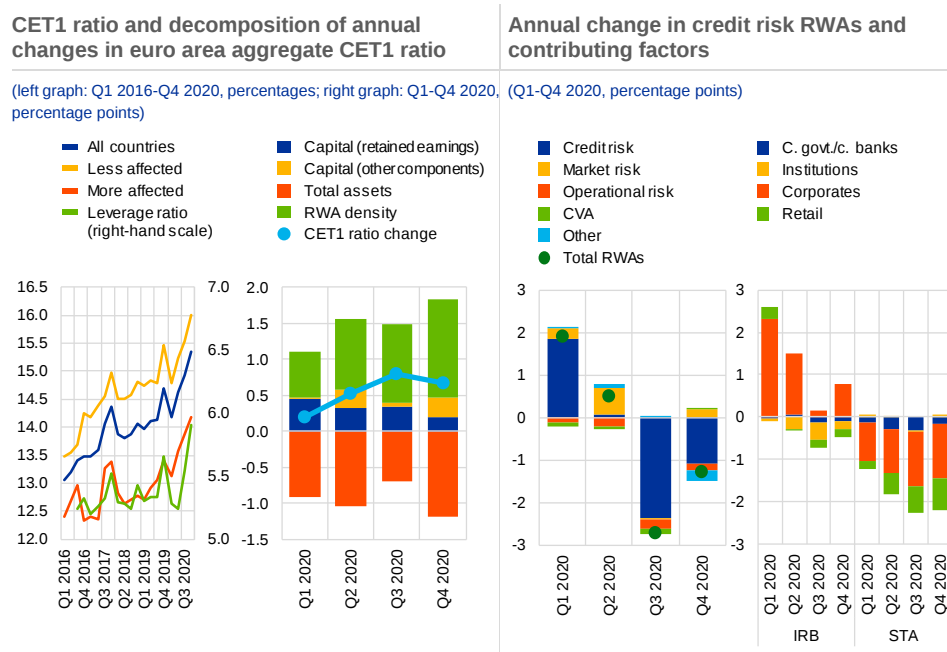
Common Equity Tier 1 (CET1) ratios of euro area banks on aggregate improved in 2020 by around 60 basis points to 15.4%. The rise in capital ratios was largely driven by declining average risk weights, which compensated for balance sheet expansion, while the contribution from retained earnings shrank at the end of 2020 (see [Chart 3.11](#), left panel). Regulatory changes (i.e. the Capital Requirements Regulation “quick fix”) and prudence on dividends also contributed to higher capital ratios. Looking in more detail at the changes in risk-weighted assets during 2020 reveals that market risk increased in the second quarter and to a lesser extent in the fourth quarter on the back of higher trading activity in volatile markets. There was a marked decline in corporate credit risk-weighted assets in the third and fourth quarters (see [Chart 3.11](#), right panel), which appears at least partly related to NFC loans granted with state guarantees and to the adjustment of the SME supporting factor. The increase in excess liquidity, which is assigned a zero risk weight, also played a major role in the decrease of average risk weights. At the country level, CET1 ratios

increased in all countries except Estonia, Finland, Greece, Ireland, Luxembourg and Slovenia where balance sheet expansion outweighed the other factors.²⁹

As asset quality indicators suggest that a materialisation of pandemic-related credit risk has started, this is likely to have implications for banks' capital ratios going forward. Banks' capitalisation levels are well above regulatory minimum requirements and therefore banks have capital space to absorb losses. So far, however, it appears that in particular banks with less capital space above regulatory buffers are reluctant to actually use these buffers (see [Chapter 5](#)). The EU-wide stress-test exercise, the results of which are expected by end-July, aims to provide additional insights into the resilience of the European banking sector to a prolonged COVID-19 scenario in a lower-for-longer interest rate environment.

Chart 3.11

The rise in the CET1 ratio was mainly due to an increase of lower-risk assets amid an expansion of state-guaranteed loans to euro area corporates



Sources: ECB supervisory data and ECB calculations.

Notes: Based on a balanced sample of 93 SIs. In this chart, to compare quarterly developments better with pre-pandemic values, quarterly flows are annualised by multiplying them by four instead of using four-quarter trailing sums. CET1: Common Equity Tier 1; C. govt./c. banks: central governments and central banks; CVA: credit valuation adjustment; IRB: internal ratings-based approach; RWAs: risk-weighted assets; STA: standardised approach.

Euro area bank equity prices have benefited from a broader market rally since November. The approval of vaccines against the coronavirus in late 2020 boosted hopes for a stronger global economic recovery and triggered a rotation out of growth stocks into value stocks (see [Chapter 2](#)). Against this backdrop and despite unchanged bank profitability projections for 2021 and 2022, bank stock prices rose by 40% in November alone. In February, the announcement of US fiscal stimulus and a

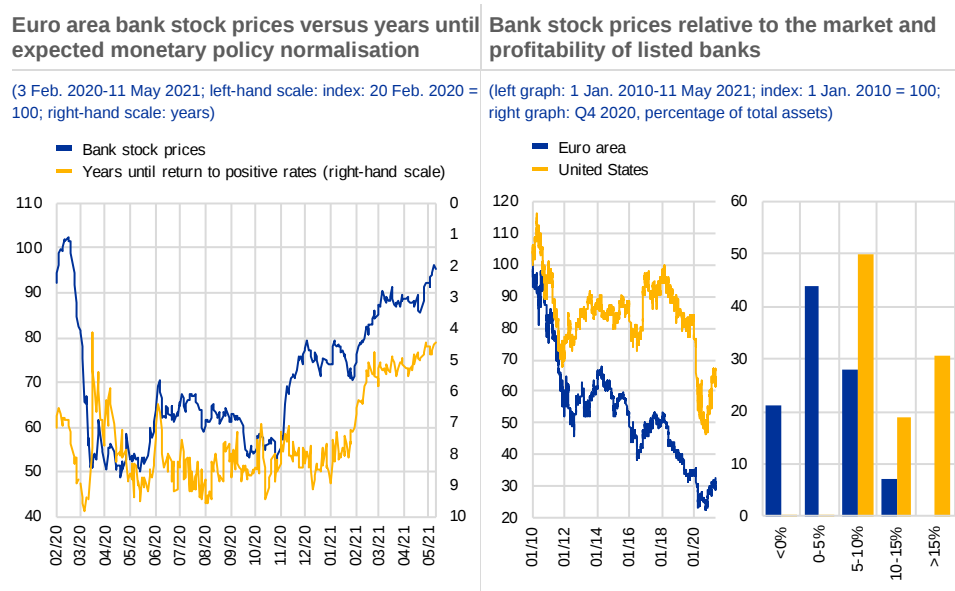
²⁹ In some countries, the number of significant institutions included in the sample is small relative to the total number of banks operating in the country which might affect the results.

pick-up in US inflation expectations spilled over to the euro area and lifted bank shares by another 25% (see [Chart 3.12](#), left panel).

But considered over a longer horizon, euro area bank stock prices have strongly underperformed the euro area broader market and banks in the United States. While there were rallies of euro area bank stock prices also in 2012 and 2017, the longer-term relative unattractiveness of the sector is rooted in structural issues, such as cost inefficiencies, which are in turn reflected in lower profitability. In the fourth quarter of 2020, 7% of euro area listed banks reported an ROE above 10%, compared with 49% of banks in the United States (see [Chart 3.12](#), right panel). Addressing these structural challenges, for example through mergers and acquisitions, is crucial for a turnaround that is longer lasting.

Chart 3.12

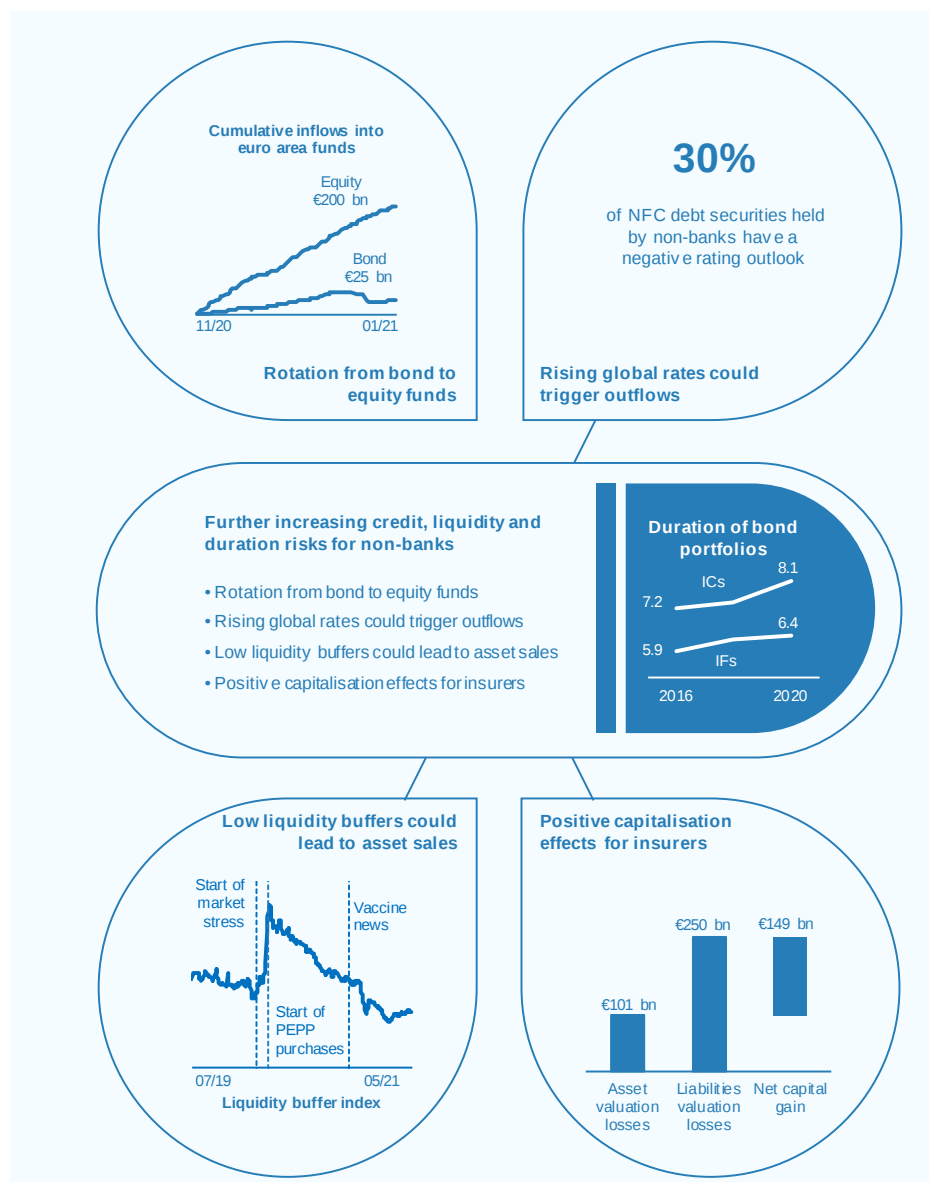
Vaccine rally and higher inflation expectations have lifted bank stock prices since November, but the long-term performance of the sector rests on higher profitability



Sources: ECB, Refinitiv, Bloomberg Finance L.P. and ECB calculations.

Notes: Right panel: sample includes 43 listed banks; share of banking sector assets in each ROE category.

4 Non-bank financial sector



4.1 Non-bank financial sector vulnerabilities could manifest in the high-yield corporate bond market

Market-based financing of the real economy has remained robust since mid-2020, with conditions continuing to be supported by accommodative policies. By December 2020, market based credit to non-financial corporations (NFCs) – i.e. intermediated via markets as opposed to loans typically originated by banks – had recovered from the initial pandemic turmoil, to stand at roughly 20% of

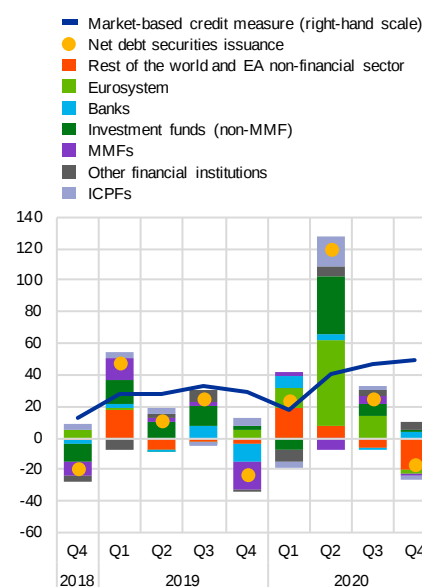
total external credit (see [Chart 4.1](#), left panel).³⁰ While euro area non-bank financial institutions were the dominant net buyers of debt overall, net purchases by the Eurosystem were around the same size as those by investment funds (IFs), insurance corporations and pension funds (ICPFs) and other financial institutions combined in the second and third quarter, highlighting the robust indirect support from the official sector.

Chart 4.1

Non-banks assumed greater credit risk after the pandemic peaked, driven by negative rating developments

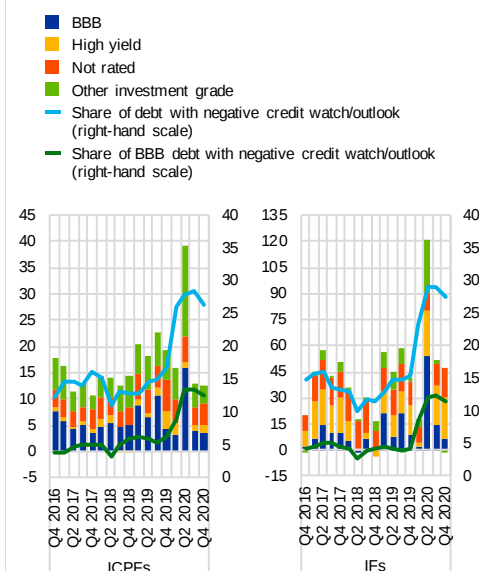
Market-based credit to euro area NFCs

(Q4 2018-Q4 2020, € billions (left-hand scale), percentages (right-hand scale))



Transactions involving global NFC debt securities by rating, and holdings of vulnerable securities

(Q4 2016-Q4 2020, € billions (left-hand scale), percentages (right-hand scale))



Sources: Euro area accounts, MFI balance sheet item statistics, ECB (securities holdings statistics and Centralised Securities Database) and ECB calculations.

Notes: Left panel: the market-based credit measure estimates the share of total marketable securities of the total external credit – i.e. loans and debt securities excluding intra-sector loans – of euro area non-financial corporations. Quarterly changes may be affected slightly by valuation effects. Right panel: transactions concern only securities that are not expired at the end of the quarter. Securities are classified as vulnerable when Standard & Poor's has placed the issuer under negative credit watch or negative credit outlook. Unrated securities are mainly short-term debt, such as commercial paper. Percentages relate to the total NFC debt portfolio.

While fiscal and financial policy measures have indirectly supported non-banks' asset quality so far, credit risk could trigger valuation losses over the coming months. The share of bonds with negative credit watch or outlook held by ICPFs and IFs rose sharply in early 2020, but declined slightly towards the end of the year, partly reflecting policy support to NFCs (see [Chart 4.1](#), right panel). Potential rating downgrades could materialise either as policy support is withdrawn abruptly or if higher global interest rates spill over into euro area credit markets, jeopardising the

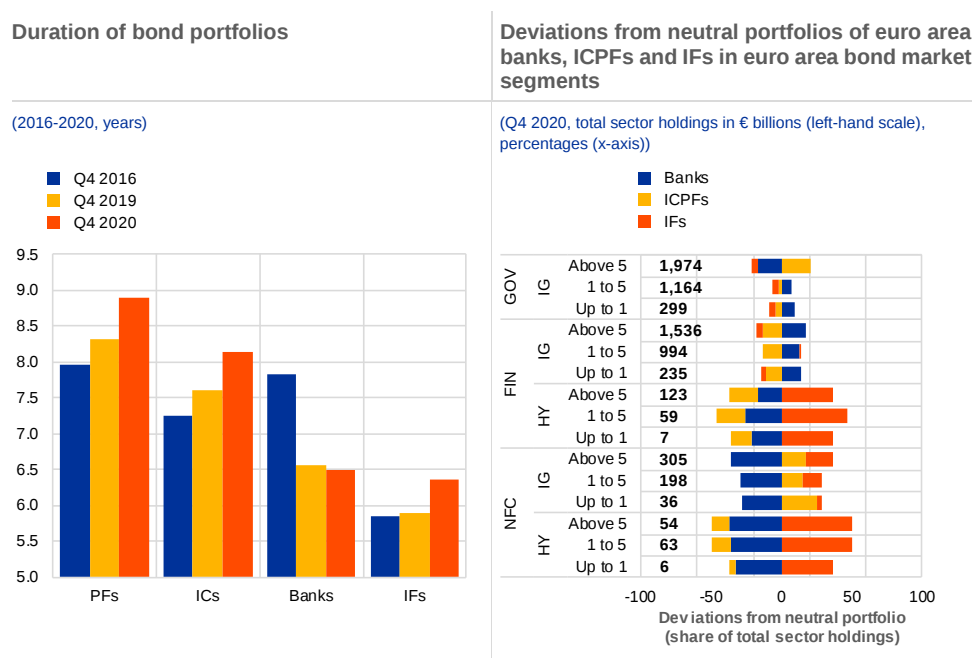
³⁰ See Section 4.1, *Financial Stability Review*, ECB, November 2020.

ability of companies to roll over their debt and support the recovery.³¹ This in turn would expose non-banks to significant credit losses.

A rise in yields would also trigger bond valuation losses, to which ICPFs and IFs are more exposed than in the past. These sectors have increased the duration in their bond portfolios over recent years in order to boost returns in the challenging environment of ultra-low interest rates. But this increases the sensitivity of their assets to rising interest rates (see [Chart 4.2](#), left panel). Asset valuation losses from rising bond yields could trigger outflows which, when coupled with low liquidity buffers, could force bond funds to liquidate assets to meet investor redemptions (see [Chart 4.5](#)).³² In the short term, ICPFs would face asset valuation losses as well, although these could be more than offset by the drop in liabilities valuation, given the negative duration gap (see [Section 4.3](#)). The net effect would be an improvement in the equity position and the overall balance sheet capacity of ICPFs. Depending on other concurrent macroeconomic developments, ICPFs could then increase asset purchases in some segments at a time when bond funds could be forced to sell.

Chart 4.2

Increased duration risk and investor base in different euro area bond market segments



Sources: ECB (securities holdings statistics and Centralised Securities Database) and ECB calculations.

Notes: Left panel: chart shows Macaulay duration. Right panel: consider a matrix with sector holders in rows and asset segments in columns. Deviations reported in the chart are the differences between actual holdings and the neutral portfolios. The matrix of actual holdings expresses exposures of sectors to asset segments. Neutral portfolios are the rows, one for each sector, of a matrix where each cell is calculated as the product of the marginals of the matrix of actual holdings divided by the sum of total sectors' holdings in all segments. Deviations between corresponding cells in the matrix of actual holdings and neutral portfolios capture the preference of a specific sector for a specific segment in its asset allocation. For instance, a positive deviation in a market segment means that the sector is holding a larger position in that asset segment than the neutral portfolio would suggest. Higher percentages reflect both stronger preference and smaller size of the market segment. Asset segments are broken down by issuer, residual maturity and rating category. The issuer sectors are financial corporations (FIN), governments (GOV) and non-financial corporations (NFC). Residual maturity buckets are in years. Numbers in bold are the holdings of the three sectors in the segments, reported in billions of euro. Holdings by all other sectors, including the Eurosystem, are not considered in the analysis. Unrated bonds are excluded.

³¹ See Section 2.3, *Financial Stability Review*, ECB, November 2020.

³² In stress episodes, funds tend to sell even more than explained by investor redemptions; see [Box 6](#).

High-yield corporate bond segments, where investment funds are dominant players, are particularly exposed to an increase in credit spreads. Investment funds have typically had a much stronger preference for holding high-yield bonds issued by financial and non-financial corporations, unlike banks and ICPFs, which generally prefer less risky fixed income assets (see [Chart 4.2](#), right panel). But high-yield bonds are also the most vulnerable to an increase in credit spreads, which tend to widen when global rates increase. In the euro area, though, this segment is small compared with investment grade corporate and sovereign bond segments. That said, should higher global yields trigger fund outflows and asset liquidation, it is unlikely that banks and ICPFs – which historically largely underweight high-yield bonds – would substantially step up their presence in these segments, thereby increasing the risk of price dislocation and a credit crunch for more vulnerable corporates.

