EUROPEAN CENTRAL BANK

EUROSYSTEM

Economic Bulletin

Contents

Economic, financial and monetary developments

Overview

Inflation continues to decline but is still expected to remain too high for too long. The Governing Council is determined to ensure that inflation returns to its 2% medium-term target in a timely manner. In order to reinforce progress towards its target, the Governing Council decided at its meeting on 14 September 2023 to raise the three key ECB interest rates by 25 basis points.

The rate increase reflects the Governing Council's assessment of the inflation outlook in light of the incoming economic and financial data, the dynamics of underlying inflation, and the strength of monetary policy transmission. The September 2023 ECB staff macroeconomic projections for the euro area see average inflation at 5.6% in 2023, 3.2% in 2024 and 2.1% in 2025. This is an upward revision for 2023 and 2024 and a downward revision for 2025. The upward revision for 2023 and 2024 mainly reflects a higher path for energy prices. Underlying price pressures remain high, even though most indicators have started to ease. ECB staff have slightly revised down the projected path for inflation excluding energy and food, to an average of 5.1% in 2023, 2.9% in 2024 and 2.2% in 2025. The Governing Council's past interest rate increases continue to be transmitted forcefully. Financing conditions have tightened further and are increasingly dampening demand, which is an important factor in bringing inflation back to target. With the increasing impact of this tightening on domestic demand and the weakening international trade environment, ECB staff have lowered their economic growth projections significantly. They now expect the euro area economy to expand by 0.7% in 2023, 1.0% in 2024 and 1.5% in 2025.

Based on its current assessment, the Governing Council considers that the key ECB interest rates have reached levels that, maintained for a sufficiently long duration, will make a substantial contribution to the timely return of inflation to the target. The Governing Council's future decisions will ensure that the key ECB interest rates will be set at sufficiently restrictive levels for as long as necessary. The Governing Council will continue to follow a data-dependent approach to determining the appropriate level and duration of restriction. In particular, the Governing Council's interest rate decisions will be based on its assessment of the inflation outlook in light of the incoming economic and financial data, the dynamics of underlying inflation, and the strength of monetary policy transmission.

Economic activity

The economy is likely to remain subdued in the coming months. It broadly stagnated over the first half of the year, and recent indicators suggest it has also been weak in

the third quarter. Lower demand for the euro area's exports and the impact of tight financing conditions are dampening growth, including through lower residential and business investment. The services sector, which had so far been resilient, is now also weakening. Over time, economic momentum should pick up, as real incomes are expected to rise, supported by falling inflation, rising wages and a strong labour market, and this will underpin consumer spending.

The labour market has so far remained resilient despite the slowing economy. The unemployment rate stayed at its historical low of 6.4% in July. While employment grew by 0.2% in the second quarter, momentum is slowing. The services sector, which has been a major driver of employment growth since mid-2022, is now also creating fewer jobs.

The short-term outlook for growth in the euro area has deteriorated, while over the medium term the economy should gradually return to moderate growth as both domestic and foreign demand recover. Euro area economic activity grew at a subdued pace in the first half of 2023, despite the elevated level of manufacturing order backlogs and the unwinding of high energy prices. Moreover, these effects have largely waned, and short-term indicators point to stagnation in the near term in the face of tighter financing conditions, weak business and consumer confidence and low foreign demand in the context of a strengthening of the euro. Growth is expected to pick up from 2024 as foreign demand approaches its pre-pandemic trend and real incomes improve, underpinned by declining inflation, strong nominal wage growth and still low, though slightly increasing, unemployment. However, growth will continue to be dampened as the ECB's monetary policy tightening and adverse credit supply conditions feed through to the real economy and as fiscal support is gradually withdrawn. Overall, annual average real GDP growth is expected to slow down from 3.4% in 2022 to 0.7% in 2023, before recovering to 1.0% in 2024 and to 1.5% in 2025. Compared with the June 2023 Eurosystem staff projections, the outlook for GDP growth has been revised down by 0.2 percentage points for 2023, 0.5 percentage points for 2024 and 0.1 percentage points for 2025, reflecting a significant downgrade of the short-term outlook, amid deteriorating survey indicators, tighter financing conditions – including more adverse credit supply effects – and the stronger euro exchange rate.