Non-banks' pro-cyclical behaviour and liquidity risks, together with their reliance on public support as seen last March, demonstrate the need to enhance resilience across the sector (see Chapter 5). For instance, liquidity risks in some types of investment funds could be limited by lengthening redemption frequencies and setting minimum liquidity buffers. Furthermore, the recent event involving Archegos Capital (see [Chapter 2](#)), a highly leveraged non-bank entity heavily interconnected with large banks, again raises the issue of contagion due to margin calls, default cascades and fire sales.³³

4.2 Investment funds may be vulnerable to a global increase in interest rates

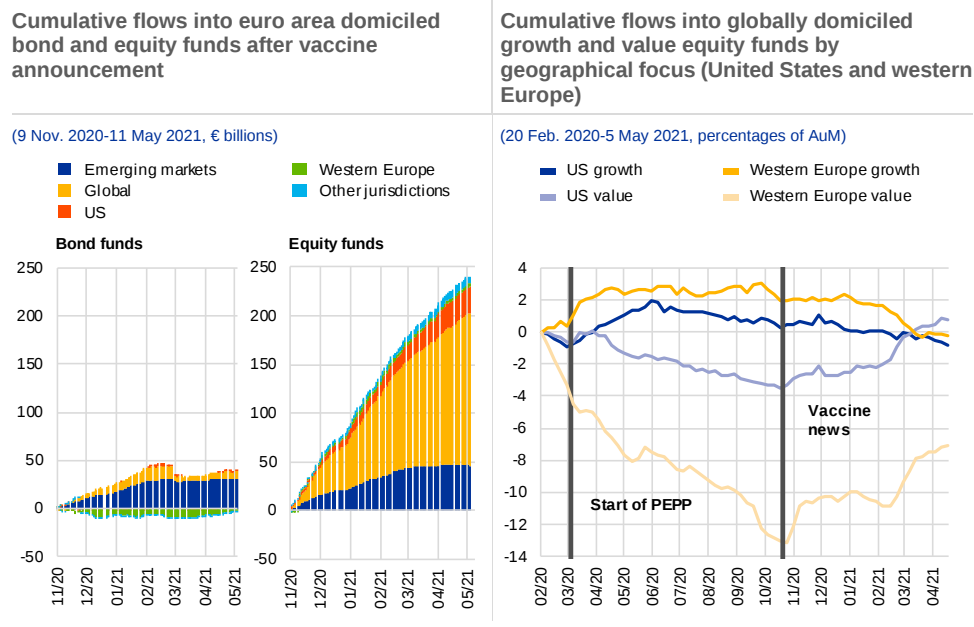
Overall, since November 2020 investors' flows have shifted from bond funds to equity funds amid a robust increase in risk appetite. While investors mainly preferred bond and money market funds until mid-2020, equity funds started to receive record-high inflows following the COVID-19 vaccine announcements in November 2020 (see [Chart 4.3](#), left panel). The significant fiscal stimulus in the United States and the agreement of the Brexit deal between the EU and the United Kingdom also contributed to the surge in risk appetite and equity fund inflows.

Inflows concentrated on euro area investment funds that focus on global, US and emerging markets, with equity funds receiving the lion's share. By contrast, flows into funds investing in western European markets remained generally stable. The rise in aggregate equity fund flows masks rotation from growth to value funds, benefiting European equity funds over US funds (see [Chart 4.3](#), right panel). Flows into western European equity funds investing in the energy and financial sectors have recovered particularly strongly.

³³ See Box 6 entitled "The role of bank and non-bank interconnections in amplifying recent financial contagion", *Financial Stability Review*, ECB, May 2020.

Chart 4.3

Investors shifted from bond to equity funds, while also favouring equity funds with a US and global focus rather than western Europe



Sources: EPFR Global and ECB calculations.

Notes: Left panel: data refer to cumulative flows of euro area-domiciled bond and equity funds with different geographical investment focus. Observations are at daily frequency. "Other jurisdictions" includes Australia, Hong Kong, Japan, Singapore, Pacific Regional and New Zealand. Right panel: data refer to cumulative fund flows as a percentage of assets under management (AuM) of globally domiciled growth and value equity funds focusing on US and western Europe markets. Western Europe markets include the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. Observations are at weekly frequency.

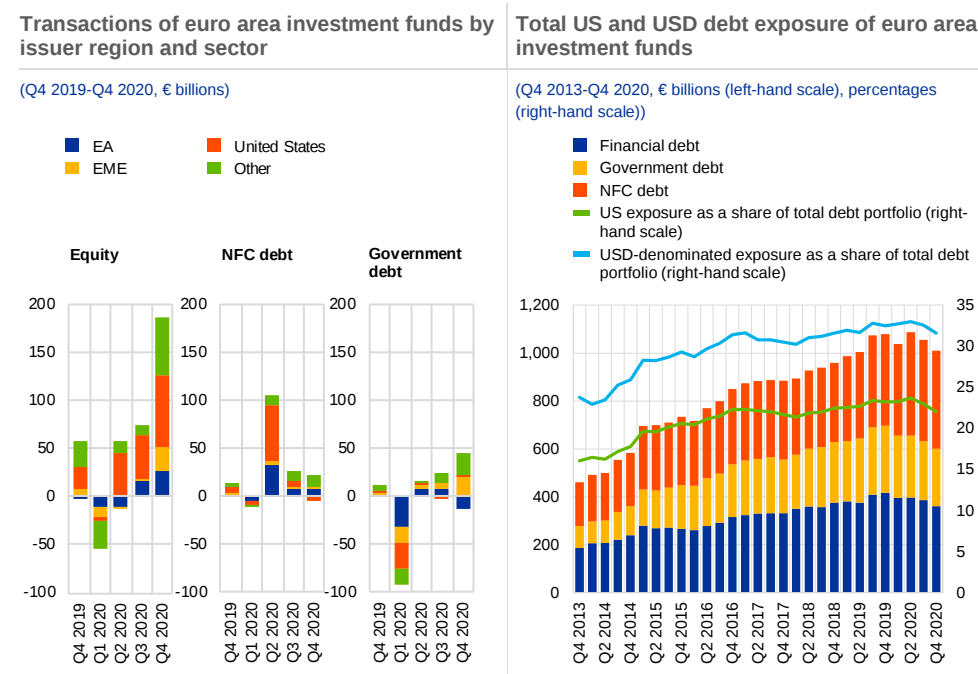
These developments have been broadly reflected in recent transactions by euro area investment funds. In the fourth quarter of 2020, euro area equity funds purchased about €135 billion of US and other developed economy equities, while bond funds purchased about €45 billion of EME and other developed country sovereign bonds (see [Chart 4.4](#), left panel). Investment funds also purchased corporate debt securities across the globe, but at a slower pace than earlier in 2020, due in part to lower issuance activity.

The credit risk of euro area investment funds remains elevated, while duration risk stands at a multi-year high. As a result of continued subdued economic activity, up to a third of investment funds' NFC debt holdings are subject to a negative credit outlook or credit watch from rating agencies (see [Chart 4.1](#), right panel). Coupled with the fact that more than 60% of corporate debt securities purchased in 2020 are either high yield or rated BBB, this highlights the increasing credit risk faced by investment funds. In addition, the continued search for yield in a low interest rate environment has pushed investment funds to increase the maturity³⁴ and, therefore, the duration of their debt securities portfolios (see [Chart 4.2](#), left panel), exposing them to greater interest rate risk from rising yields.

³⁴ See Chapter 4 on Non-banks in *Financial Stability Review*, ECB, May 2020.

Chart 4.4

Euro area equity funds mainly invested in the US and other developed economies' stock markets, but less in euro area equities



Sources: ECB securities holdings statistics and ECB calculations.

Notes: Left panel: net transactions in equity and debt securities by euro area investment funds. The investment areas are: euro area (EA), emerging markets (EME), United States, and "Other" for all remaining developed economies. Right panel: euro area investment funds' exposures to US debt securities broken down by sector of issuance and the total US debt exposure as a share of the total bond portfolio.

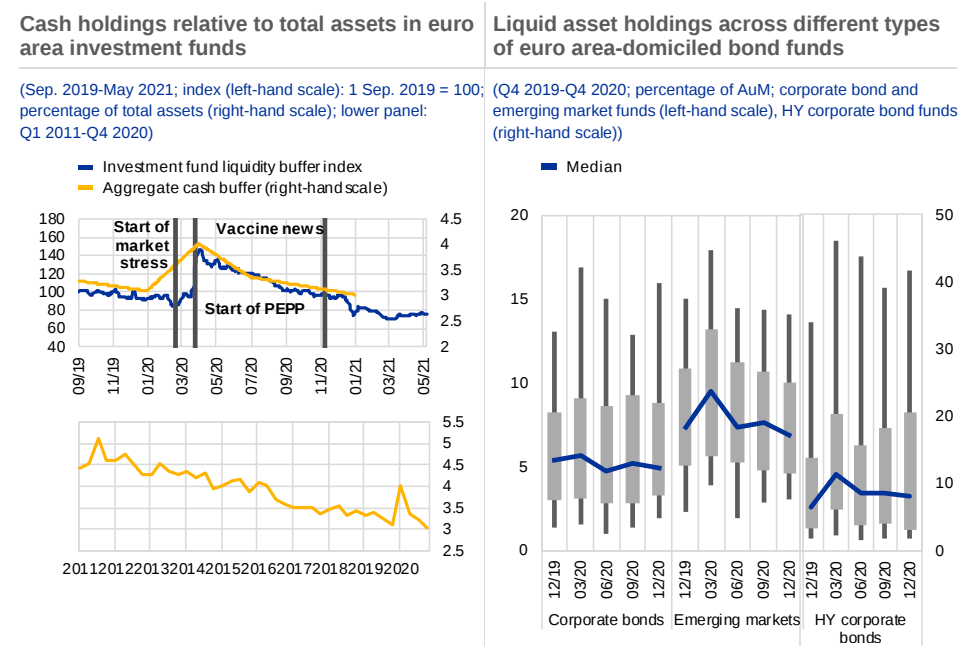
Significant and abrupt increases in global interest rates may lead to material valuation losses on euro area investment funds' debt portfolios. To date, repricing has been more pronounced for US debt securities than for their euro area equivalents due to the different increases in yields in the two economic areas (see [Chart 2.1](#), left panel). Nevertheless, euro area investment funds are heavily exposed to US interest rate risks. In particular, their holdings of US-based and USD-denominated debt securities are close to record levels (see [Chart 4.4](#), right panel) and the duration of their US bond portfolios is high, exceeding that in their overall debt securities portfolios.

Over recent years, investment funds' liquidity risk has increased amid a search for yield (see also Box 5). Since last November, funds' cash positions have continued to fall as a proportion of their total assets. Cash buffers have declined below pre-pandemic levels to reach new lows (see [Chart 4.5](#), left panel). Liquid asset holdings also stand at relatively low levels, falling below pre-pandemic volumes for funds investing in corporate bonds (see [Chart 4.5](#), right panel). This is a concern, as rising credit risks and elevated asset valuations in some financial market segments leave the fund sector vulnerable to shocks. Furthermore, an increase, particularly abrupt, in global yields may trigger relatively large redemptions, especially for funds investing in debt securities. Given the persistent liquidity risk in investment funds, such shocks may lead to funds selling assets, with the potential to exacerbate adverse

market dynamics and propagate spillovers to other financial intermediaries.³⁵ This underscores the importance of strengthening the resilience of the investment fund sector from a macroprudential perspective (see [Chapter 5](#)).

Chart 4.5

Funds' cash buffers continue to fall while liquid asset holdings remain stable at relatively low levels



Sources: ECB money market statistical reporting (MMSR) dataset, EPFR Global, ECB IVF statistics, Refinitiv and ECB calculations. Notes: Upper left panel: the cash buffer index (blue line) is constructed with cash holdings from MMSR divided by total net assets for euro area-domiciled investment funds from EPFR data. As the two data sources use different investment fund samples, the series is normalised to an index with value=100 on 1 September 2019. Cash holdings mainly consist of deposits. Aggregate cash buffer (yellow line) is the ratio of deposit and loan claims against MFIs (used as proxy for cash) to total assets. Lower left panel: quarterly data for the aggregate cash buffer. Right panel: distribution of liquid assets over total assets across funds by fund type. The boxes correspond to the interquartile range and the whiskers to the 10th-90th percentiles. Liquid assets include cash and high-quality liquid asset (HQLA) bonds. Data refer to euro area-domiciled bond funds only. High-yield corporate bond funds are euro area-domiciled funds which primarily invest in high-yield bonds. This sample is distinct from the corporate bond fund sample, which has a broader investment focus.

Box 5

Investment fund flows, risk-taking and monetary policy

Prepared by Margherita Giuzio, Christoph Kaufmann and Ellen Ryan

This box examines the response of the investment fund sector to monetary policy shocks and the implications of this for financial stability. The investment fund sector has more than doubled in size since the global financial crisis. As the sector grows, so does its importance for the funding of economic activity and the transmission of monetary policy. But excessive risk-taking by funds can also have damaging effects for the wider financial system when it contributes to high levels of corporate leverage or when risky asset holdings need to be unwound quickly in times of market stress, as occurred in March 2020.

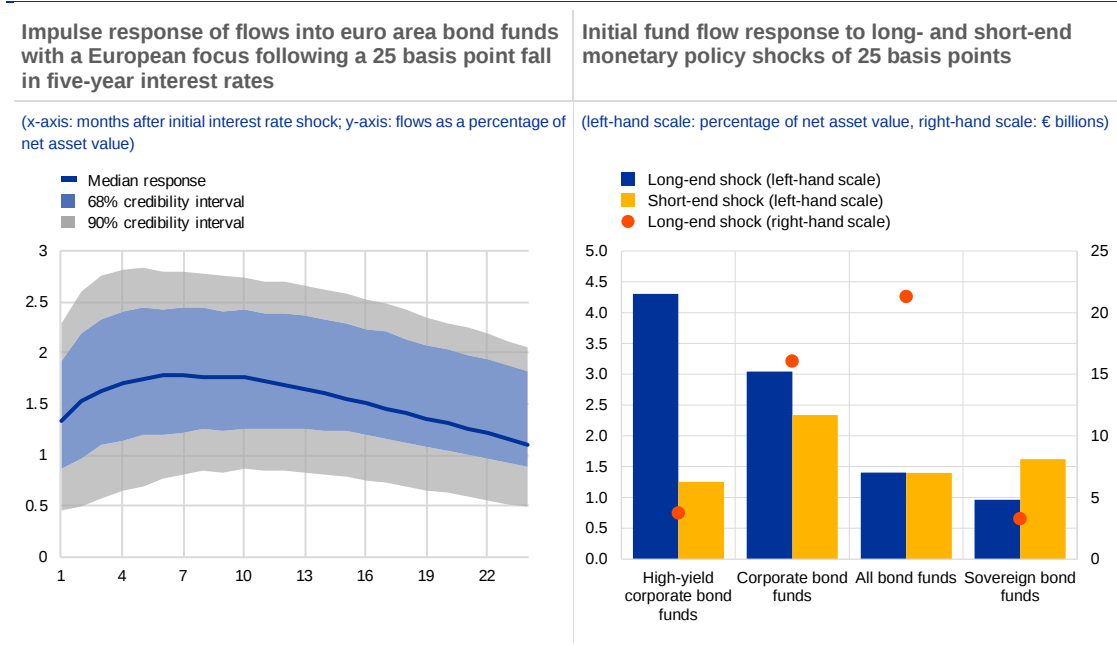
Aggregate flows into investment funds are highly responsive to monetary policy, with investors clearly demonstrating search-for-yield behaviour. Extended periods of low interest rates may then result in riskier parts of the fund sector expanding. However, this also suggests that

³⁵ See Chapter 4 on Non-banks in *Financial Stability Review*, ECB, May 2020.

the ECB's pandemic emergency purchase programme (PEPP) and pandemic emergency longer-term refinancing operation (PELTRO) announcements played a key role in stemming outflows from high-yield and corporate bond funds following the outbreak of the pandemic early last year. Empirical evidence further suggests that fund managers reduce liquidity holdings following expansionary monetary policy shocks, which points towards increased liquidity risk-taking. Insufficient liquidity holdings may have resulted in funds amplifying market dynamics following the outbreak of the pandemic.³⁶

Chart A

Investors' search for yield in response to expansionary monetary policy shocks



Sources: EPFR Global, ECB Investment Funds Balance Sheet Statistics and authors' calculations.

Notes: Estimates in both panels are based on a BVAR model using monthly data between April 2007 and June 2019. Monetary policy shocks are identified using an adapted version of the method in Jarociński, M. and Karadi, P., "Deconstructing monetary policy surprises – the role of information shocks", *American Economic Journal: Macroeconomics*, Vol. 12, No 2, April 2020, pp. 1-43, using data provided by Altavilla, C., Brugnolini, L., Gürkaynak, R., Motto, R. and Ragusa, G., "Measuring euro area monetary policy", *Journal of Monetary Economics*, Vol. 108, December 2019, pp. 162-179. The model includes the five-year Bund yield, the five-year euro area NFC bond spread, the EURO STOXX index and its volatility (VSTOXX). The left panel shows the median impulse response function, with areas shaded blue (grey) denoting 68% (90%) credibility intervals after a monetary policy shock equivalent to a 25 basis point reduction of the five-year euro area risk-free rate. The right panel shows the first-month response for different fund types. The monetary policy shocks are equivalent to a 25 basis point reduction in the five-year euro area risk-free rate for long-end shocks and in the three-month OIS for short-end shocks. Flows examined are to funds with euro area domicile and European investment focus.

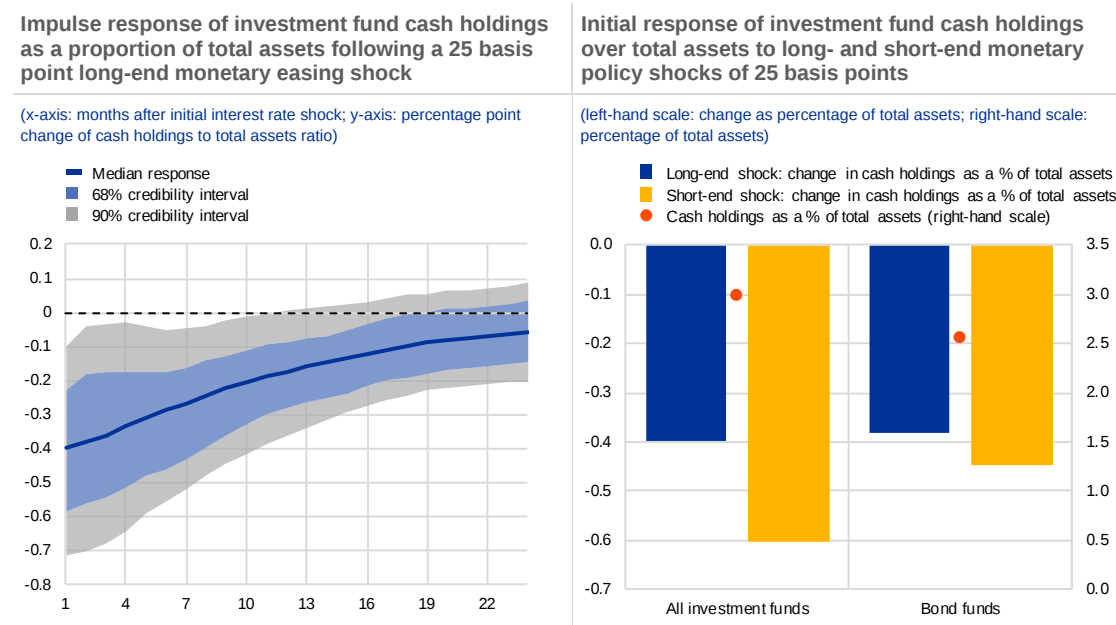
An accommodative monetary policy shock is associated with persistent net inflows into bond funds, which are strongest most notably for riskier bond fund types. The analysis focuses on shocks to the longer end of the yield curve to reflect a baseline monetary policy measure, given the extensive use of unconventional tools over the period considered, starting in 2007. A 25 basis point reduction in the five-year euro area risk-free rate is followed by large and persistent inflows across the investment fund sector. For bond funds, these amount to 1.8% of net asset value after six months (**Chart A**, left panel). These inflows are even larger for riskier fund types (**Chart A**, right panel). This risk-taking channel of monetary policy involving funds has economically significant effects, with different bond fund categories experiencing inflows of between €4 billion and €22 billion in the first month after the shock. There is less evidence of risk-taking from end investors following short-end shocks to the short-end of the yield curve. High-yield funds receive smaller proportional inflows than

³⁶ See the ECB blog post "[The ECB's commercial paper purchases: A targeted response to the economic disturbances caused by COVID-19](#)" and Chapter 4 in the *Financial Stability Review*, ECB, May 2020.

any other type of bond fund, whereas the flow response for corporate and sovereign bond funds is broadly similar for short- and long-end shocks.

Chart B

Fund managers reduce cash holdings in response to expansionary monetary policy shocks



Sources: EPFR Global, ECB Investment Funds Balance Sheet Statistics and authors' calculations.

Note: The monetary policy shock is equivalent to a 25 basis point reduction in the five-year euro area risk-free rate for long-end shocks and in the three month OIS for short-end shocks.

Asset managers also persistently reduce fund cash holdings following announcements of expansionary monetary policy (Chart B, left panel). First, a low or negative interest rate environment makes it more expensive to hold cash, thus increasing the attractiveness of riskier securities to help improve fund profitability. Second, the introduction of the ECB's asset purchase programme eased liquidity conditions in bond markets,³⁷ which may have resulted in fund managers reducing cash positions and relying to a higher degree on improved bond market liquidity conditions. While this shift towards riskier assets aids the transmission of monetary policy and may help to support the real economy in the short run, excessively low liquidity holdings leaves funds vulnerable to large outflows during periods of stress. If this results in funds having to engage in fire sales to meet crisis-related redemption needs, this may undermine market functioning, credit provision and ultimately the transmission of monetary policy. Shocks to short-term rates have a greater relative impact on funds' cash holding than shocks to long-term rates (Chart B, right panel). This suggests that interest rate changes which directly affect the short-term cost of holding cash are, in relative terms, more important drivers of fund liquidity than quantitative easing policies, which affect the long end of the yield curve.

It is important to devise macroprudential policies that could help restrict risk building up in the investment fund sector during extended periods of accommodative monetary policy. For example, pre-emptive liquidity policies, such as usable liquidity requirements, or a better alignment of fund redemption terms with asset liquidity may help to mitigate the build-up of vulnerabilities in the

³⁷ See De Santis, R., Geis, A., Juskaite, A. and Vaz Cruz, L., "The impact of the corporate sector purchase programme on corporate bond markets and the financing of euro area non-financial corporations", *Economic Bulletin*, Issue 3, 2018, ECB, pp. 66-84.

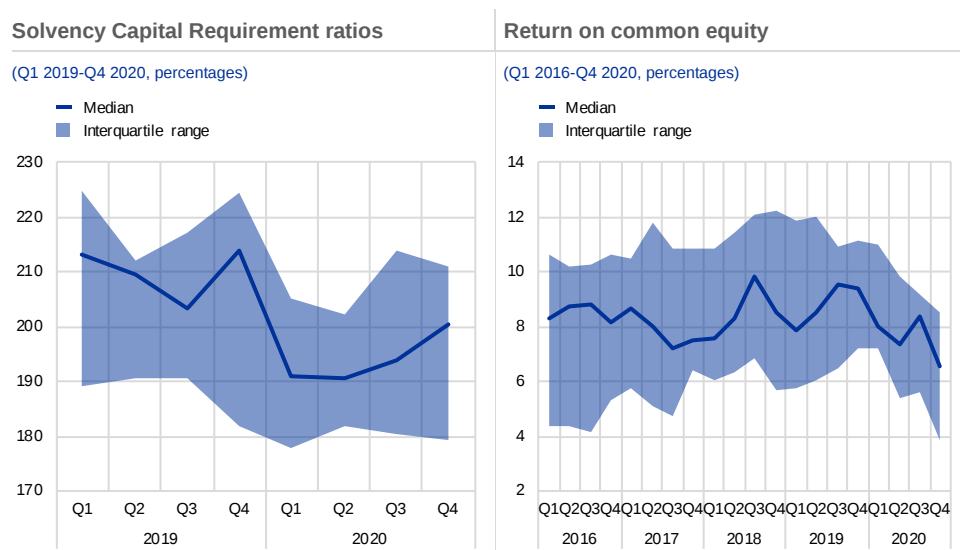
fund sector. This may increase the resilience of the financial system as a whole.³⁸ By reducing the likelihood of fund risk-taking amplifying market disruptions, such measures could also support the smooth transmission of monetary policy by ensuring stable funding for the economy and reduce the need for additional central bank intervention in times of crisis.

4.3 Insurers engage in further risk-taking, but could benefit from the moderate increase in global interest rates

While the profitability of euro area insurance companies remains subdued, their capitalisation has started to recover. Towards the end of 2020, solvency ratios already regained more than half of the decline that occurred amid the initial coronavirus shock (see [Chart 4.6](#), left panel). By contrast, insurers' profitability still lies significantly below multi-year averages (see [Chart 4.6](#), right panel).

Chart 4.6

While solvency ratios have mostly recovered from the coronavirus shock, insurers' profitability remains below multi-year averages



Sources: Bloomberg Finance L.P. and ECB calculations.

Notes: Based on a sample of up to 25 large euro area insurers offering life and non-life products. The full sample is not covered in 2020 due to reporting lags.

Despite the signs of improvement in the economic outlook, the insurance sector remains under pressure from low interest rates and weak demand. The economic fallout from the pandemic led to a further fall in interest rates over 2020 together with higher financial market volatility. These developments weighed on the sector's investment income. In addition, the recession and the ongoing uncertainty surrounding the pandemic meant that sales of life and savings products remained subdued, despite higher household saving. Non-life insurers also saw their new

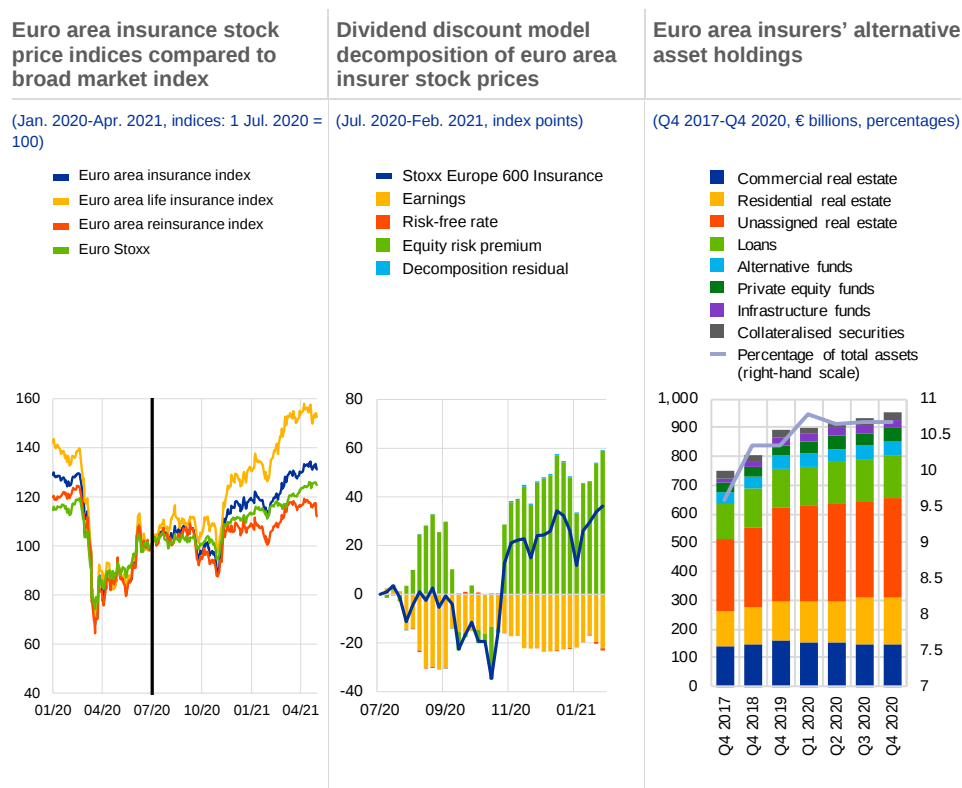
³⁸ Policy options would need to depend on the type of fund and an in-depth analysis of options is needed before considering implementation.

business contract, although the sector is benefiting from rising policy prices and generally solid underwriting profitability. This has been particularly evident in retail business lines like motor insurance where fewer loss events were registered due to lockdown measures. Going forward, a materialisation of credit risks (see [Chapter 1](#)) could further weigh on insurers' profits.

Even though profitability prospects remain muted, insurers' stock valuations have recovered from last year's losses. The stock market valuations of insurance corporations increased over 2020 in tandem with the broader equity market (see [Chart 4.7](#), left panel). Life insurers significantly outperformed most other market segments, primarily because the recent moderate steepening of the yield curve has improved investor sentiment towards the sector. This development contrasts with the trend observed over recent years, when life insurance stocks typically performed worse than the overall market. A decomposition of insurance stock prices shows that the sector's valuation gains are mainly driven by the positive sentiment on stock markets that started to resurface in November 2020 (see [Chart 4.7](#), middle panel). At the same time, the weak profitability prospects for the sector continue to hold down insurers' valuations.

Chart 4.7

Euro area insurers' stock valuations have recovered from last year's losses despite muted profitability prospects



Sources: Refinitiv, EIOPA and ECB calculations.

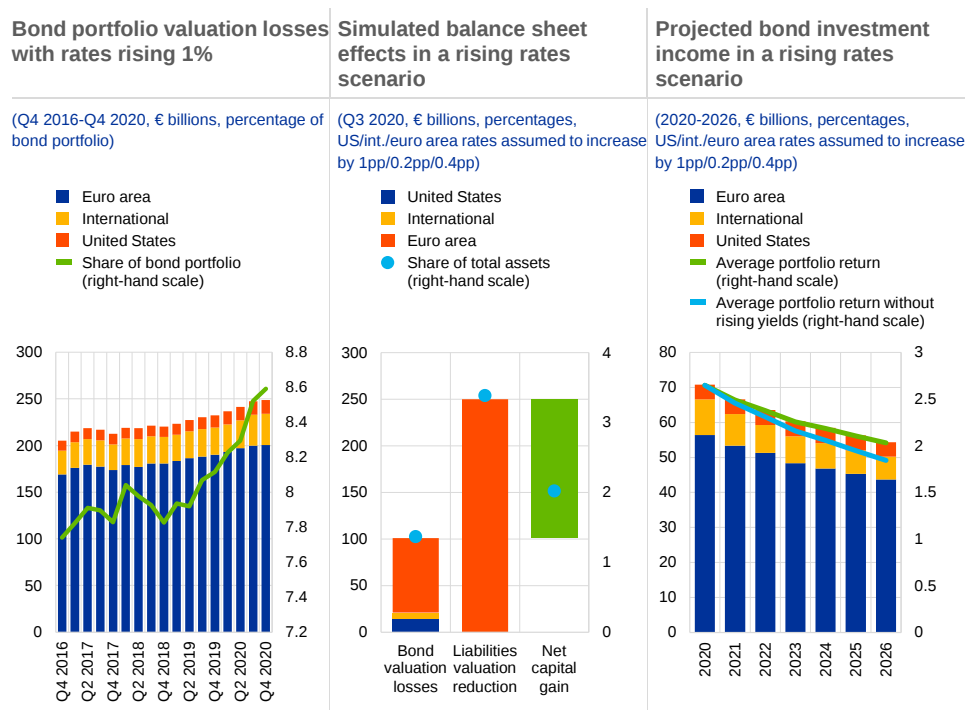
Notes: Left panel: indices are normalised to 100 on 1 July 2020. Middle panel: the "risk-free rate" category only captures the effect of the discount factor. Interest rate changes that affect profitability are incorporated in the "earnings" category.

Insurers are taking on more risk as they increase their investments in alternative asset classes.

Amid decreasing income from debt securities portfolios, insurers have continued gradually increasing their exposures to higher yielding but potentially riskier alternative assets (see [Chart 4.7](#), right panel). Around 70% of these holdings are invested in real estate-related assets. Exposures to commercial real estate in particular could suffer credit and valuation losses if the pandemic-accelerated shift towards more working from home and online shopping persists after lockdown restrictions are lifted (see [Chapter 1.5](#)). This could have a sizeable impact on insurers' solvency. Empirical analysis shows that a 10% decline in the value of commercial real estate holdings could wipe out as much as 4% of aggregate insurance excess of assets over liabilities in the EU.³⁹

Chart 4.8

Insurers' bond portfolio valuations decline as global rates rise, but effects on capitalisation more than offset these losses due to negative duration gaps



Sources: ECB (securities holdings statistics and Centralised Securities Database), EIOPA and ECB calculations.

Notes: Left panel: the changes in price due to an interest rate increase of one percentage point are calculated as the sum of modified durations multiplied by nominal amounts held at the security level multiplied by 0.01. Middle panel: rates on US portfolios are assumed to rise by 1%. Rates on euro area and international portfolios are assumed to rise by 0.4% and 0.2% respectively. The relative sizes of rate changes are based on a change in the ten-year US Treasury yield between December 2020 and March 2021 relative to the changes in the euro area ten-year AAA-rate and the Bloomberg Barclays Global Government excluding US and Europe bond index respectively. Bond valuation losses are calculated based on the same metric as in the left panel. Liabilities valuation reductions are calculated as the amount of technical reserves of euro area life insurers in the third quarter of 2020 multiplied by the average duration of liabilities multiplied by 0.355%. The quantification abstracts from valuation changes in other parts of insurers' portfolios, the application of regulatory measures, such as the volatility adjustment, and details on Solvency II treatment of technical provisions, such as the inclusion discretionary profit sharing. Right panel: it is assumed that all securities currently in the portfolio are held to maturity. All maturing securities are assumed to be rolled over so that the debt portfolio size is kept constant. Under the projection shown by the light blue line, all rolled-over securities are reinvested at the average yields of newly issued debt purchased by insurers during the fourth quarter of 2020. Projections in bars and the green line assume the same interest rates plus the additional yield rise that are used in the middle panel.

³⁹ See the analysis in the chapter entitled "Developments in commercial real estate", *Financial Stability Report*, European Insurance and Occupational Pensions Authority (EIOPA), December 2020.

Although insurers have accumulated record-high exposures to duration risks, higher interest rates would boost the sector's capitalisation significantly due to negative duration gaps. If interest rates on insurers' fixed income holdings increased by 1%, asset valuation losses would amount to 8.6% of the bond portfolio (€250 billion) compared to 7.7% (€200 billion) four years ago (see [Chart 4.8](#), left panel). Global interest rates have started rising in 2021, particularly in the United States. This trend has affected euro area rates, which have also increased albeit more mildly (see [Chapter 2](#)). Under a scenario of moderately higher interest rates abroad in 2021, euro area insurers' bond portfolios could lose around €20 billion in value, which could translate into capital losses of the same size (see [Chart 4.8](#), middle panel).⁴⁰ However, the largest share of insurers' fixed income portfolios (78%) is invested in euro area assets while only about 7% is invested in US assets. Moreover, the sector has a negative duration gap on its balance sheets, with a weighted average duration of assets and liabilities of 7.3 and 13.3 years respectively at the end of 2019. As a result, even a small rise in interest rates in the euro area would lead to sizeable reductions in insurers' liabilities by an estimated €250 billion. This decrease would more than offset all asset valuation losses and could lead to net capital gains of more than €150 billion (2%).⁴¹

Moderately higher interest rates would only partially dampen the deterioration of insurers' investment income over the next few years. Under the interest rate changes assumed, the average portfolio return would fall to 2% five years ahead compared to 1.8% in a scenario in which interest rates do not increase (see [Chart 4.8](#), right panel). A more significant improvement in investment income prospects would require much larger changes in interest rates. Consequently, the revenue outlook for the insurance sector remains muted.

⁴⁰ As euro area insurers' liabilities are predominantly denominated in euro, their value would not react to higher interest rates abroad.

⁴¹ The estimated effects on the capitalisation would be less benign to the extent that the rising interest rates depress stock and corporate bond valuations in insurers' portfolios.

5 Macprudential policy issues



5.1 Supporting economic recovery and the resilience of the banking sector amid pandemic-related vulnerabilities

Since the November 2020 FSR, policy measures have continued to support financial stability by limiting corporate insolvencies and containing rising unemployment. With many euro area countries facing renewed surges in infections, lockdown measures have been reinstated and economic support policies maintained or extended, increasingly in a more targeted and selective manner.⁴² Taken together, the extension of economic, monetary, prudential and other support measures has

⁴² Economic support measures have been largely extended into 2021, but in several cases in a more targeted manner (see also the discussion in Chapters 1 and 3 on the role of guarantees and moratoria).

underpinned the functioning of the financial system, prevented widespread bank deleveraging and maintained generally accommodative credit conditions.⁴³

As pandemic and economic conditions allow, extensive policy support, particularly for corporates, could gradually move from being broad based to more targeted.⁴⁴ As long as significant lockdown measures remain in place to control the pandemic in euro area countries, economic policy support that prevents viable companies from failing and unemployment from rising considerably will also protect near-term financial stability. As parts of the economy become better adapted to lockdown measures, increasingly targeted extensions of policy support across euro area countries are already contributing towards limiting the medium-term financial stability side effects and should be continued. These adverse effects arise from the growth in sovereign and corporate indebtedness and the allocation of resources to potentially non-viable, “zombie” companies (see [Special Feature A](#)), which increase balance sheet vulnerabilities of sovereigns, corporates and banks. Adjusting support schemes to strengthen mechanisms for assessing the future viability of beneficiaries or promote debt/equity restructuring for highly leveraged but viable firms could be a particularly useful way of managing financial stability side effects (for example, through existing initiatives such as quasi-equity instruments and the partial conversion of guaranteed loans into direct grants).⁴⁵ Moreover, fast and effective use of the €750 billion Next Generation EU (NGEU) recovery funds should complement national support measures to mitigate cross-country divergences in the coming years.⁴⁶

For banks specifically, capital relief measures should continue to prevent excessive deleveraging, which could negatively impact the economic recovery. Credit risk and losses for banks are expected to materialise as some businesses suffer permanent damage from the pandemic and become unviable. Therefore, as highlighted in previous issues of the FSR, it is crucial that bank capital buffers are usable to absorb losses and to avoid procyclical financial amplification effects due to, for example, bank deleveraging. At the same time, managing non-performing loans (NPLs) effectively will also be key to reducing the drag on bank balance sheets and supporting lending. In this context, the prudent approach to capital distributions has been extended and adapted from the initial guidance asking financial institutions to refrain from making any distributions to shareholders. Following the updated guidance, banks can proceed with capital distributions up to a conservative threshold set by the competent authorities.⁴⁷ Banks are expected to exercise extreme prudence

⁴³ For example, while a decision to extend the leverage ratio exemption of central bank reserves has not yet been taken, a continued exemption would help support the implementation and transmission of policies such as the pandemic emergency purchase programme (PEPP) and the targeted longer-term refinancing operations (TLTROs). Note that the banking system as a whole cannot avoid holding (in the form of central bank reserves) the excess liquidity created by monetary policy decisions.

⁴⁴ See also “[COVID-19 support measures – Extending, amending and ending](#)”, Financial Stability Board, April 2021.

⁴⁵ These initiatives benefit from the European Commission’s prolonged and expanded State Aid Temporary Framework, including the increase in aid ceilings and the possibility to convert repayable instruments such as guaranteed loans into direct grants.

⁴⁶ See Section 1.2 for a more in-depth discussion of the NGEU package.

⁴⁷ On 15 December 2020, the European Systemic Risk Board [extended the recommendation](#) on restrictions of distributions during the COVID-19 pandemic until September 2021 and introduced certain amendments. National authorities complied with the recommendation. On the same day, the ECB also [extended its recommendation](#) on dividend distributions accordingly until 30 September 2021.

and engage in discussion with the competent authorities before taking any action on dividend distributions or share buybacks.⁴⁸

Banks will retain investor confidence by ensuring the proper and timely identification of credit risk, supporting this by using capital buffers in case of need.⁴⁹ Given the potential for losses to materialise, the ability to distinguish between viable and non-viable borrowers becomes increasingly essential to supporting a robust recovery. The policy guidance issued since the November 2020 FSR has continued to emphasise the need to set aside adequate provisions based on assumptions appropriate for the current risk environment and, more generally, to identify credit risk in a timely manner.⁵⁰

However, preliminary evidence points to banks' reluctance so far to use available capital space. In particular, initial evidence suggests that banks with less capital headroom above regulatory buffers appear reluctant to use these buffers by letting capital ratios decrease,⁵¹ despite supervisors communicating that they expect these buffers to be used.⁵² In recent quarters, lending to corporates by banks with a smaller capital headroom on top of the combined buffer requirement (CBR) has decreased significantly (see [Chart 5.1](#)). The preliminary evidence points to a more pronounced weakening of credit provision to non-financial corporations, a stronger reduction in risk weights and a tightening in lending conditions by banks closer to the CBR relative to other banks.⁵³ For the moment, these procyclical adjustments may have only limited implications for aggregate credit supply due to the limited number of banks close to the CBR threshold. Nevertheless, if credit risk materialises and more banks approach the threshold, there is the risk that procyclical adjustments could become more systemic.

⁴⁸ Additional analysis indicates that restrictions on distributions increase the resilience of banks by ensuring that capital is used to support the real economy and absorb losses. At the same time, however, they may negatively affect bank valuations due to the uncertainty over future distributions (see also the forthcoming issue of the ECB Macprudential Bulletin).

⁴⁹ For a broader overview of policy actions taken since the beginning of the pandemic, see Chapter 5 of the May and November 2020 issues of the FSR.

⁵⁰ See the discussion in Chapter 3, as well as the December 2020 [ECB Banking Supervision guidance on the identification and measurement of credit risk in the context of the coronavirus \(COVID-19\) pandemic](#), and the April 2021 [press release on the targeted review of internal models](#), which emphasises the importance of accurate modelling of credit risk parameters. In addition, the [EBA guidelines on legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 crisis](#) (originally extended until end-March 2021) have not been renewed.

⁵¹ Banks' willingness to accept a decline in capital ratios can be undermined by a number of factors, including market, supervisory, macroprudential and regulatory factors (see Behn, M., Rancoita, E. and Rodriguez d'Acri, C., "[Macprudential capital buffers – objectives and usability](#)", *Macprudential Bulletin*, Issue 11, ECB, October 2020).

⁵² See, for example, "[ECB Banking Supervision provides temporary capital and operational relief in reaction to coronavirus](#)", press release, 12 March 2020; "[Basel Committee meets; discusses impact of Covid-19; reiterates guidance on buffers](#)", press release, Bank for International Settlements, 17 June 2020; and "[FSB Chair's letter to G20 Finance Ministers and Central Bank Governors: July 2020](#)", Financial Stability Board, 15 July 2020.