As the energy crisis fades, governments should continue to roll back the related support measures. This is essential to avoid driving up medium-term inflationary pressures, which would otherwise call for an even stronger monetary policy response. Fiscal policies should be designed to make the euro area economy more productive and to gradually bring down high public debt. Policies to enhance the euro area's supply capacity – which would be supported by the full implementation of the Next Generation EU programme – can help reduce price pressures in the medium term, while supporting the green transition. The reform of the EU's economic governance framework should be concluded before the end of 2023 and progress towards capital markets union should be accelerated.

Inflation

Inflation declined to 5.3% in July but remained at that level in August, according to Eurostat's flash estimate.[1] Its decline was interrupted because energy prices rose compared with July. Food price inflation has come down from its peak in March but was still almost 10% in August. In the coming months, the sharp price increases recorded in the autumn of 2022 will drop out of the yearly rates, thus pulling inflation down.

Inflation excluding energy and food fell to 5.3% in August, from 5.5% in July. Goods inflation declined to 4.8% in August, from 5.0% in July and 5.5% in June, owing to better supply conditions, previous drops in energy prices, easing price pressures in the earlier stages of the production chain and weaker demand. Services inflation edged down to 5.5% but was still kept up by strong spending on holidays and travel and by the high growth of wages. The annual growth rate of compensation per employee remained constant at 5.5% in the second quarter of the year. The contribution of labour costs to annual domestic inflation increased in the second quarter, in part owing to weaker productivity, while the contribution of profits fell for the first time since early 2022.

Most measures of underlying inflation are starting to fall as demand and supply have become more aligned and the contribution of past energy price increases is fading out. At the same time, domestic price pressures remain strong.

Most measures of longer-term inflation expectations currently stand at around 2%. But some indicators have increased and need to be monitored closely.

Headline inflation in the euro area is projected to continue to decline over the projection horizon owing to easing cost pressures and supply bottlenecks, as well as the impact of monetary policy tightening. HICP inflation excluding energy and food is also expected to gradually decline. However, it is projected to stand above headline inflation until early 2024. The projected disinflation is due to fading effects of the past energy price shocks and other pipeline price pressures, with strong growth in labour costs gradually becoming the dominant driver of HICP inflation excluding energy and food. Wage growth is expected to decline gradually from mid-2023, albeit remaining high over the projection horizon, driven by increases in minimum wages and inflation compensation, in a context of a tight, though cooling, labour market. Profit margins, which expanded notably last year, are expected to provide a buffer to the pass-through of labour costs to final prices in the medium term. In addition, the tighter monetary policy should increasingly dampen underlying inflation. Overall, with medium-term inflation expectations assumed to remain anchored at the ECB's inflation target, headline HICP inflation is expected to decrease from an average of 8.4% in 2022 to 5.6% in 2023, 3.2% in 2024 and 2.1% in 2025, reaching the target in the third quarter of 2025. Compared with the June 2023 projections, HICP inflation has been revised up for 2023 and 2024, driven by higher energy futures prices, and down for 2025, as the impacts from the appreciation of the euro, tighter financing

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[1]   The cut-off date for the statistics included in this issue was 13 September 2023. According to the final release on 19 September 2023, HICP inflation declined to 5.2% in August 2023 from 5.3% in July; this outcome was 0.1 percentage points below the flash release.

conditions and weaker cyclical conditions are seen to dampen HICP inflation excluding energy and food.

Risk assessment

The risks to economic growth are tilted to the downside. Growth could be slower if the effects of monetary policy are more forceful than expected, or if the world economy weakens, for instance owing to a further slowdown in China. Conversely, growth could be higher than projected if the strong labour market, rising real incomes and receding uncertainty mean that people and businesses become more confident and spend more.

Upside risks to inflation include potential renewed upward pressures on the costs of energy and food. Adverse weather conditions, and the unfolding climate crisis more broadly, could push food prices up by more than expected. A lasting rise in inflation expectations above the Governing Council's target, or higher than anticipated increases in wages or profit margins, could also drive inflation higher, including over the medium term. By contrast, weaker demand – for example due to a stronger transmission of monetary policy or a worsening of the economic environment outside the euro area – would lead to lower price pressures, especially over the medium term.

Financial and monetary conditions

The monetary policy tightening continues to be transmitted strongly to broader financing conditions. Funding has again become more expensive for banks, as savers are replacing overnight deposits with time deposits that pay more interest and the ECB's targeted longer-term refinancing operations are being phased out. Average lending rates for business loans and mortgages continued to increase in July, to 4.9% and 3.8% respectively.