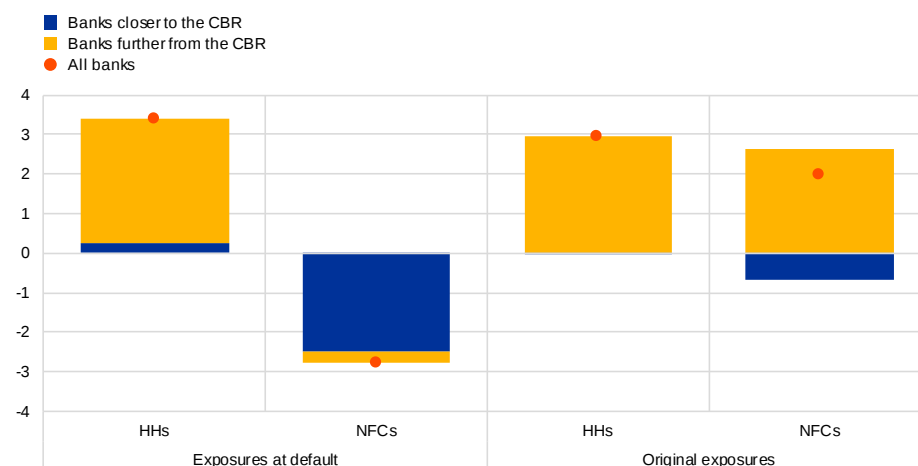
⁵³ These preliminary findings are also confirmed by multivariate analyses that make it possible to control for bank-level characteristics, the macro-financial environment and credit demand. Moreover, the combination of simple chart-based evidence measured in terms of exposures at default and original exposures makes it possible to identify bank reactions which are driven by capital-related and fiscal policy-related incentives. More specifically, exposure at default developments are useful for monitoring the exposures that must be covered by capital, while original exposure developments, which are not subject to credit risk mitigation, provide information on credit that is originated by banks and reaches the real economy.

Chart 5.1

Preliminary evidence points to stronger deleveraging since the start of the pandemic by banks that are close to the CBR

Non-financial private sector exposures

(Q1-Q4 2020, percentage changes)



Source: ECB supervisory data.

Notes: Exposures measured at default (left) and before credit risk mitigation is applied (right). The category “banks closer to the CBR” includes nearly 30 significant institutions under the direct supervision of the ECB (accounting for roughly 40% of total credit risk exposures of all significant institutions), which by the end of the first quarter of 2020 had a buffer on top of the CBR of less than 3%. CBR: combined buffer requirement; HHs: households; NFCs: non-financial corporations.

In the medium term, a higher share of releasable capital buffers could be considered, as this can enhance banks’ ability to absorb losses and continue providing key financial services in a crisis. An enhanced role for releasable capital buffers could strengthen authorities’ ability to act countercyclically. It would also reflect the increasingly important role that macroprudential policy needs to play as the first line of defence in preserving financial stability in the face of a severe, system-wide shock. Any change to the buffer framework should ensure continued compliance with the applicable international standards set by the Basel Committee on Banking Supervision.

Concerns regarding the expected deterioration in asset quality in the banking sector reinforce the need for effective NPL solutions. Among several initiatives under way, the European Commission’s action plan on tackling non-performing loans emphasises two key objectives: (i) the continued development of secondary markets for distressed assets; and (ii) reform of insolvency and debt recovery frameworks.⁵⁴ The first objective has already played a key role in NPL reductions in some Member States (e.g. Greece and Italy) in recent years. This requires an appropriate balance to be struck between strengthening common standards and market transparency, on the one hand, and avoiding excessive administrative barriers to entry to the NPL market, on the other hand. The second objective aims to reduce costs and delays, which would translate into higher recoveries for banks and investors, together with higher NPL valuations in the market. Moreover, further initiatives may be necessary if NPLs increase beyond current expectations. A common EU blueprint for NPL securitisations

⁵⁴ “Action plan: Tackling non-performing loans (NPLs) in the aftermath of the COVID-19 pandemic”, European Commission, 16 December 2020.

benefiting from government guarantees might also be useful. EU policymakers should also consider options to restructure and recapitalise distressed but viable companies. A more flexible application of the Commission's framework for public support that would make it easier to set up asset management companies could complement policy efforts to manage potential systemic NPL problems.

Given the low interest rate environment and profitability challenges, efforts to address structural issues across banks should intensify. The euro area banking sector is hampered by low cost-efficiency, limited revenue diversification and overcapacity. Banks have increased cost-cutting efforts in response to the pandemic by further reducing the number of staff and branches, but low profitability may limit the required digital transformation. Consolidation via mergers and acquisitions could be one potential avenue for reducing overcapacity in the sector. This process should be market-driven but can also be supported by completing the banking union and removing barriers to consolidation, such as differences in national insolvency and taxation regimes and restrictions on the free flow of capital and liquidity within banking groups.

The timely, full and consistent application of the Basel III framework remains essential with a view to strengthening banks' resilience to withstand future shocks. Deferring the implementation timeline by one year freed up operational capacity for banks and supervisors to respond to the immediate priorities related to the pandemic without affecting the substance of the reforms. These reforms, which reflect important lessons learned from the global financial crisis, are necessary to further strengthen the regulatory framework for banks. The ECB's updated macroeconomic impact assessment shows that the economic costs of implementing the reforms are modest and temporary, and outweighed by their permanent benefits in terms of strengthening the resilience of the economy to adverse shocks.⁵⁵ It also finds that potential deviations from the globally agreed Basel III reforms – for example, with regard to the output floor – would dilute the benefits to the real economy.

Where ongoing developments point to increasing vulnerabilities, such as in the residential real estate (RRE) sector, policies should prudently balance procyclical considerations against the need to stem the build-up of risk. Capital already built up to target RRE risks should only be released to facilitate loss absorption if losses start to materialise. At the same time, heightened vulnerabilities require careful monitoring. Going forward, it could be worth considering gradually activating or tightening borrower-based measures, but not before economic conditions stabilise and the impact of the pandemic on RRE markets is clearer. Nonetheless, such considerations should carefully consider the stage of the RRE cycle and any potential procyclical effects on demand, especially from income-based limits.

⁵⁵ See "The macroeconomic impact assessment of Basel III finalisation in Europe", ECB, forthcoming.

5.2 Further steps towards developing macroprudential policies for non-banks

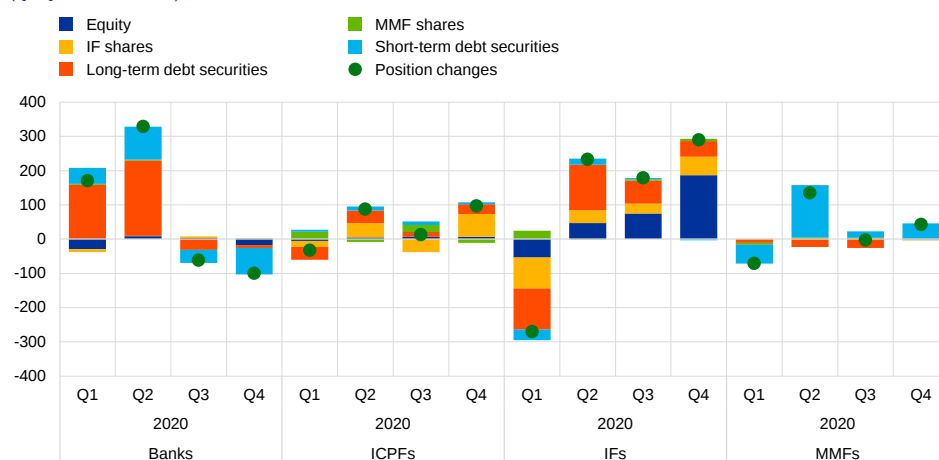
The market turmoil in March 2020 exposed structural fault lines in the non-bank financial sector – in particular liquidity mismatches in investment funds. Many money market funds (MMFs) and open-ended investment funds faced acute liquidity stress last spring owing to significant outflows and difficulties in selling assets in markets with little or no secondary trading. These funds responded to this liquidity pressure by acting procyclically through asset sales (see [Chart 5.2](#) and [Box 6](#)). Over 200 European investment funds also suspended redemptions.⁵⁶ This behaviour added to pressure on asset valuations and market liquidity, contributing to the tightening of funding conditions in the real economy. This tightening ultimately only eased when central banks took extraordinary policy action. Furthermore, renewed risk-taking and growing liquidity mismatches in funds in recent months continue to pose increasing risks (see [Chapter 4](#)).

Chart 5.2

Investment funds shed large amounts of securities during the March market turmoil and have been rebuilding positions since then

Securities transactions by euro area sector and asset class

(Q1-Q4 2020, € billions)



Source: ECB securities holdings statistics.

Notes: The net transactions of investment funds in the first quarter of 2020 amounted to -€271 billion, calculated as the sum of transactions in MMF shares (+€25 billion), equity (-€54 billion), shares of other investment funds (-€90 billion) and debt securities (-€152 billion). The transactions in debt securities can be further broken down into transactions in government debt (-€93 billion), bank debt (-€22 billion), debt issued by other financial institutions (-€27 billion) and debt issued by non-financial corporations (-€10 billion). See also Chart 4.4 in Chapter 4. ICPFs: insurance corporations and pension funds; IFs: investment funds; MMFs: money market funds.

A comprehensive macroprudential approach for non-banks remains a key missing element in the overall policy framework. Many investment funds, insurance corporations and pension funds are subject to relatively weak liquidity requirements. They are typically designed from a microprudential perspective. A comprehensive macroprudential approach instead would address structural vulnerabilities and emerging risks in the non-bank financial sector. This would lower the need for extraordinary central bank intervention to tackle significant market stress.

⁵⁶ Grill, M., Molestina Vivar, L. and Wedow, M., "The suspensions of redemptions during the COVID-19 crisis – a case for pre-emptive liquidity measures?", *Macprudential Bulletin*, Issue 12, ECB, April 2021.

Furthermore, it would also complement monetary policy in good times, thereby further aligning the financial stability and monetary policy mandates of central banks.

The Financial Stability Board (FSB) is expected to issue recommendations aimed at strengthening the resilience of the non-bank financial sector. Once issued, they should be swiftly implemented in the EU as appropriate. These recommendations will stem from the ongoing FSB work on MMFs, open-ended investment funds and margining practices. The vulnerabilities in MMFs must be addressed, in particular by reducing their liquidity mismatch. This could be achieved by limiting investments in relatively illiquid assets or increasing liquidity buffers, which should be made more usable given the evidence that MMFs have been reluctant to draw down on their buffers in the past. These are among the measures being examined by the FSB in relation to the MMF sector.⁵⁷ Given the interdependencies of money markets across jurisdictions and currencies, this work is of particular importance for ensuring a globally consistent approach to policy reforms. Any FSB recommendations on MMFs should feed into the review of the EU Money Market Fund Regulation planned for 2022. For open-ended investment funds, minimum liquidity requirements could be considered to increase their asset liquidity profile, while requirements on redemption frequencies and notice periods would help to bolster their resilience, thereby reducing their reliance on crisis liquidity management tools.⁵⁸ Finally, it is important to assess whether tools to reduce excessive procyclicality in initial margins for derivatives – a topic relevant for both bank and non-bank financial institutions – need to be recalibrated and/or revised.⁵⁹ There is also scope for increasing the transparency and predictability of margining practices.

The ongoing review of the EU Solvency II framework could also strengthen the macroprudential approach to insurance companies. The proposal put forward by the European Insurance and Occupational Pensions Authority in its Opinion suggests introducing measures of a macroprudential nature that would usefully equip national supervisory authorities with additional powers to tackle systemic risk in insurance companies.⁶⁰ These include powers to introduce a capital surcharge for systemic risk, require the development of systemic risk and liquidity risk management plans, and temporarily freeze redemption rights. The Solvency II review could also consider other macroprudential aspects proposed by the European Systemic Risk Board such as new Pillar 2 liquidity provisioning requirements for insurers with a vulnerable liquidity profile and making the volatility adjustment symmetric to build capital buffers during good times.⁶¹

⁵⁷ Grill, M., O'Sullivan, S., Wedow, M. and Weistroffer, C., "[Liquidity transformation by investment funds: structural fault line or desirable financial transformation? A systemic perspective](#)", *Macroprudential Bulletin*, Issue 12, ECB, April 2021; and Capotă, L., Grill, M., Molestina Vivar, L., Schmitz, N. and Weistroffer, C., "[How effective is the EU Money Market Fund Regulation? Lessons from the COVID-19 turmoil](#)", *Macroprudential Bulletin*, Issue 12, ECB, April 2021.

⁵⁸ Giuzio, M., Grill, M., Kryczka, D. and Weistroffer, C., "[A theoretical model analysing investment funds' liquidity management and policy measures](#)", *Macroprudential Bulletin*, Issue 12, ECB, April 2021.

⁵⁹ See, for example, Cominetta, M., Grill, M. and Jukonis, A., "[Investigating initial margin procyclicality and corrective tools using EMIR data](#)", *Macroprudential Bulletin*, Issue 9, ECB, October 2019.

⁶⁰ See [Opinion on the 2020 Review of Solvency II](#), European Insurance and Occupational Pensions Authority, EIOPA-BoS-20/794, 17 December 2020.

⁶¹ See "[Response letter to a consultation of the European Commission on the review of Solvency II](#)", European Systemic Risk Board, 16 October 2020.

Box 6

Investment funds' procyclical selling and cash hoarding: a case for strengthening regulation from a macroprudential perspective

Prepared by Katharina Cera, Linda Fache Rousová, Angelica Ghiselli, Christoph Kaufmann and Sean O'Sullivan

During the March 2020 market turmoil, investment funds shed assets on a large scale – but was this selling commensurate with the outflows they faced or was it much larger? This box finds evidence of the latter, highlighting that the less regulated non-UCITS funds tended to engage in more procyclical selling and cash hoarding than UCITS funds.⁶² While it can be rational for fund managers individually to sell assets in excess of current outflows when uncertainty about future redemptions is high, such cash hoarding may be detrimental to the stability of financial markets from a macroprudential perspective.⁶³

To estimate the extent of excess selling by the investment fund sector, this box introduces a new measure of transactions relative to outflows – a “flow multiplier”. The flow multiplier is defined as the ratio between the fund sector's (net) transactions in securities and the (net) in/outflows to/from the sector of “external investors” (i.e. investors outside the universe of funds under consideration). If this ratio significantly exceeds one, the procyclical investment behaviour of investment funds is deemed excessive. To account for the fund sector's buying or selling of shares issued by other funds (“circular investment fund transactions”), the box proposes two versions of the flow multiplier – a narrow and a broad multiplier. The former ignores these intra-fund sector transactions, while the latter includes them in the numerator of the ratio.

The flow multiplier for euro area investment funds is, on average, close to 1 in good times, but takes on values of between 2 and 3.5 in stressed periods (see Chart A, left panel). This suggests that euro area funds tend to sell up to 3.5 times the volume of securities which investors redeem when markets are stressed. For example, euro area investment funds sold securities worth around €270 billion (including shares issued by other investment funds; see **Chart 5.2**) in the first quarter of 2020, even though external investors only redeemed around €85 billion.⁶⁴

The excess selling behaviour of funds in market downturns goes hand in hand with procyclical cash hoarding. In the first quarter of 2020, euro area investment funds increased their cash holdings by around €85 billion.⁶⁵ Based on a limited sample of funds where daily data on cash holdings are available, more than half of funds increased rather than decreased their cash positions in response to outflows in March 2020, thus amplifying sales in the markets (see **Chart A**, right panel). By contrast, in times of low market volatility, such as towards the end of 2019, a large proportion of investment funds instead tended to reduce their cash positions amid an increase in inflows. This suggests that funds also engage in procyclical cash management in good times, which can imply a build-up of liquidity risks in such periods (see **Section 4.2**). In general, procyclical cash

⁶² The classification of funds as UCITS and non-UCITS depends on whether they fall under the EU Directive on undertakings for collective investment in transferable securities (UCITS). UCITS funds are mutual funds that can be sold to retail investors and are perceived as non-speculative, diversified and well-regulated investments.

⁶³ Morris, S., Shim, I. and Shin, H.S., “Redemption risk and cash hoarding by asset managers”, *Journal of Monetary Economics*, Vol. 89, April 2017, pp. 71-87, show that cash hoarding behaviour is pervasive among fund managers when they face redemptions. For more recent evidence, see also Schrimpf, A., Shim I. and Shin, H.S., “Liquidity management and asset sales by bond funds in the face of investor redemptions in March 2020”, *BIS Bulletin*, No 29, Bank for International Settlements, March 2021.

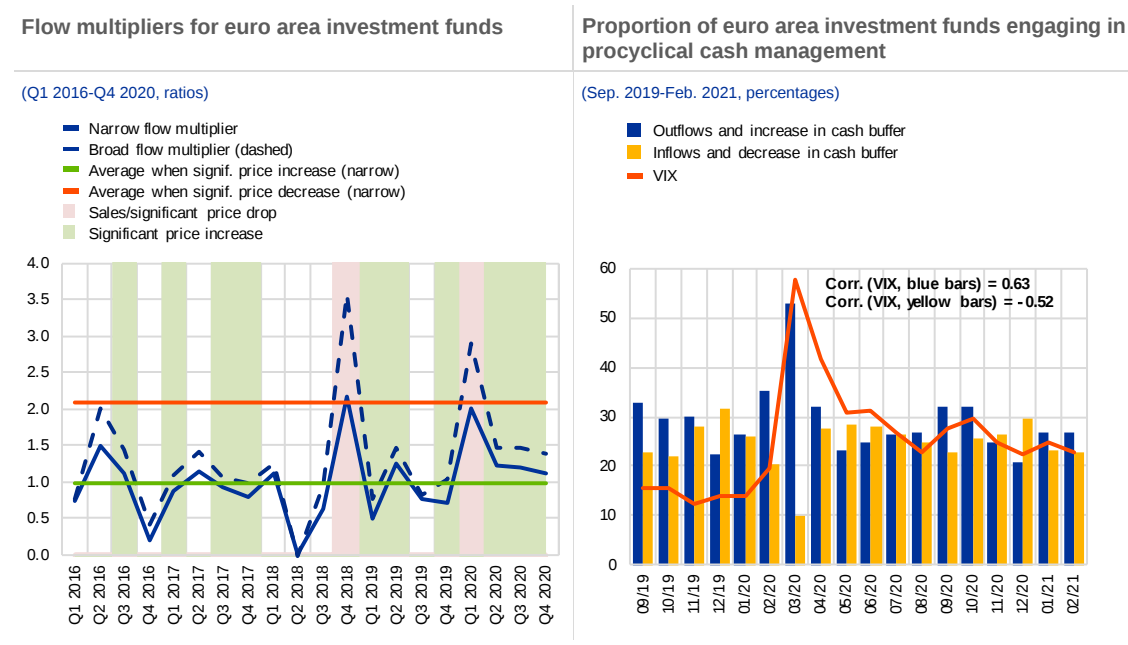
⁶⁴ The category of external investors refers to all sectors except for euro area investment funds. The amount is calculated as the sum of sales of euro area investment fund shares by non-euro area investors (€62 billion), euro area insurance corporations and pension funds (€19.5 billion) and other euro area sectors (€3.5 billion). The sector breakdown of non-euro area investors is not available.

⁶⁵ As derived from ECB investment funds balance sheet (IVF) statistics.

hoarding behaviour is highly correlated with financial market uncertainty and volatility as measured by metrics like the VIX.

Chart A

Asset sales and cash hoarding by investment funds during market downturns



Sources: ECB securities holdings statistics by sector, ECB money market statistical reporting (MMSR) dataset, IVF statistics, Refinitiv, Bloomberg L.P. and ECB calculations.

Notes: Left panel: securities include listed equity, debt securities, investment fund shares and MMF shares. Ratios are between total net transactions in securities by euro area investment funds and total net transactions of euro area fund shares by other sectors ("external investors"). Other sectors refer to all non-euro area investors and euro area sectors except the fund sector. The (narrow) broad multiplier (does not include) includes transactions in shares issued by euro area funds in the numerator of the ratio. Price increases/decreases are considered significant when the absolute quarterly price change of euro area investment fund portfolios (excluding euro area fund shares) exceeds 2%. Right panel: the sample of funds is restricted to up to 652 bond, equity and mixed funds which place their cash holdings with the banks reporting MMSR data and are available in the Refinitiv Lipper database. The spike for the March turmoil period can be observed for all three different fund types individually. Cash holdings mainly consist of deposits, call accounts, call money and repos. VIX: CBOE Volatility Index.

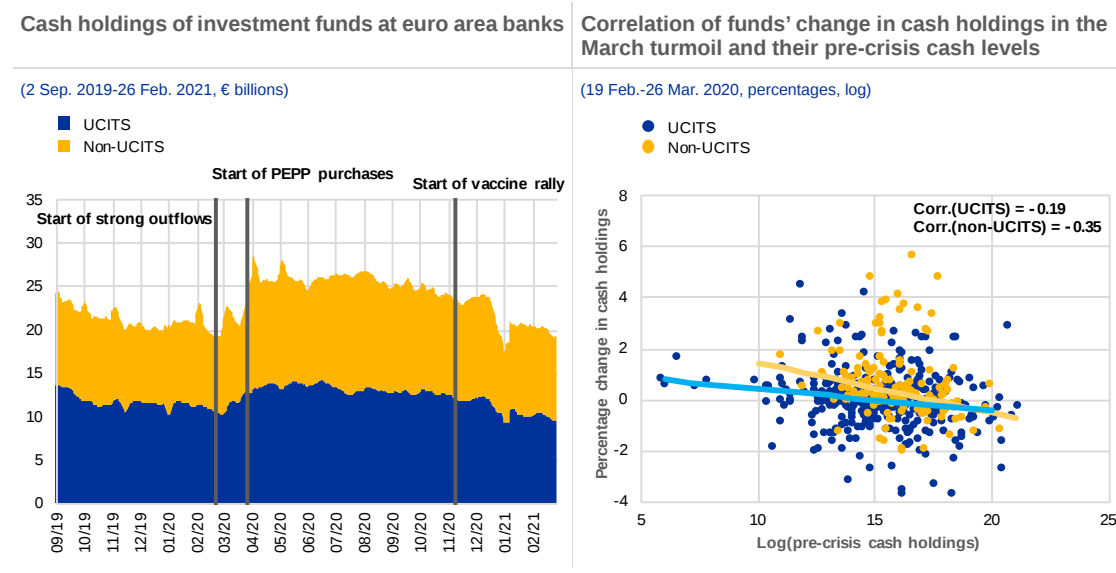
Investment fund cash hoarding during the March 2020 market turmoil was largely driven by the less regulated non-UCITS funds and those with smaller cash positions going into the crisis (see Chart B). Overall, cash placed with selected euro area banks by a sample of around 1,500 funds increased from approximately €20 billion to around €28 billion between mid-February and the end of March 2020.⁶⁶ Non-UCITS funds increased their cash holdings by 64%, compared with a more muted increase of 19% for UCITS funds (see Chart B, left panel). In addition, smaller pre-crisis cash positions were correlated with stronger cash hoarding, with the relationship being stronger for non-UCITS funds (see Chart B, right panel).⁶⁷

⁶⁶ It should be noted that due to differences in samples and reference periods, the increase in cash cannot be compared with the excessive selling described above.

⁶⁷ Schrimpf, A., Shim, I. and Shin, H.S., "Liquidity management and asset sales by bond funds in the face of investor redemptions in March 2020", *BIS Bulletin*, No 39, Bank for International Settlements, March 2021 have a related finding for US corporate bond funds and euro area government bond funds.

Chart B

Cash hoarding behaviour during the March market turmoil was more prevalent among less regulated non-UCITS funds, while funds with higher pre-crisis cash positions behaved less procyclically



Sources: ECB money market statistical reporting (MMSR) dataset, IVF statistics and ECB calculations.

Notes: Cash holdings mainly consist of deposits, call accounts, call money and repos. The sample of funds is restricted to bond, equity and mixed euro area funds which place their cash holdings with the banks reporting MMSR data. Left panel: the sample consists of around 1,500 mostly open-ended funds (coverage differs slightly by date). Overall developments in cash holdings are a good match with those of the wider universe (see Chart 4.5, left panel). Funds for which information on regulation is missing are excluded. The dynamics in cash holdings are driven by bond and mixed funds. A five-day moving average is applied for smoothing purposes. Right panel: the percentage change in cash holdings is calculated for the period between 19 February and 26 March 2020, while for pre-crisis cash holdings it is calculated on 19 February 2020. The regression lines and correlations shown in the chart are calculated based on the actual data. Start and end point of the lines are indicative. The dots display randomly drawn data points based on the actual data distributions and were added for illustrative purposes due to confidentiality restrictions of the actual data. The differences in correlations between UCITS and non-UCITS funds are robust for the three different fund types. The sample consists of 524 funds. PEPP: pandemic emergency purchase programme; UCITS: undertakings for collective investment in transferable securities.

These findings suggest the need to consider a macroprudential approach to mitigate risks arising from such procyclical behaviour. This box shows that investment funds generally behave procyclically through excess asset selling and cash hoarding in periods of market stress. Funds with relatively high cash positions tend to hoard less cash amid market turmoil. Moreover, the degree of cash hoarding differs across regulatory fund types: UCITS funds engaged in relatively less procyclical cash hoarding than non-UCITS funds. To the extent that such procyclical behaviour generates significant wider spillovers, these results strengthen the case for considering enhanced liquidity requirements for investment funds from a macroprudential perspective (see also **Section 5.2**).⁶⁸ Further analysis would be required, for instance, to identify the extent to which structural factors such as the differences in the portfolio composition or leverage of UCITS and non-UCITS funds influence their procyclicality, and to consider the potential costs and unintended consequences of possible regulatory measures.

⁶⁸ See also, for example, "The Behavior of Fixed-income Funds during COVID-19 Market Turmoil", Global Financial Stability Notes No 2020/02, International Monetary Fund, December 2020, and "Holistic Review of the March Market Turmoil", Financial Stability Board, November 2020.

Table 1**Strengthening the banking union and other ongoing policy initiatives**

Further regulatory actions with structural implications for the broader financial sector	
Topic	Latest initiative
Banking union	First, establishing a European deposit insurance scheme (EDIS) will maintain depositor confidence across the banking union, which would be key in a future crisis. As a first step, an EDIS could cover liquidity needs for national deposit guarantee schemes, but its design needs to be conducive to a smooth transition to a steady state in which it also covers losses. Second, the crisis management framework for banks is currently ill-equipped to deal with the failure of smaller and medium-sized banks in an effective and cost-efficient way. The ongoing review of the crisis management and deposit insurance framework by the Commission – to which the ECB will contribute – provides an opportunity to address these shortcomings.
Crypto-assets	The proposed EU Regulation on Markets in Crypto-assets (MiCa Regulation) (see the ECB Opinion of February 2021) is expected to provide safeguards against risks to monetary policy transmission, financial stability, the smooth functioning of payment systems and market integrity by subjecting issuers and service providers of stablecoins/crypto-assets to authorisation, prudential and supervisory requirements.
€STR transition	A swift transition to the €STR in derivatives trading would support the smooth functioning of markets following EONIA's discontinuation (notably the overnight index swap market, which is critical for managing interest rate risk) and thereby support financial stability (no significant decrease in reliance has been observed relative to October 2020; see Box 2 entitled "Some way to go in the transition to the €STR", <i>Financial Stability Review</i>, ECB, November 2020).

Special features

A

Corporate zombification: post-pandemic risks in the euro area

Tobias Helmersson, Luca Mingarelli, Benjamin Mosk, Allegra Pietsch, Beatrice Ravanetti, Tamarah Shakir and Jonas Wendelborn⁶⁹

Policy measures aimed at supporting corporates and the economy through the coronavirus pandemic may have supported not just otherwise viable firms, but also unprofitable but still operating firms – often referred to as “zombies”. This has in turn raised questions about an increased risk of zombification in the euro area economy, which could constrain the post-pandemic recovery. Firm-level, loan-level and supervisory data for euro area companies suggest that zombie firms may have temporarily benefited from loan schemes and accommodative credit conditions – but likely only to a modest degree. These firms may face tighter eligibility criteria for schemes and more recognition of credit risk in debt and loan pricing in the future. Tackling the risk of zombification more fundamentally requires the consideration of suggested reforms to insolvency frameworks, and better infrastructure for banks to manage non-performing loans.

Introduction

Policy responses to the pandemic have revived the debate about the presence of unprofitable but still operating firms – often referred to as “zombies” – in the euro area. Since the sovereign debt crisis, there have been concerns about the potential existence of a cohort of failing firms that continue operating on the back of cheap credit and debt forbearance. It is argued that such firms weigh on economic productivity by trapping resources and crowding out the emergence of new, more productive companies.⁷⁰ Furthermore, the incentives for some banks to repeatedly extend or alter loan terms so as to avoid writing off their loans (forbearance) can also weigh on bank balance sheets over time, dampening banks’ profitability and capacity for new lending.⁷¹ Monetary, fiscal and prudential policy measures since the pandemic began have prevented a wave of insolvencies of otherwise viable and productive firms. They have done this through direct financial support, as well as by

⁶⁹ The authors are grateful to Benjamin Hartung, Paloma Lopez-Garcia, Giulio Nicoletti, Marek Rusnák, Ralph Setzer, Mika Tujula and Peter Welz for useful comments and discussions.

⁷⁰ See, among others, Caballero, R.J., Hoshi, T. and Kashyap, A.K., “Zombie Lending and Depressed Restructuring in Japan”, *American Economic Review*, Vol. 98, No 5, 2008, pp. 1943-1977; Adalet McGowan, M., Andrews, D. and Millot, V., “The walking dead? Zombie firms and productivity performance in OECD countries”, *Economic Policy*, Vol. 33, Issue 96, 2018, pp. 685-736; Acharya, V.V., Eisert, T., Eufinger, C. and Hirsch, C., “Whatever It Takes: The Real Effects of Unconventional Monetary Policy”, *The Review of Financial Studies*, Vol. 32, Issue 9, 2019, pp. 3366-3411; and Nurmi, S., Vanhala, J. and Virén, M., “The life and death of zombies – evidence from government subsidies to firms”, *Research Discussion Paper*, No 8/2020, Bank of Finland, 2020.

⁷¹ See Andrews, D. and Petroulakis, F., “[Breaking the shackles: Zombie firms, weak banks and depressed restructuring in Europe](#)”, *Working Paper Series*, No 2240, ECB, February 2019.

maintaining favourable credit conditions and introducing loan guarantee, loan moratorium and payment holiday schemes. But could these conditions have the unintended side effect of propping up unproductive and unviable firms? And, in turn, could this dampen the longer-term economic recovery and increase risks to the financial system?⁷²

This special feature explores how the pandemic may have affected such firms and the impact of recent policy responses and credit conditions. The analysis focuses on considering how firms that were not viable *before* the pandemic may have been affected by it, rather than on the issue of whether the pandemic itself will lead to sustained changes in preferences and technologies that make some business models no longer viable. First, firm-level data are used to estimate the extent of zombie firms in the euro area ahead of the pandemic, and to construct a new measure to assess which firms are vulnerable to becoming zombies. This then allows an examination at firm level of how the pandemic may have affected these firms' profitability and their eligibility for policy schemes, providing evidence of zombie firms benefiting from easy credit conditions.

Pre-pandemic prevalence of zombie firms in the euro area

Ahead of the pandemic the estimated share of zombie firms in the euro area was modest and declining, but still above the levels of the early 2000s (see Chart A.1). In the absence of a single definition, previous studies have defined zombie firms in various ways, but they generally agree on seeking out firms that are being artificially sustained by credit. In this special feature, building on the approach of Storz et al. (2017)⁷³, zombie firms are defined as those firms that meet all of the following three criteria over two consecutive years: (i) negative returns on assets (net income over total assets), identifying unprofitable firms; (ii) low debt servicing capacity (earnings before interest, taxes, depreciation and amortisation (EBITDA) over financial debt of below 5%), capturing indebted firms; and (iii) negative net investment (annual change in total fixed assets), to avoid capturing young firms. Using Orbis euro area firm-level data spanning fifteen years up until 2019⁷⁴ suggests an average euro area share of zombie firms of around 3.4% before the pandemic (see Chart A.1, left panel). This is above the 2% share in the early 2000s, but below the peaks of almost 6% following the euro area sovereign debt crisis.⁷⁵

The higher level of zombie firms following the global financial crisis partly reflects the low interest rate environment, weaker banks and inefficient

⁷² "Reviving and Restructuring the Corporate Sector Post-Covid: Designing Public Policy Interventions", Group of 30, 2020.

⁷³ Storz, M., Koetter, M., Setzer, R. and Westphal, A., "Do we want these two to tango? On zombie firms and stressed banks in Europe", *Working Paper Series*, No 2104, ECB, October 2017.

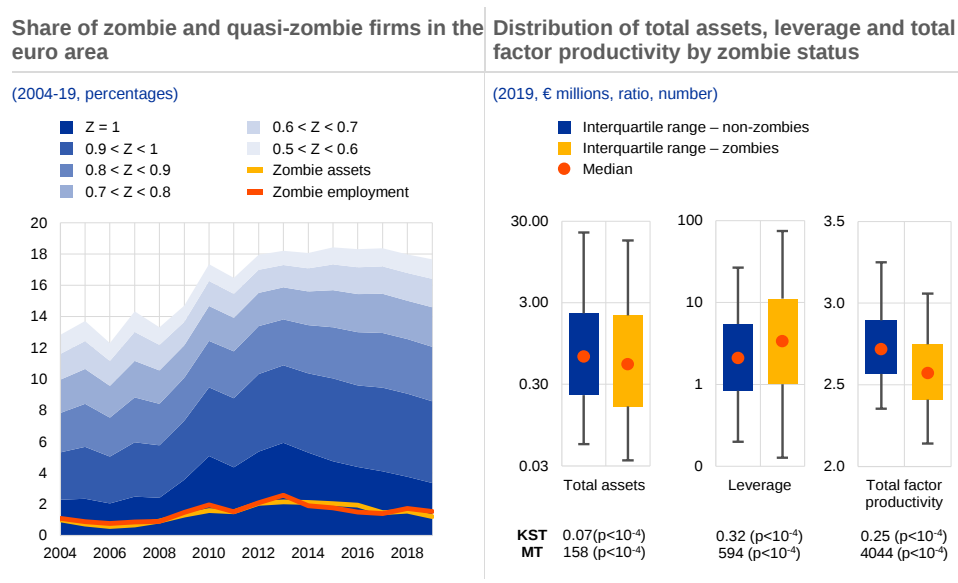
⁷⁴ The Bureau van Dijk's Orbis database provides balance sheet information for millions of firms globally. Applying the filters laid out in Storz et al. (op. cit.), our sample comprises around 13 million firm-year observations for euro area non-financial firms between 2004 and 2019.

⁷⁵ A similar evolution of the share of zombies over time is found when looking at a very strict indicator of vulnerable firms based on the ECB Survey on the Access to Finance of Enterprises (SAFE). These are firms that have reported simultaneously lower turnover, decreasing profits, higher interest expenses, and a higher or unchanged debt-to-total assets ratio in the last six months.

insolvency frameworks. Acharya et al. (2020)⁷⁶ find evidence for 12 European countries that the share of zombie firms has significantly increased since the global financial crisis, reaching an asset-weighted share of 6.7% in 2016. Banerjee and Hofmann (2020)⁷⁷ use a sample of publicly listed firms from 14 OECD countries and find an increase in the share of zombie firms from around 4% in the mid-1980s to almost 15% in 2017.

Chart A.1

Ahead of the pandemic, the euro area share of zombie firms was still above pre-financial crisis levels, and they had lower productivity than other firms



Sources: Bureau van Dijk – Orbis and ECB calculations.

Notes: Left panel: share of zombie firms based on the number of firms, the share of total assets held by zombie firms and the share of employment in zombie firms. Due to a two-year structural reporting lag, estimates are available only until 2019. The zombie score Z is a dimensionless number in the unit interval, with $Z = 1$ corresponding to a (crisp) zombie as per the definition of Storz et al. (2017), and $Z = 0$ corresponding to viable firms. Here only values of $Z > 0.5$ are presented. Right panel: total assets and leverage are shown on log-scales. Leverage is computed as debt over equity. The whiskers indicate the 5th and 95th percentiles. Total factor productivity is computed by means of Solow residuals. KST indicates the Kolmogorov-Smirnov statistic; here the null hypothesis (that the two distributions are the same) is rejected at level $\alpha = 0.001$ if the statistic exceeds the critical value $D = 0.013$. MT indicates the Mood's median test.

Zombie firms are found to be less productive, as well as typically smaller than other firms. Supporting concerns that zombie firms may weaken overall economic productivity, euro area zombie firms have on average lower firm-level total factor productivity⁷⁸ than other firms, producing less per unit of labour and capital employed (see [Chart A.1](#), right panel). The median zombie firm is also 20% smaller in terms of total assets, with micro-enterprises⁷⁹ five times more likely to be zombies than large firms. They also contribute less than average to employment and, as well as being (by

⁷⁶ Acharya, V.V., Crosignani, M., Eisert, T. and Eufinger, C., "Zombie credit and (dis)inflation: Evidence from Europe", *NBER Working Paper*, No 27158, National Bureau of Economic Research, 2020.

⁷⁷ Banerjee, R.N. and Hofmann, B., "Corporate zombies: Anatomy and life cycle", *BIS Working Paper*, No 882, Bank for International Settlements, 2020.

⁷⁸ Total factor productivity is computed based on Solow residuals from ordinary least squares estimates of a Cobb-Douglas production function.

⁷⁹ As per [Commission Recommendation 2003/361](#), micro-enterprises are defined as those meeting two of the following three criteria and not failing to do so for at least ten years: fewer than ten employees, balance sheet total below €2 million and turnover below €2 million.

definition) less profitable, the median zombie firm is 60% more leveraged than its non-zombie counterpart.

Furthermore, a larger cohort of firms have high debt and weak profitability. Most studies have employed a binary definition of firms being either zombie or not, typically using discrete thresholds. This is consistent with zombie firms being seen as a distinct group of firms. But it has the drawback of not capturing the possibility of a cohort of quasi zombies that may be at risk of a zombie-like condition, with for example a noticeably high degree of indebtedness and weak profitability.⁸⁰ Identifying firms which are just above the zombie threshold, but still have a high degree of indebtedness and weak profitability even if still viable, points to a larger cohort of firms (see [Chart A.1](#), left panel). For example, around 8% of firms obtain a score higher than 0.9. While the share of zombie firms has trended down since the euro area sovereign debt crisis in 2012, the share of quasi zombies with a high degree of indebtedness and weak profitability has instead been more steady.

The impact of the pandemic and the policy response

The economic impact of the pandemic and the policy response may have, at least temporarily, contributed to some degree of zombification. Policy measures intended to help viable companies bridge liquidity needs arising during the pandemic and lockdowns – such as loan guarantee schemes or loan repayment breaks – may also have been accessed by zombie firms. More generally, measures seeking to ensure accommodative monetary and credit conditions may have maintained or even lowered debt servicing needs for zombie firms as well as other firms.

Zombie firms are likely to have accessed euro area government-guaranteed loan schemes and moratoria, given their broad eligibility criteria. Early in the pandemic, the European Commission set guidelines for access to loan guarantee schemes requiring that firms should have reported EBITDA interest coverage ratios greater than unity and debt-to-equity ratios below 7.5 for both of the last two most recent reporting years.⁸¹ Each country eventually put in place its own eligibility criteria, although these were by and large in line with the Commission's guidelines. Firm-level data suggest that although such criteria were successful in providing access to viable firms, with only a negligible fraction not qualifying (1%), they may have also been unable to prevent as many as 90% of firms identified as zombies from becoming

⁸⁰ A linear membership function with boundaries between the thresholds and medians of each variable (return on assets, debt servicing capacity and net investment) is used to capture a fuzzy score in the unit interval, with zero indicating a healthy firm and unity a zombie. A geometric mean of the scores in each dimension ensures that more weight is given to firms where all variables are closer to the respective threshold and the zombie-like condition is constrained to firms for which all variables are below the median. See Mingarelli, L., Ravanetti, B., Shakir, T. and Wendelborn, J.T., "Corporate zombification risks and COVID-19 public support schemes" (2021, forthcoming) for more details.

⁸¹ See [Commission Regulation No 651/2014](#) (Article 2(18)). These eligibility criteria are those envisaged for large firms, while for small and medium-sized enterprises financial difficulty is defined as being in insolvency proceedings, having lost more than half of capital due to accumulated losses, or being subject to restructuring aid. Due to the lack of up-to-date information on corporates' financial health during the pandemic, the former criteria are applied to the whole sample to test the eligibility of zombie firms.

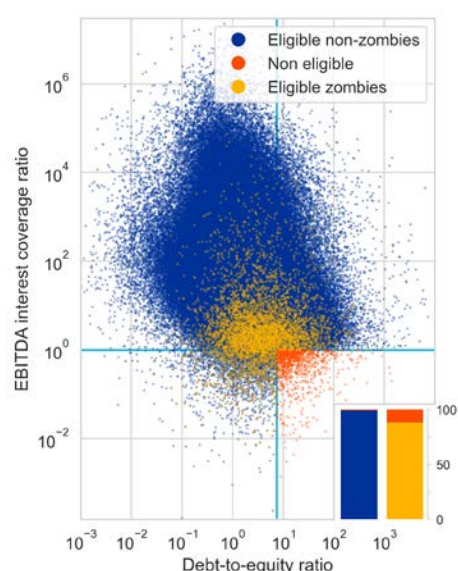
eligible for public support^{82,83} (see [Chart A.2](#), left panel). Eligibility does not mean that these firms actually borrowed from these schemes. Correlation between loan guarantee take-ups and the shares of zombie firms in selected country sectors across the euro area (see [Chart A.2](#), right panel) may indeed suggest zombies might have accessed such schemes, although a conclusive analysis would need to rely on more granular information.

Chart A.2

Many zombie firms may have been eligible for public support and have a high share in sectors where scheme take-up has been greatest

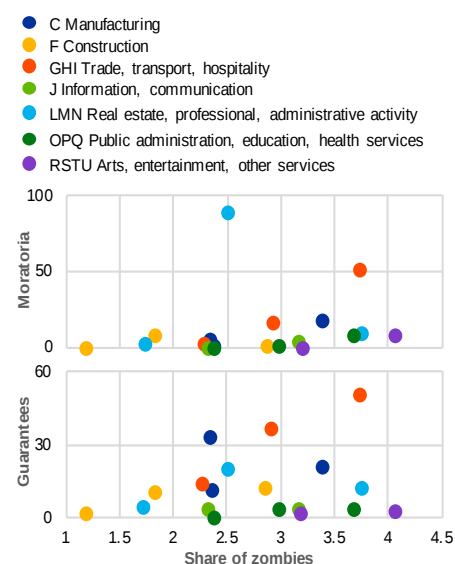
Eligible versus non-eligible firms

(2019, ratios, log-log axis)



Loan guarantee take-ups and moratoria versus share of zombie firms in selected country sectors

(2020-21, 2018, € billions and percentages)



Sources: Bureau van Dijk – Orbis, ECB supervisory data, data on guarantee take-ups from KfW, the German Federal Ministry for Economic Affairs and Energy, the French Ministry for the Economy and Finance and the Spanish Instituto de Crédito Oficial, and ECB calculations.