Credit dynamics have weakened further. Loans to firms grew at an annual rate of 2.2% in July, down from 3.0% in June. Loans to households also grew less strongly, by 1.3%, after 1.7% in June. In annualised terms based on the last three months of data, household loans declined by 0.8%, which is the strongest contraction since the start of the euro. Amid weak lending and the reduction in the Eurosystem balance sheet, the annual growth rate of M3 fell from 0.6% in June to an all-time low of -0.4% in July. In annualised terms over the past three months, M3 contracted by 1.5%.

Monetary policy decisions

At its meeting on 14 September 2023 the Governing Council decided to raise the three key ECB interest rates by 25 basis points. Accordingly, the interest rate on the main refinancing operations and the interest rates on the marginal lending facility

and the deposit facility were increased to 4.50%, 4.75% and 4.00% respectively, with effect from 20 September 2023.

The asset purchase programme portfolio is declining at a measured and predictable pace, as the Eurosystem no longer reinvests the principal payments from maturing securities.

As concerns the pandemic emergency purchase programme (PEPP), the Governing Council intends to reinvest the principal payments from maturing securities purchased under the programme until at least the end of 2024. In any case, the future roll-off of the PEPP portfolio will be managed to avoid interference with the appropriate monetary policy stance.

The Governing Council will continue applying flexibility in reinvesting redemptions coming due in the PEPP portfolio, with a view to countering risks to the monetary policy transmission mechanism related to the pandemic.

As banks are repaying the amounts borrowed under the targeted longer-term refinancing operations, the Governing Council will regularly assess how targeted lending operations and their ongoing repayment are contributing to its monetary policy stance.

Conclusion

Inflation continues to decline but is still expected to remain too high for too long. The Governing Council is determined to ensure that inflation returns to its 2% medium-term target in a timely manner. In order to reinforce progress towards its target, the Governing Council decided at its meeting on 14 September 2023 to raise the three key ECB interest rates by 25 basis points. Based on its current assessment, the Governing Council considers that the key ECB interest rates have reached levels that, maintained for a sufficiently long duration, will make a substantial contribution to the timely return of inflation to the target. The Governing Council's future decisions will ensure that the key ECB interest rates will be set at sufficiently restrictive levels for as long as necessary. The Governing Council will continue to follow a data-dependent approach to determining the appropriate level and duration of restriction.

In any case, the Governing Council stands ready to adjust all of its instruments within its mandate to ensure that inflation returns to its medium-term target and to preserve the smooth functioning of monetary policy transmission.

1 External environment

After rebounding strongly at the start of 2023, the global economy is set to expand at a more moderate pace in the remainder of the year, mainly reflecting a loss of momentum in China's economic recovery. However, the outlook for global growth embedded in the September ECB staff macroeconomic projections for the euro area remains broadly similar to the June Eurosystem staff macroeconomic projections. In fact, while global growth remains steady overall over the projection horizon, its country composition has changed, as the growth outlook for China was revised significantly downwards while real GDP growth was revised upwards in the United States owing to the resilience displayed by its economy so far. Weak global trade growth in 2023 reflects the composition of global economic activity, which is being driven by less trade-intensive countries (emerging economies), demand components (consumption) and products (services). Global trade growth is expected to pick up again over the rest of the projection horizon and increase broadly in line with global activity. Compared with the June projections, both global imports growth and euro area foreign demand growth were revised downwards for 2023, largely on account of further downward revisions to historical data and weaker than estimated outturns in the second quarter at the cut-off date for the projections. However, the growth of foreign demand over the rest of the projection horizon remains comparable with the June projections. Global headline consumer price index (CPI) inflation is receding gradually but underlying inflationary pressures remain strong, particularly among advanced economies. However, euro area competitor export prices are projected to decline sharply, driven by commodity price developments.

After a strong start at the beginning of 2023, global economic activity is now moderating, mainly reflecting a loss of momentum in China's recovery. In the September projections, global growth is expected to ease in the second half of the year. Despite remaining broadly in line with the June projections, its underlying country composition has changed.[2] In key advanced economies, including the United States and the United Kingdom, economic activity remained more resilient than anticipated, while in China it slowed more sharply than previously estimated, as problems in the residential real estate sector resurfaced and dampened the consumption-led recovery. The expected moderation in global economic activity is also confirmed by incoming high-frequency data. The global composite output Purchasing Managers' Index (PMI) remains on a downward trend, albeit staying in expansionary territory in both advanced and emerging economies. The same is true for the services output PMI, while the manufacturing output PMI has fallen deeper into contractionary territory across advanced economies but edged up in emerging market economies, narrowing the gap in relation to the services sector (Chart 1).