Notes: Left panel: only pure zombies ($Z = 1$) are considered. Debt-to-equity ratio refers to the minimum debt-to-equity ratio in the last two years considered; EBITDA interest coverage ratio refers to the maximum EBITDA interest coverage ratio in the last two years considered; figures refer to pre-pandemic reporting; bottom-right inset: share of eligible firms for non-zombie and zombie firms. Right panel: Markers of equal colour refer to different countries within the same sector. Moratoria and loan guarantee take-ups versus share of zombie firms in selected country sectors for the four largest European economies. Share of zombies in 2018 due to lower 2019 coverage in some country sectors. Data on loan guarantee take-ups are as at February 2021 and data on moratoria show the maximum value of loans under moratoria in the specific country sector between March 2020 and February 2021.

Such firms may also have benefited from loan moratorium schemes (see [Chart A.2](#), right panel). Almost €1 trillion of loans have been subject to moratoria, although these have been relatively short-lived, with 93% of them expiring by the end

⁸² The result is dependent on the definition of zombie taken. Therefore, a more encompassing definition able to capture more strictly the non-viability of firms (as opposed to firm vulnerability), such as the one employed here, is to be preferred.

⁸³ Company size is not a relevant factor in explaining the degree of eligibility. Replicating the analysis on a sample of SMEs and on a sample of large firms, one obtains similar shares of firms accessing public schemes.

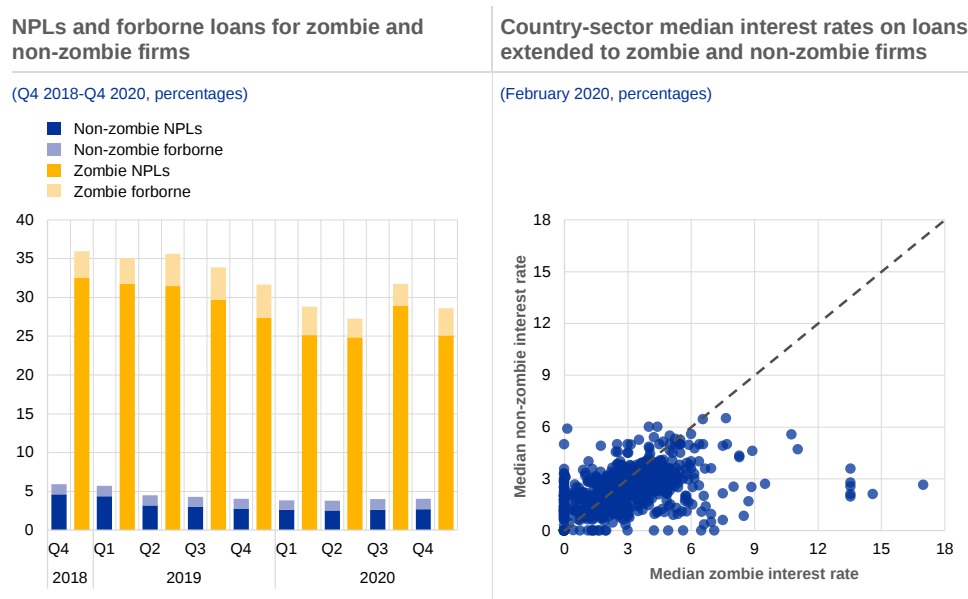
of the first half of 2021.⁸⁴ This suggests that, by and large, any benefit to a zombie firm's individual financial position may have been modest at most.

Highly accommodative credit conditions

In an environment of highly accommodative credit conditions, zombie firms are also likely to benefit from accommodative bank lending rates. Despite the severity of the economic shock, monetary, fiscal and prudential policy actions supported the supply of bank lending and typical lending rates remained stable throughout 2020. Even though zombie firms are substantially more likely to have non-performing loans (NPLs) (see [Chart A.3](#), left panel),⁸⁵ which is in line with their higher credit risk, the interest rates on zombie firms' bank loans are not systematically higher than those on loans to other firms (see [Chart A.3](#), right panel).⁸⁶

Chart A.3

Interest rates on loans to zombie firms show little recognition of their greater tendency for non-performing loans



Sources: Bureau van Dijk – Orbis, ECB AnaCredit data and ECB calculations.

Notes: Zombie firms as identified in 2019. Left panel: NPLs and forborne loans as a percentage of total loans. Right panel: interest rates are calculated as the median interest rates of outstanding loans in February 2020 at a country-NACE4 level.

The relatively strong capital positions of banks at the onset of the pandemic might have averted some risk of excessively lenient lending to zombie firms.

Several earlier studies of lending to zombie firms have emphasised the link between

⁸⁴ [EBA Guidelines for legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 pandemic](#) (EBA/GL/2020/02), European Banking Authority, 2 April 2020, amended by EBA/GL/2020/08 on 25 June 2020.

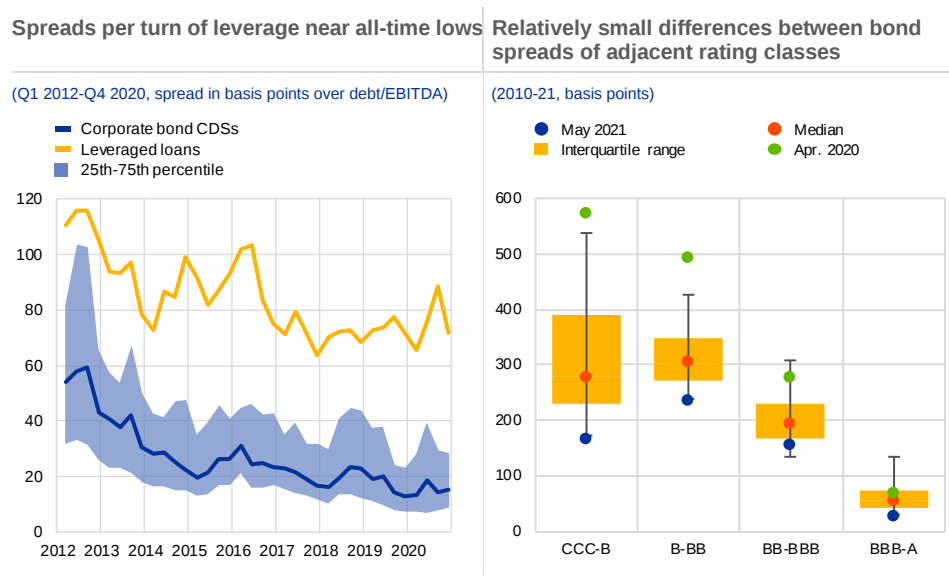
⁸⁵ See also Ari, A., Chen, S. and Ratnovski, L., "COVID-19 and non-performing loans: lessons from past crises", *Research Bulletin*, No 71, ECB, May 2020.

⁸⁶ Other factors, such as different collateral requirements, which have not been considered in this analysis, could explain the divergence between the two groups.

weak banks and greater forbearance or “subsidy” credit to failing firms.⁸⁷ With most banks having entered the crisis well capitalised and therefore being able to sustain larger losses from the pandemic, incentives for forbearance should be lower. As previously recognised however (Laeven et al., 2020)⁸⁸, going forward it will be necessary to continue ensuring that banks maintain sound capital positions, while taking a forward-looking stance on loan loss provisioning.

Chart A.4

Signs of market complacency: credit spreads show little differentiation based on leverage and rating, despite the asymmetric impact of the pandemic



Sources: Credit Market Analysis (CMA), S&P Global Market Intelligence, IHS Markit and ECB calculations.
Notes: Left panel: turns of leverage are based on annualised quarterly earnings (EBITDA). CDSS: credit default swaps. Right panel: differences in non-financial corporate spreads between pairs of adjacent rating classes, May 2021 and April 2020 versus historical range. The whiskers represent the historical 5th and 95th percentiles based on daily data since January 2010.

Pricing in capital markets shows some signs of complacency. The overall tightening of credit spreads after the March 2020 market turmoil seems to have been accompanied by decreased price differentiation with respect to fundamental credit characteristics. This could indicate that support measures may have backstopped weaker and perhaps unviable firms in particular. By the end of 2020, the spread per turn of leverage stood near all-time lows (see [Chart A.4](#), left panel). In addition, spreads between firms with different credit ratings are also low compared with historical ranges (see [Chart A.4](#), right panel). This relatively small differentiation between firms with different credit characteristics suggests that there may be some degree of complacency among market participants. Firms at the lower end of the credit spectrum potentially benefit from cheap funding conditions, which increase their chances of survival; but this also means that investors exposed to such debt securities may face substantial losses if such firms become unviable in the medium term.

⁸⁷ See, for example, Andrews, D. and Petroulakis, F., “[Breaking the shackles: Zombie firms, weak banks and depressed restructuring in Europe](#)”, *Working Paper Series*, No 2240, ECB, February 2019, and Keuschnigg, C. and Kogler, M., “The Schumpeterian role of banks: Credit reallocation and capital structure”, *European Economic Review*, Vol. 121(C), 2020.

⁸⁸ Laeven, L., Schepens, G. and Schnabel, I., “Zombification in Europe in times of pandemic”, VoxEU.org, 11 October 2020.

Implications

It is likely that the policy response to the pandemic has also provided support to zombie firms, but in the short term this has supported aggregate demand.

Zombie firms have been able to extend their indebtedness via government-guaranteed loan schemes, the use of moratoria and generally accommodative debt pricing. At the same time, the economic impact of the pandemic itself is also likely to have moved some already zombie-like firms even further away from viability, lowering their profitability and increasing their leverage. But in the short term, preventing the failure of both viable and unviable firms has limited unemployment and spillovers from insolvency during this challenging period.

A more targeted approach to ongoing policy support measures and more recognition of credit risk may reduce any unintended subsidy for zombie firms.

This would decrease the risk of expanding lending to zombie firms, especially when seen in conjunction with a well-designed phasing-out of policy support. Moreover, banks might find additional disincentives to recognising losses within systems with weak insolvency frameworks (Andrews and Petroulakis, 2019). In such an environment, creditors might find the risk associated with evergreening preferable to long court proceedings, especially in cases in which the exposure is expected to be recovered only partially. Measures to improve the efficiency of insolvency procedures would therefore also help in addressing the issue, with more efficient laws on bankruptcy providing additional incentives for banks to recognise losses from non-viable borrowers. These include electronic filings, virtual court hearings, as well as out-of-court or hybrid solutions.

Zombification may lead to an inefficient capital allocation, but also poses medium-term risks to the financial system if risks are not properly priced. The analysis of interest rates on bank loans (see [Chart A.3](#), right panel) as well as credit spreads in corporate debt markets (see [Chart A.4](#)) suggests that firms' cost of funding is relatively undifferentiated with respect to individual firms' fundamental credit characteristics. Zombie firms may be able to access relatively cheap funding, but this leaves banks, sovereigns and investors exposed in the medium term should the viability of these firms be challenged. Such a scenario may materialise following unexpected adverse shocks, a weak recovery or an unbalanced withdrawal of policy support measures. In the face of any such adverse developments, the existence of a sizeable cohort of firms with zombie characteristics may lead to sell-offs, large-scale downgrades⁸⁹ or "catch-up defaults". If unaddressed, these risks, in conjunction with an increase in the share of zombie firms, might result in a concrete source of losses, increasing pressure on financial institutions' balance sheets and thus potentially jeopardising the stability of the euro area financial system. Additionally, the existence of a wider tail of overindebted corporates could be a drag on growth, as debt overhang can affect firms' investment and employment.⁹⁰ Such macro risks could in turn feed back into the banking sector and the financial system.

⁸⁹ See also "[A system-wide scenario analysis of large-scale corporate bond downgrades](#)", ESRB technical note, European Systemic Risk Board, July 2020.

⁹⁰ See also Kalemlı-Özcan, S., Laeven, L. and Moreno, D., "[Debt overhang, rollover risk, and corporate investment: evidence from the European crisis](#)", *Working Paper Series*, No 2241, ECB, February 2019.

B

Climate-related risks to financial stability

Prepared by Spyros Alogoskoufis, Sante Carbone, Wouter Coussens, Stephan Fahr, Margherita Giuzio, Friderike Kuik, Laura Parisi, Dilyara Salakhova and Martina Spaggiari

The ECB has been intensifying its quantitative work aimed at capturing climate-related risks to financial stability. This includes estimating financial system exposures to climate-related risks, upgrading banking sector scenario analysis and monitoring developments in the financing of the green transition. Considerable progress has been made on capturing banking sector exposures to firms that are subject to physical risks from climate change. While data and methodological challenges are still a focus of ongoing debates, our analyses suggest (i) somewhat concentrated bank exposures to physical and transition risk drivers, (ii) a prevalence of exposures amongst more vulnerable banks and in specific regions, (iii) risk-mitigating potential for interactions across financial institutions, and (iv) strong inter-temporal dependency conditioning the interaction of transition and physical risks. At the same time, investor interest in “green finance” continues to grow – but so-called greenwashing concerns need to be addressed to foster efficient market mechanisms. Both the assessment of risks and the allocation of finance to support the orderly transition to a more sustainable economy can benefit from enhanced disclosures, including of firms’ forward-looking emission targets, better data and strengthened risk assessment methodologies, among other things.

Introduction

This special feature presents recent progress in the ECB’s quantitative work to map and monitor financial system exposures to climate change transition and physical risks and to measure bank vulnerabilities to climate-related risks (see [Box A](#)). This is complemented by analyses of the role played by the financial system in the transition to a greener economy.⁹¹ While several challenges related to data and methodological developments still need to be addressed, a greater understanding of the potential risks posed by climate change is urgently needed. These analyses are intended to assist the orderly transition to a greener economy, while avoiding larger shocks or abrupt changes in the financial system stemming from climate-related risks.

Exposure of financial institutions to transition risk

Carbon prices have already seen steep increases and new policy commitments suggest they need to rise further if global climate targets are to be met. Since

⁹¹ This special feature builds on the special feature entitled “[Climate change and financial stability](#)”, *Financial Stability Review*, ECB, May 2019. It complements recent ECB initiatives, including climate-related disclosures of the ECB’s investments in non-monetary policy portfolios (see [press release of 4 February 2021](#)), the consideration of climate-related factors in macroeconomic models and in the monetary policy strategy review and supervisory guidance for banks (see “[Guide on climate-related and environmental risks – Supervisory expectations relating to risk management and disclosure](#)”, ECB Banking Supervision, May 2020).

the last FSR was published in November 2020, the price of carbon under the EU Emissions Trading System (ETS) has climbed by about 60%, based on expectations that relevant EU policies – including the EU ETS itself – will be reviewed.⁹² On 19 February 2021 the European Commission announced that it was raising its target for reducing net greenhouse gas (GHG) emissions by 2030 from 40% to at least 55% compared with 1990 levels.⁹³

The financial system is exposed to transition risk arising, for example, from exposures to firms with high carbon emissions throughout their value chains.

Here, emissions of non-financial corporations (NFCs) are categorised as direct (“scope 1”), energy-related (“scope 2”) and indirect (“scope 3”) emissions which are associated with all other steps in the value chain, such as the use of goods sold.⁹⁴ The universe of NFCs reporting GHG emissions is limited to mainly large listed corporates, with scope 3 emissions having the lowest coverage of all disclosures. In order to fill the data gaps for other firms, this analysis relies on modelled GHG emissions calibrated on data self-reported by firms. Building on estimates for emissions along the full value chain, the entire resulting dataset spans €4 trillion of euro area banks’ loan exposures.

Banks’ loan portfolios are exposed to varying degrees to the four sectors with the highest emissions, although manufacturing sector exposures are significant and at the same time associated with high scope 3 emissions.⁹⁵

Firms in the mining and energy sectors account for about 5% of banks’ loan exposures. While they are among the most carbon-intensive counterparties in banks’ loan portfolios, the low share of loans suggests that the risk for banks is modest (see [Chart B.1](#), left panel). However, manufacturing represents a much larger share (around 20%) of banks’ loan portfolios. The manufacturing sector’s emissions are mostly defined as scope 3, giving grounds to assume that changes in consumer preferences would entail significant transition risks. Our analysis therefore suggests that exposures to manufacturing firms represent a major source of climate-related credit risk in banks’ corporate loan portfolios, although this is only revealed after capturing the carbon footprint of the entire value chain due to scope 3 emissions. Transition risk exposure due to securities holdings follows a similar pattern, as around 30% of banks’ equity and corporate bond portfolios consist of high-emitting NFCs (see [Chart 8](#) in the [Overview](#), left panel).

⁹² See “[EU Emissions Trading System \(EU ETS\)](#)”.

⁹³ See [speech by President von der Leyen](#) at the Special Edition 2021 of the Munich Security Conference.

⁹⁴ Considering emissions by different “scope” makes it easier to understand different demand and supply channels through which transition risk can translate into financial risk. Scope 1 and 2 emissions can help capture the adverse effects of carbon taxes and policies that penalise the use of fossil fuels. Scope 3 emissions focus on the impact of changes in transporting supplies or finished products, but also in consumer demand for goods. For example, an abrupt reduction in demand for carbon-intensive products can be harmful for firms producing less sustainable goods, causing their assets to become stranded.

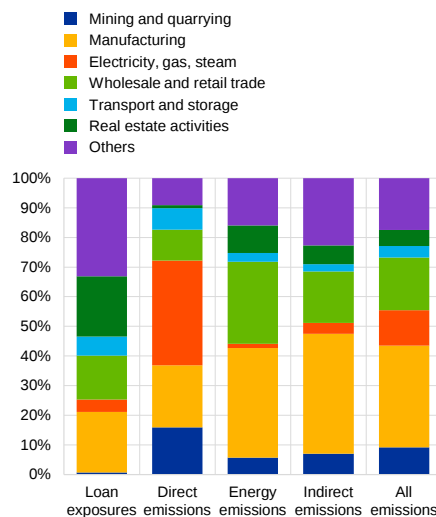
⁹⁵ The industry sector classification used throughout this special feature is the NACE rev. 2.

Chart B.1

High indirect emissions in the manufacturing sector may point towards concentrated transition risks, and non-banks are highly exposed to high emitters

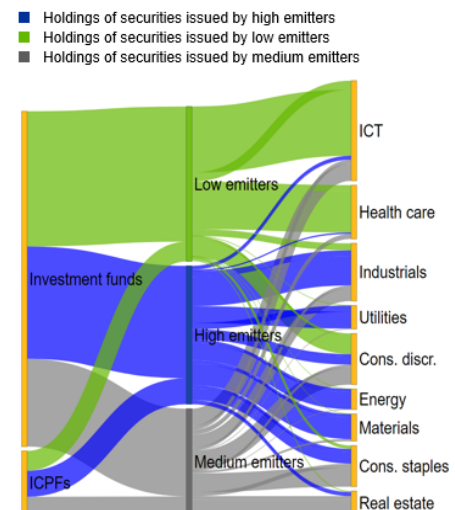
Banks' loan exposures by NACE sector, and share of corporate emissions in each sector

(exposures: December 2020; emissions: 2018)



Non-banks' exposure to transition risk via equity and debt securities

(exposures and emissions: Q4 2019; total holdings of NFC securities by sector)



Sources: AnaCredit, Urgentem, ECB (securities holdings statistics by sector) and ECB calculations.

Notes: Left panel: the sample consists of €4 trillion of exposures above €25,000 to NFCs matched with emission data, corresponding to 80% of euro area loans to NFCs. The left bar indicates the share of exposures to firms in the respective sector, compared with all exposures to all firms in the sample. All other bars compare emissions of firms in the respective sector to emissions of all firms in the sample. Direct emissions are scope 1, energy-related emissions are scope 2 (purchased energy) and indirect emissions are scope 3. Where reported data are not available, emissions were modelled (see main text). Right panel: the panel captures the exposure of non-banks to firms that issue bonds or are listed in the equity market. These firms are classified as low, medium and high emitters according to their emission intensities (scope 1, 2 or 3) in December 2019, i.e. the ratio of CO₂ emissions to revenues. Low emitters are firms with less than 309 CO₂-equivalent tonnes per million USD revenue (33rd percentile), while high emitters are firms with more than 1,068 CO₂-equivalent tonnes per million USD revenue (66th percentile). NACE: Nomenclature statistique des activités économiques dans la Communauté Européenne (Statistical classification of economic activities in the European Community); NFCs: non-financial corporations; ICPFs: insurance corporations and pension funds; ICT: information and communication technology.

Non-bank financial institutions hold 30% of their portfolios in securities of high-emitting NFCs (see Chart B.1, right panel).

Investment funds, and insurance corporations and pension funds (ICPFs) invest around €1.3 trillion and €0.3 trillion respectively in securities issued by high emitters operating mainly in the industrial, energy and materials sectors.⁹⁶ While the relative share of high-emitting firms in non-banks' portfolios has remained broadly stable at around 30% over the last seven years, the absolute amount has doubled, from €0.8 trillion in 2013 to €1.6 trillion in 2019, broadly in line with the growth of non-bank assets. At the same time, an increasing number of institutional investors are adopting sustainable investment strategies with a view to financing the green transition. These approaches do not necessarily imply investing in current low emitters. Instead, they range from *passive* exclusion or screening strategies to exclude carbon-intensive firms, through to more sophisticated and *active* models. These include integration of environmental, social

⁹⁶ Transition risk varies across funds, and the median exposure to polluting assets is 57% of total holdings (see "Report on Trends, Risks and Vulnerabilities", European Securities and Markets Authority, No 1, 2021). In contrast to "Sensitivity analysis of climate-change related transition risks: EIOPA's first assessment", European Insurance and Occupational Pensions Authority (EIOPA), December 2020, our estimates include exposures to NFCs, irrespective of their sector's relevance for climate policy, and do not reflect indirect exposures through investment funds' holdings.

and governance (ESG) factors and impact investing, which aims to engage with firms to green their activities by improving their ESG score compared with the rest of the sector, for instance.⁹⁷

Climate-related physical risks for the financial sector

In 2019 total economic losses from extreme events amounted to 1% of GDP in the euro area; without action, these costs are expected to rise over time.

Extreme climate and weather events such as floods, wildfires and hurricanes can affect GDP through the destruction of property and physical capital used to produce goods, and their impact on investments and financial institutions.⁹⁸ Other hazards such as water stress and heat stress can reduce labour and agricultural productivity, impair logistics and lead to the relocation of economic activity.⁹⁹ Overall, physical hazards can have a lasting effect on GDP, as they can cause the long-term loss of production and divert capital earmarked for investment towards reconstruction and replacement. With climate change, these hazards are expected to increase in frequency and intensity, giving rise to ever greater physical risks.

Some firms are already highly or increasingly exposed to physical risks, usually concentrated in distinct geographical areas (see Chart B.2, left panel).¹⁰⁰ In this analysis, firms' exposure is proxied by the location of their head office and the location of large firms' subsidiaries.¹⁰¹ Floods are most relevant in central and northern areas of Europe, with more than 7% of individual firms facing high or increasing levels of flood risk. Heat-related hazards dominate in southern Europe, with 18% of firms highly or increasingly exposed to heat stress, water stress or wildfires. Without ambitious reductions in emissions, firms that currently have only some risk exposure may in the long run also be subject to higher physical risks.

Around 30% of euro area banking system credit exposures to NFCs are to firms subject to high or increasing risk due to at least one physical risk driver (see Chart B.2, right panel). Looking at individual hazards, around 10% of loan exposures

⁹⁷ According to Krueger, P., Sautner, Z. and Starks, L., "[The Importance of Climate Risks for Institutional Investors](#)", *The Review of Financial Studies*, Vol. 33, Issue 3, March 2020, institutional investors consider risk management and engagement, rather than divestment, to be the better approach for addressing climate risks. The classification of strategies is based on Eurosif and the United Nations' Principles for Responsible Investment (PRI). See, for example, the "[2018 Eurosif European SRI Study](#)".

⁹⁸ See Faiella, I. and Natoli, F., "[Natural catastrophes and bank lending: the case of flood risk in Italy](#)", *Occasional Papers*, No 457, Banca d'Italia, October 2018.

⁹⁹ "[The Macroeconomic and Financial Stability Impacts of Climate Change](#)", Network for Greening the Financial System, June 2020.

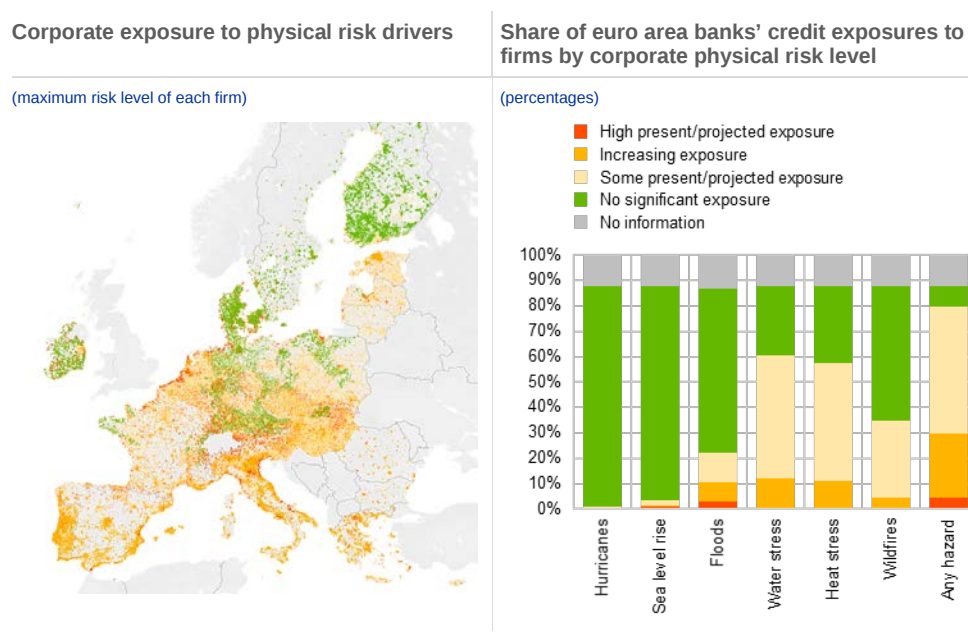
¹⁰⁰ Four Twenty Seven describes the exposure of firms to physical hazards at five different levels: "highly exposed to historical and/or projected risks" ("high present/projected exposure" in Chart B.2, right panel), "exposed today and exposure level is increasing" ("increasing exposure" in Chart B.2, right panel), "exposed to some historical and/or projected risks" ("some present/projected exposure" in Chart B.2, right panel), "not significantly exposed to historical or projected risks" and "no exposure" (grouped together as "no significant exposure" in Chart B.2, right panel). The risk indicators integrate information on current and projected hazards up to 2040.

¹⁰¹ The assumption of corporate head office location as the place where the firm is exposed to physical hazards is a reasonable assumption for small and medium-sized firms and for those sectors that do not commonly involve multiple physical locations in their activities. In turn, it may fall short of capturing the full extent of firms' exposure to physical hazards for larger firms with multiple production facilities or locations.

involve firms at high or increasing risk of floods, heat stress or water stress. Taken together, around 80% of loan exposures are to firms with at least some exposure to physical risks. This may become increasingly relevant if emissions are not effectively reduced in the long run and if firms and economies fail to adapt to climate change. In addition, almost 10% of loan exposures to NFCs are subject to multiple high or increasing physical risk drivers (see [Chart B.3](#), left panel). An increase in connected or compound events may amplify the impact of the respective risks and cause clustering, with limited possibilities for diversification.

Chart B.2

Climate change hazards could affect up to a third of euro area banks' credit exposures



Sources: Four Twenty Seven, AnaCredit and ECB calculations.

Notes: Based on a sample of 1.5 million firms in Europe, 1.1 million of which are located in the euro area; information refers to head office location and subsidiaries of the largest listed firms. The left panel shows the maximum risk level across the following hazards: floods, heat stress, hurricanes, sea level rise, water stress and wildfires. The risk levels defined by Four Twenty Seven are "high present/projected exposure", "increasing exposure", "some present/projected exposure" and "no significant exposure" (legend in right panel). For example, if one firm has "no significant exposure" to floods and "increasing exposure" to heat stress, it is marked with "increasing exposure" on the map. The indicators and risk levels are based on data integrating information on the current and projected (until 2040) extent of the different physical hazards; they are taken directly from Four Twenty Seven. Any potential economic impact is not taken into account. Right panel: bank loan exposure is taken from AnaCredit and matched with Four Twenty Seven data at corporate level. Credit exposures to NFCs above €25,000 are considered; total exposures amount to €4.2 trillion. 31% of exposures can be matched directly, 58% are matched using postcode-level aggregates of the Four Twenty Seven corporate level indicators and 11% cannot be matched this way due to missing geolocal information in AnaCredit ("no information" in right panel).

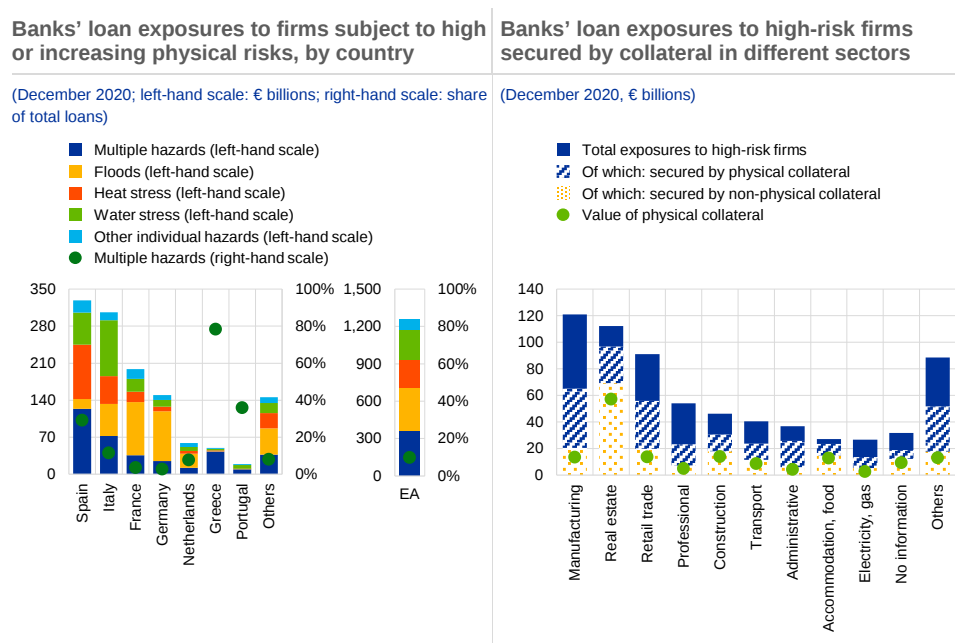
Two-thirds of exposures to firms highly or increasingly subject to physical risks are secured by collateral, which plays an important role in mitigating losses for banks but may itself be subject to damage or loss of value. The use of collateral ensures that bank losses from credit exposures are mitigated. However, climate-related damage causing firms to default also likely has an impact on the physical collateral used to secure the exposures. If the collateral is not fully covered by insurance, this link reduces its loss-mitigating ability and increases potential losses for banks.

Physical assets represent around 50% of the collateral value used to secure exposures to firms subject to high or increasing physical risks, but that share differs across sectors (see [Chart B.3](#), right panel). The different degree of

collateralisation for high-risk exposures reflects sector-specific characteristics. Banks are most exposed to firms in the manufacturing and real estate sectors, with more than two-thirds of exposures to sectors like real estate activities, construction, and accommodation and food being covered by collateral (mainly physical assets). The extensive use of physical collateral in these sectors raises concerns about the potential loss of value should these business activities be disrupted by physical hazards or take place in regions where risks are expected to intensify.

Chart B.3

A significant share of loan exposures in some sectors is secured by physical collateral which may also be impacted by climate-related damage



Sources: Four Twenty Seven, AnaCredit and ECB calculations.

Notes: Credit exposures to NFCs above €25,000 are considered; total exposures amount to €4.2 trillion; NFC location used to assign risk levels refers to the head office and the location of subsidiaries of the largest listed firms; country breakdown refers to the bank's country of residence. Left panel: "Multiple hazards" refers to bank exposure to firms which are highly or increasingly exposed to more than one hazard (i.e. red and orange bars in Chart B.2, right panel) of those hazards listed in Chart B.2. For example, if a firm is highly exposed to both heat and water stress, banks' exposure to that firm is counted under "multiple hazards". Right panel: the maximum risk level across floods, sea level rise and wildfires is considered; the total collateral value at instrument level is capped at the value of the instrument; insurance cover not included.

Physical risk exposures may potentially give rise to broader financial stability risks if they are concentrated or paired with less capitalised and less profitable banks (see Chart B.4, left panel). Without taking collateral or other mitigating factors into account, the exposure to firms subject to high or increasing physical risk is six times larger among the 25% least well capitalised banks (by Common Equity Tier 1 ratio) relative to the 25% most well capitalised banks. Similarly, the median exposure at risk held by the quartile of banks with the lowest return on equity is twice as big as that for the 25% most profitable banks.

More than 70% of the banking system credit exposures to the identified high-risk firms are held by 25 banks (see Chart B.4, right panel).¹⁰² Ten of these

¹⁰² These 25 banks represent 64% of the banking system in terms of total assets, suggesting that exposures to climate-related risks tend to be more concentrated than overall exposures.

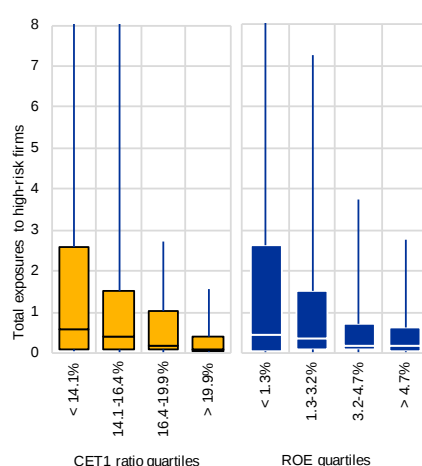
banks individually hold more than 3% of the total exposures to high-risk firms. These banks are generally large and well diversified across asset classes and regions and have additional capital buffers given their status as global or other systemically important banks. While exposures to the high-risk firms are generally around 5% of total assets among these banks, seven of the 25 banks have exposures of 10-15% of total assets.

Chart B.4

Physical risks concentrated in a few banks and interaction with other vulnerabilities

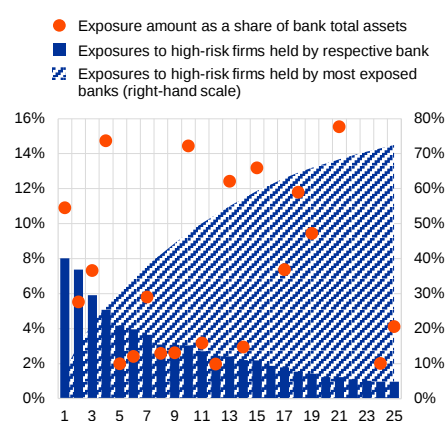
Distribution of banks' exposures to high-risk firms by level of capital and profitability

(December 2020, € billions)



Concentration of exposures to high-risk firms in the banking system

(December 2020; x-axis: banks ranked by exposures to high-risk firms; y-axis: share of total banking system exposures to high-risk firms)



Sources: Four Twenty Seven, ECB supervisory data, AnaCredit and ECB calculations.

Notes: Credit exposures to NFCs above €25,000 are considered; total exposures amount to €4.2 trillion; NFC location used to assign risk levels refers to the head office; sample of 357 banks (significant institutions and major less significant institutions in the euro area). Whiskers in the left panel extend to €8.83 billion and €9.7 billion for CET1 quartiles 1 and 2 respectively and €10.06 billion for ROE quartile 1. CET1: Common Equity Tier 1; NFCs: non-financial corporations; ROE: return on equity.

A potential concentration of climate-related physical risks among a few, more vulnerable banks could have implications for financial stability. While physical risks are not new for the assessment of credit and market risks, more frequent, more severe and more strongly correlated physical hazards may place additional strains on the banking system, especially for banks with lending in limited geographical areas. Furthermore, medium and long-term forward-looking scenario-based analysis can be used to assess the interaction of these risks with transition risks across sectors (see **Box A**). To limit losses to the financial system, it will be essential to support an orderly transition to a sustainable economy, limit the impact from physical hazards by means of climate change adaptation measures and diversify risks among financial institutions using loss-absorbing capacity, financial instruments or insurance coverage. In addition, further investment in granular, forward-looking data collections and risk quantification methodologies is needed to underpin comprehensive, forward-looking analyses.

Role of insurers in mitigating physical risk¹⁰³

Only a third of climate-related economic losses in the euro area are insured, and climate change is expected to cause this protection gap to widen. Eurostat and NatCatSERVICE data indicate that this share is as low as 12% in southern European countries. Insurance claims are set to increase as natural disasters become more frequent and more severe, which may result in higher insurance premiums and/or lower insurance coverage, thereby widening the protection gap.¹⁰⁴

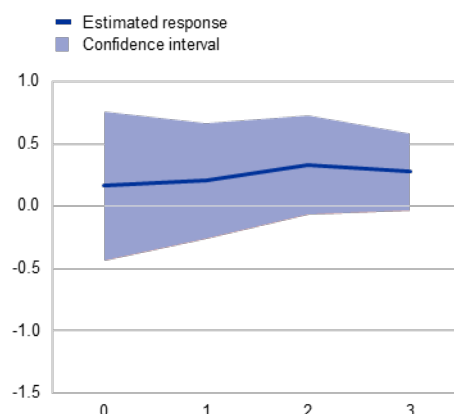
Insurers play an important role in mitigating the macroeconomic effects of catastrophes which may be precipitated by climate change. Estimates suggest that uninsured losses have a negative aggregate impact on a country's GDP, while this is not the case if the event is insured (see [Chart B.5](#)). Specifically, the payouts from insurers reduce uncertainty and support aggregate demand and investment for reconstruction, which helps to accelerate the recovery from a natural disaster. Still, the reduction in value added following such events has a negative impact on corporate productivity.

Chart B.5

Insurance helps to maintain GDP growth after a natural disaster, while uninsured losses are estimated to have an adverse effect on GDP growth

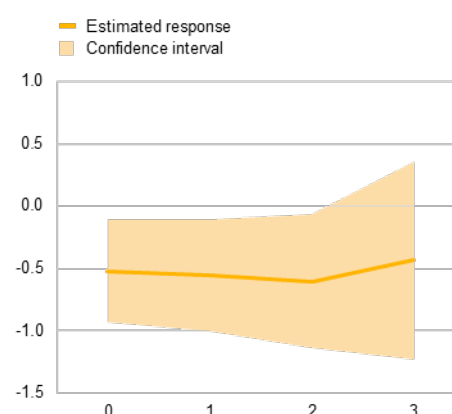
Impact of insured losses from a large-scale disaster on annual GDP growth rate

(y-axis: impact on annual GDP growth rate (%); predictions up to three quarters ahead after a large-scale disaster)



Impact of uninsured losses from a large-scale disaster on annual GDP growth rate

(y-axis: impact on annual GDP growth rate (%); predictions up to three quarters ahead after a large-scale disaster)



Sources: EM-DAT, OECD and ECB calculations.

Notes: The sample includes 45 countries for which the OECD provides quarterly GDP data from 1996 to 2019. The charts show the impact of large-scale natural disasters (i.e. with total damage larger than the third quartile at 0.1% of GDP) when the share of insured losses is high (above the median of 35%) in the left panel, and low (i.e. below the median of 35%) in the right panel. The estimates are obtained using a panel regression model where the dependent variable is the year-on-year difference in the log of GDP and the explanatory variables include two dummies capturing large-scale disasters with a high and low share of insured losses respectively (included with up to three lags), and country and quarterly fixed effects. For the quarter including the date(s) of the disaster (t=0) and the three subsequent quarters, the y-axis measures the percentage point impact of the disaster on the year-on-year annual growth rate at the end of that quarter.

¹⁰³ This analysis is based on a joint study with EIOPA.

¹⁰⁴ See [“Draft Application Paper on the Supervision of Climate-related Risks in the Insurance Sector”](#), International Association of Insurance Supervisors (IAIS) and Sustainable Insurance Forum (SIF), October 2020.

These results suggest strong risk-pooling benefits – across entities and over time – from enhanced insurance protection. The European Commission recently published a new EU strategy on adaptation to climate change, which includes the objective of closing the insurance protection gap.¹⁰⁵ More concrete actions should be considered to mitigate physical risk by means of insurance coverage and adaptation measures by, for example, linking specific forms of credit to insurance requirements, increasing public-private partnerships or diversifying risks through a common European disaster fund.

Box A

Advances in bank vulnerability assessments

The ECB is currently conducting an economy-wide climate stress test¹⁰⁶. Its purpose is to assess the resilience of the banking system to the transition to a low-carbon economy and to provide information to market participants on the risks from climate change. To that end, it looks at the exposure of euro area banks to future climate risks by analysing the resilience of their counterparties under various climate scenarios over the next 30 years.

The current climate stress test combines granular datasets with economic scenarios. This specifically encompasses: (a) a dataset of approximately four million companies worldwide, including climate risk data and financial information; (b) granular data on loan and securities exposures for some 2,000 euro area banks (almost all monetary financial institutions in the euro area); and (c) aggregate trajectories for transition and physical risk embedded into scenarios created by the Network for Greening the Financial System (NGFS).¹⁰⁷ The scenarios consider possible future paths for key aggregates such as real GDP, carbon emissions and energy prices, in cases both with and without successful climate policy action. This allows the impact of climate risks on the probability of companies defaulting to be assessed and clarifies the trade-off between the cost of transitioning towards a greener economy and a no-transition scenario.

The scenarios and firm-level data are complemented by models built on micro data sources that are specifically designed to assess the impact of climate risks on non-financial corporate solvency and profitability.¹⁰⁸ Policies to facilitate the transition, such as a carbon tax, can increase the prices of energy generated from fossil fuels and some goods that rely heavily on carbon emissions during the production process. This could result in some firms – especially in carbon-intensive industries – seeing their revenues decrease and their operating costs increase. Changes in corporate debt are also likely due to the possible destruction of physical capital by natural disasters, potentially coupled with technological substitution in the transition towards a less carbon-intensive production chain. Mitigants and amplifiers of climate risks have also been considered. Insurance coverage can mitigate the losses of physical capital from future natural disasters, while operating costs can be affected by changes in insurance premiums, especially for firms located in vulnerable geographical areas. The combined impact of transition and physical risk on corporate profits, operating costs and debt allows the probabilities of default (PDs) to be estimated for firms under different climate scenarios.

¹⁰⁵ See “[Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change](#)”, European Commission, 24 February 2021.

¹⁰⁶ See also de Guindos, L., “[Shining a light on climate risks: the ECB’s economy-wide climate stress test](#)”, *The ECB Blog*, 18 March 2021.

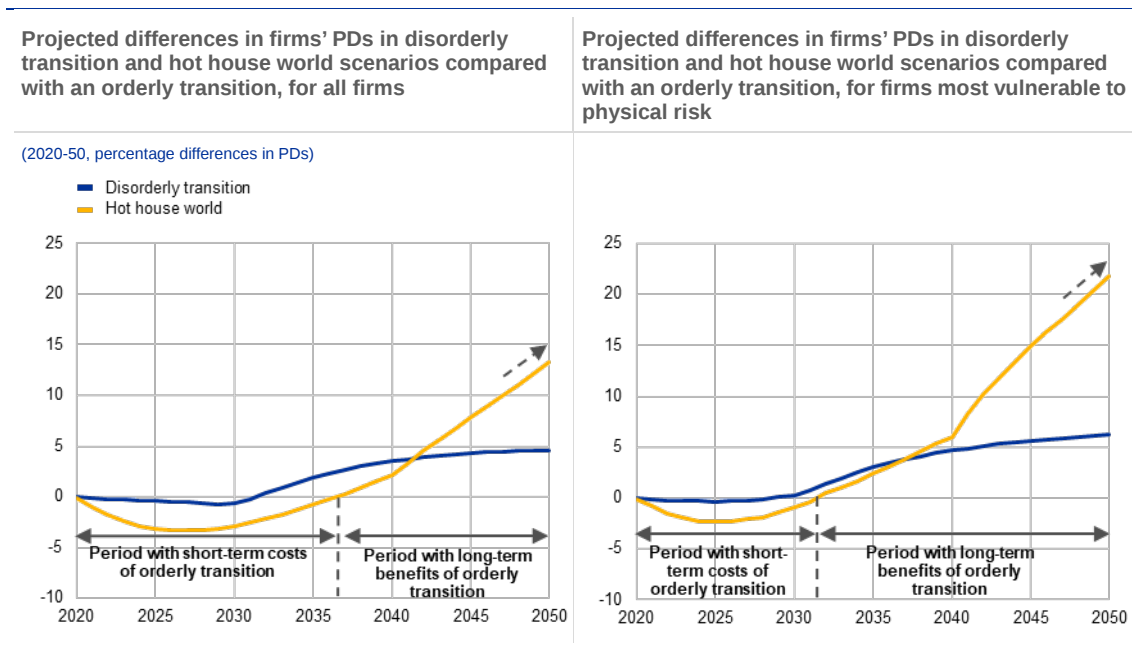
¹⁰⁷ See “[NGFS Climate Scenarios for central banks and supervisors](#)”, Network for Greening the Financial System, June 2020.

¹⁰⁸ All model specifications and details of their calibration will be published by mid-2021 in a dedicated ECB Occasional Paper.

Preliminary results show that, in the absence of further climate policies, the impact of extreme physical events on companies' PDs will rise substantially over the 30-year time horizon (see Chart B.A). The PD for a median firm initially rises in the orderly transition scenario compared with the adverse scenarios, reflecting the short-term costs of introducing climate policies in an orderly fashion (see **Chart B.A**, left panel). In a “hot house world”, by contrast, PDs rise rapidly in the second half of the time horizon, far beyond the levels of the orderly transition. This outcome highlights the long-term benefits of rolling out climate policies and conversely the long-term costs of taking no action to combat climate change. The same chart also demonstrates the limited short-term benefits followed by the high long-term costs of a disorderly transition rather than an orderly transition. The benefits of an orderly transition are even more prominent when looking at the results for those firms that are most exposed to physical risk (see **Chart B.A**, right panel).

Chart B.A

Without further climate policies, the impact on companies' PDs from extreme physical risk would rise substantially, especially for those firms most exposed to physical risk



Sources: NGFS scenarios, Four Twenty Seven, Urgentem, Bureau van Dijk – Orbis database, Bloomberg Finance L.P., Refinitiv, AnaCredit and ECB calculations.

Notes: Left panel: median across all firms in the sample. Right panel: median across all firms in the sample with a physical risk score above the 75th percentile.

The results show a strong inter-temporal dependence of risks, with early action yielding clear benefits in terms of systemic risk reduction. The short-term costs of implementing climate policies are significantly lower than the potentially much higher costs arising from natural disasters in the medium to long term. Climate change may thus represent a source of systemic risk, particularly for banks with portfolios concentrated in certain economic sectors and geographical areas. The results will help inform ongoing climate work across the ECB, including the separate supervisory climate stress test of individual banks that ECB Banking Supervision will carry out in 2022.

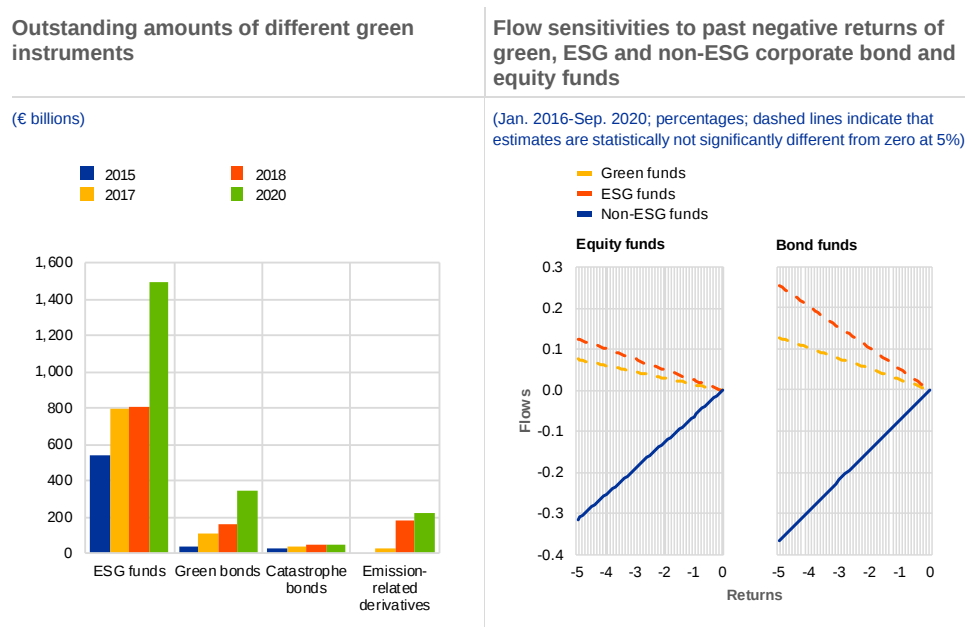
The role of financial markets in financing the transition and mitigating risks

Financial markets have been seizing the opportunity to help finance the

transition to a greener economy. Since 2015 assets under management of ESG funds have almost tripled, the outstanding amount of green bonds issued by euro area residents has increased eightfold, the outstanding amount of catastrophe bonds has almost doubled, and emission-related derivatives have grown more than sevenfold¹⁰⁹ (see [Chart B.6](#), left panel).¹¹⁰

Chart B.6

Investors in ESG and green funds appear less sensitive to past negative performance



Sources: Artemis, Bloomberg Finance L.P., EMIR data, EPFR Global, Lipper and ECB calculations.

Notes: Left panel: data on catastrophe bonds are copyright to www.artemis.bm, Steve Evans Ltd. To avoid end-of-year effects, the outstanding amount of emission-related derivatives is the notional value of open positions reported under EMIR as at the end of November. 2015 values are not included due to data unavailability. See footnote 109 for data limitations. The right panel shows the relationship between net flows as a share of a fund's lagged total net assets and lagged fund returns. It is based on a sample of 1,452 and 8,337 non-ESG fund shares, and 131 and 1,017 ESG shares, of corporate bond and equity funds domiciled in the euro area between January 2016 and September 2020. Green funds are identified using text search for key words such as 'green' and 'environmental' in funds' prospectuses. Controls include fund age, fund size, lagged flows and standard deviation of returns. Share and interaction-time-ESG fixed effects are included and standard errors are clustered at share level. Dashed lines indicate that estimates are statistically not significantly different from zero at the 5% level. EMIR: European Market Infrastructure Regulation; ESG: environmental, social and governance.

As transition risks to the financial system increase with higher carbon prices, they need to be actively managed. This is causing volumes to rise in emission-related derivatives markets, mostly concerning futures on EU ETS allowances that are used to hedge transition risk. In parallel, financial markets are designing new products, such

¹⁰⁹ The sample of EMIR data used here includes transactions with at least one counterparty located in the euro area or the underlying issued by a euro area entity; reliable data start in 2017. Reported data do not capture the full EU emission-related derivatives market. The data (reported by both trade counterparties) are paired and de-duplicated, then outliers are removed. The final data can still be subject to data quality limitations (e.g. missing values, some transactions remain unpaired, possible under-reporting, etc.).

¹¹⁰ See also the box entitled "[The performance and resilience of green finance instruments: ESG funds and green bonds](#)", *Financial Stability Review*, ECB, November 2020, with evidence on the resilience of flows into ESG funds compared with their non-ESG peers.

as blue bonds to protect marine areas and sustainability-linked bonds¹¹¹ to incentivise sustainable investments and help counter greenwashing. But the risk of greenwashing remains high due to the lack of consistent disclosures, taxonomy alignment and consistent standards for green bonds and ESG investment funds.¹¹²

Investors in ESG bond and equity funds appear less sensitive to past negative performance, meaning that they appear to provide relatively stable financing to support the transition (see Chart B.6, right panel). Returns of ESG and non-ESG funds are statistically similar. However, the sensitivity of flows to negative performance in ESG funds, including those with a green focus, has not been statistically significantly different from zero over the last four years. This is in contrast with non-ESG funds, which exhibit a clear flow-performance relationship following negative returns, consistent with the wider literature.¹¹³ This observation may signal that investors have started pricing in transition risks and may expect better risk-adjusted performance from ESG funds, or that ESG investors are more committed and have a longer-term investment horizon.

Complementary evidence about whether investors in green bonds treat them differently to conventional bonds is mixed, potentially due to a lack of clear standards and commitment from issuers (see Chart B.7, left panel). Over 2019 and 2020 green bonds were issued at lower yields and with larger order books than conventional bonds. However, their subsequent performance in terms of interest rates and liquidity is statistically similar when controlling for macroeconomic factors and bond-specific characteristics.¹¹⁴ Tentative evidence suggests, by contrast, that green bonds satisfying all the green bond principles promoted by the International Capital Market Association and with second-party certification exhibit a statistically significant “greenium”¹¹⁵, unlike green bonds satisfying only the “use-of-proceeds” principle. This suggests that further strengthening green bond standards and issuer accountability can foster market development in order to fund the transition. Measures aimed at averting greenwashing may also be important, given mixed evidence on whether green bond issuance signals lower or decreasing carbon intensity on the part of the issuers.¹¹⁶

¹¹¹ In January 2021 the Eurosystem started accepting sustainability-linked bonds as eligible collateral for Eurosystem credit operations and also for Eurosystem outright purchases for monetary policy purposes, provided they comply with all other eligibility criteria. This signals the Eurosystem's support for innovation in the area of sustainable finance.

¹¹² See “Testing Draft EU Ecolabel Criteria on UCITS equity funds”, European Commission, June 2020.

¹¹³ See, for example, Goldstein, I., Jiang, H. and Ng, D.T., “Investor flows and fragility in corporate bond funds”, *Journal of Financial Economics*, Vol. 126, Issue 3, December 2017.

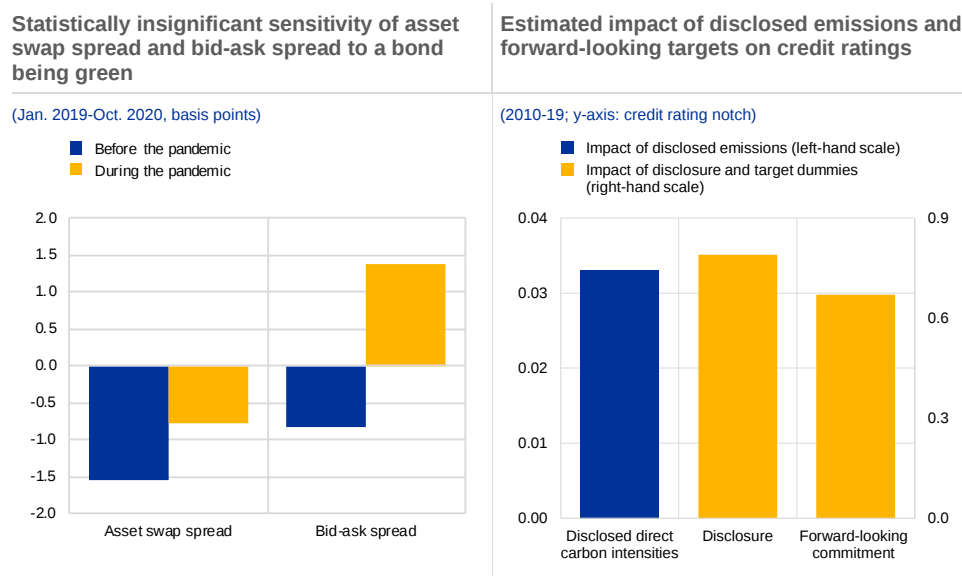
¹¹⁴ This is an average result for the full sample; however, there is significant diversity within the sample.

¹¹⁵ The term “greenium” refers to a lower yield for green bonds compared with conventional bonds with a similar risk profile, reflecting the fact that green projects benefit from cheaper financing.

¹¹⁶ Ehlers, T., Mojon, B. and Packer, F., “Green bonds and carbon emissions: exploring the case for a rating system at the firm level”, *BIS Quarterly Review*, September 2020, find that current labels for green bonds do not necessarily signal lower or decreasing carbon intensity of issuers; Fatica, S. and Panzica, R., “Green bonds as a tool against climate change?”, *Business Strategy and the Environment*, March 2021, show a decrease in the carbon intensity of green bond issuers' assets after borrowing in the green segment.

Chart B.7

Green bonds are similar to conventional bonds in terms of interest rates and liquidity, and credit ratings partly reflect firms' transition risk



Sources: Bloomberg Finance L.P., Dealogic, IHS Markit, Refinitiv, Urgentem and ECB calculations.

Notes: Left panel: the chart shows how green bonds differ from matched conventional bonds in terms of asset swap spread and liquidity (bid-ask spread). It is based on 145 pairs between January 2019 and October 2020. Dependent variables, asset swap spread and bid-ask spread are regressed on a green-bond dummy variable. Controls include macro variables (VIX, three-month EURIBOR, ten-year German Bund), bond-specific characteristics (maturity, coupon rate, size, issuer credit rating, ECB eligibility and bid-ask spread for regression of spread). Pair and month fixed effects are included, and standard errors are clustered at a bond level. The coefficients are not significantly different from zero at the 5% level. Right panel: the coefficients are based on a firm-level panel regression of environmental metrics, financial controls and sectoral/time fixed effects on credit ratings. The sample consists of yearly data on 859 listed non-financial corporations from Europe and the United States, with observations covering the period from 2016 to 2019. The first column presents the impact of an average yearly decrease in scope 1 and 2 carbon intensities, while the other two columns show the impact of dummy variables for the existence of environmental disclosure and forward-looking targets related to emissions reduction respectively.

Firms' transition risk seems to be reflected in credit ratings to some degree, but its impact is mitigated by the presence of forward-looking emission-reduction targets. Corporate disclosure is predominantly based on current emissions, but transition risk can affect a firm's capacity to service and repay its debt in the future.¹¹⁷ For this reason, an increasing number of companies are disclosing their strategy to reduce emissions in line with the Paris Agreement targets. Our analysis suggests that disclosure and more ambitious forward-looking targets are associated with better credit ratings (see [Chart B.7](#), right panel), which may be indicative of greater risks in companies not taking a proactive approach to assessing and reducing their carbon footprint.¹¹⁸

¹¹⁷ Capasso, G., Gianfrate, G. and Spinelli, M., "Climate change and credit risk", *Journal of Cleaner Production*, Vol. 266, September 2020, and Höck, A., Klein, C., Landau, A. and Zwergel, B., "The effect of environmental sustainability on credit risk", *Journal of Asset Management*, Vol. 21, March 2020, show that high emitters have shorter distance to default and higher credit spreads.

¹¹⁸ The International Financial Reporting Standards (IFRS) Foundation is currently developing new sustainability reporting standards, starting from the recommendations of the Task Force on Climate-Related Financial Disclosures, to foster more informative forward-looking disclosures.

Conclusions and policy considerations

While data and methodological challenges still persist, the available evidence suggests that euro area banks, funds and insurers face material climate-related financial risks. Banks and non-bank financial institutions alike have a sizeable share of exposures to emission-intensive corporates that could face an increased risk of losses during the transition to a low-carbon economy. Including more evidence on scope 3 emissions allows these risks to be captured more comprehensively. An even more concerning risk for banks and non-bank financial institutions may arise from exposure to physical risks if climate change is not contained and if economies fail to adapt to climate change. For both transition and physical risks, our results suggest that the risks may be particularly concentrated in certain sectors, geographical regions and individual banks. In addition to mapping financial system risk exposures and transforming them into impacts, climate stress tests enhance our understanding of financial system vulnerability to higher corporate default risk. To do so, they make use of alternative forward-looking scenarios for climate change and emission reduction, thereby shedding light on the relative costs and benefits of transitioning towards a greener economy. Overall, our understanding of climate-related risks is still a work in progress, as data and methodological gaps continue to need addressing.

The analysis also reveals that the measurement of climate-related financial risks needs to account for the interplay between banks and insurers. A key determinant of how banks are affected by materialising risks is the extent to which exposures or collateral are covered by insurance. Evidence from past disasters shows how economic recovery benefits from a higher level of insurance coverage. Insurers play a central role in managing and distributing the risks that could arise from climate change. However, as climate-related risks intensify, there is a growing risk of an increasing insurance protection gap due to increasing insurance premiums or because of some risks becoming uninsurable. A cross-sectoral assessment is therefore required in order to obtain a complete picture of the climate-related risks faced by the financial system.

While investor interest in “green finance” continues to grow, supportive market pricing and further growth may be inhibited if greenwashing concerns are left unaddressed. Amid the wider market turmoil in the wake of the coronavirus (COVID-19) pandemic, green funds and instruments have proved notably resilient, and ESG funds have continued to grow, demonstrating the value investors place on this sector. Effective green finance can help to foster an orderly transition towards a net zero emissions economy and reduce vulnerability to climate-related risks. At the same time, possible market failures can stem from data gaps, which would raise the risk of greenwashing.

Further progress on closing data gaps and improving reporting is required to enhance the capacity to measure, monitor and mitigate climate-related financial risks and reduce the risk of greenwashing. The lack of adequate and consistent data hampers the development of active strategies for monitoring and managing climate-related risks and undermines the effective pricing of risk. Disclosed metrics should include direct and indirect emissions together with forward-looking measures,

such as emission-reduction targets and green investments. It is also essential to enhance granular geolocational information on physical risk drivers and the exposure of firms and their facilities to these risk drivers, together with implemented and future adaptation measures and insurance coverage. These data gaps should be closed as a matter of priority, by setting mandatory, harmonised and auditable disclosure standards.

European and global initiatives to develop consistent sustainability disclosures should help to foster better informed pricing of climate-related risks. Given the importance of a globally coordinated approach, the efforts of the Financial Stability Board (FSB) and the G20, as well as the initiative of the IFRS Foundation, are essential to develop common standards. Mandatory global reporting standards which still leave room for regional jurisdictions to go further, if they wish, can help promote global upward convergence beyond the minimum standards. The EU's recent initiatives serve as an important global reference point.¹¹⁹

Building on improved disclosures and standards, consistent regulatory and supervisory approaches will help to address climate-related and environmental financial risks.¹²⁰ Maintaining global consistency will be important to avoid regulatory arbitrage, with ongoing work in this area being conducted by the FSB, the Basel Committee on Banking Supervision, the European Banking Authority (EBA) and others. Currently, the work at both the international and the EU level focuses on whether the current prudential frameworks adequately cover climate-related financial risks or whether there are any gaps. Subsequently, the need for potential regulatory and/or supervisory measures will be considered to ensure financial institutions are effectively addressing climate-related financial risks.

A macroprudential perspective is needed to mitigate climate-related risks in the financial system. In particular, the systemic nature of climate-related risks implies that narrowly mitigating the exposure of one part of the financial system could prompt the transfer of risk to other sectors. This suggests that a system-wide perspective is needed. Hence, while the microprudential framework can continue to focus on the soundness of individual financial institutions, macroprudential authorities will need to consider the risks to the financial system as a whole and ensure cross-sector consistency. Ultimately, macroprudential and supervisory approaches will need to be complementary and account for the long horizon of climate-related risks and their complex interactions with the real economy and the financial system.

¹¹⁹ Recent EU initiatives include a proposed [Corporate Sustainability Reporting Directive](#), as released on 21 April 2021 and based on the review of the [Non-Financial Reporting Directive](#), ongoing work on the [EU taxonomy for sustainable activities](#) including the EU Taxonomy Climate Delegated Act, and EBA initiatives on [prudential disclosures of ESG risks](#).

¹²⁰ See “[Guide on climate-related and environmental risks – Supervisory expectations relating to risk management and disclosure](#)”, ECB Banking Supervision, May 2020.

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