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[2] Given the focus of this section on developments in the global environment, all references to world and/or global aggregate economic indicators exclude the euro area.

Chart 1

PMI output by sector across advanced and emerging market economies

a) Advanced economies (excluding the euro area)

(diffusion indices)

- Services
- Manufacturing
- Composite
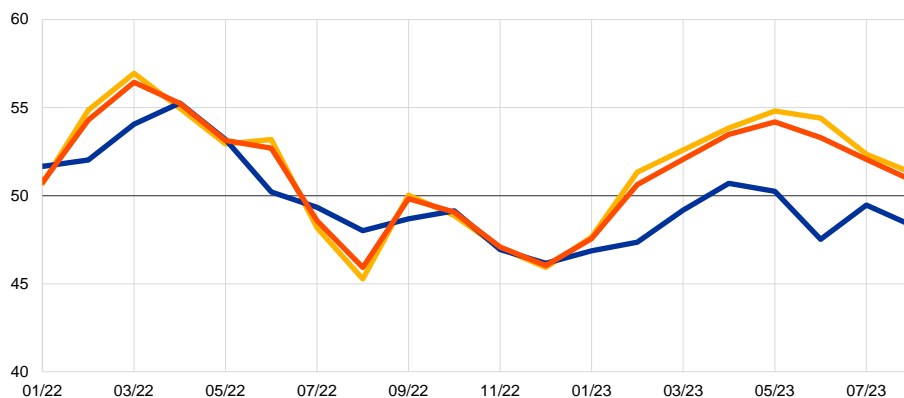
b) Emerging market economies

(diffusion indices)

- Services
- Manufacturing
- Composite
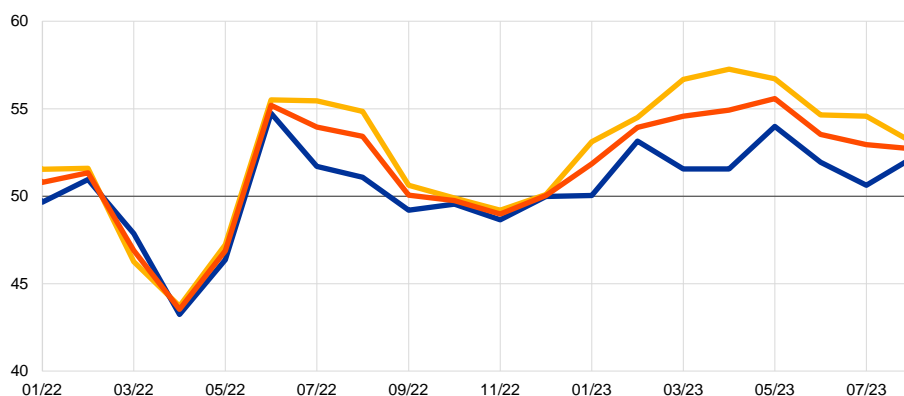
Sources: S&P Global Market Intelligence and ECB staff calculations.
Note: The latest observations are for August 2023.

The overall global growth outlook in the September projections is close to that of the June projections but prospects across major economies were reassessed. Global real GDP is now projected to expand by 3.2% in 2023, 3.0% in 2024 and 3.2% in 2025, reflecting only small revisions compared with the June projections (+0.1 percentage points in 2023 and -0.1 percentage points in both 2024 and 2025). However, growth prospects in China have been revised substantially downwards, owing to the aforementioned dynamics in the country's residential real estate sector.[3] Economic activity in major advanced economies, by contrast, was revised upwards for 2023, reflecting stronger labour market resilience, although the

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[3]   In early September, Chinese authorities announced further support for the property market, including cutting interest rates on existing mortgages and reducing down payments. While these measures were announced after the cut-off date for the projections, it is still too early to see whether they will be sufficient to halt the projected decline in the property sector for the rest of 2023.

growth outlook is expected to weaken further along the projection horizon. Emerging market economies remain a key driver of global economic growth, despite projected growth being somewhat slower than in the June projections.

World trade growth is expected to remain weak this year and recover gradually thereafter. Sluggish global trade this year contrasts with relatively resilient global activity. Global imports are projected to grow only marginally this year (+0.2%) because imports across advanced economies are expected to contract, reflecting weak demand resulting from tighter financial conditions and composition effects related, in part, to the post-pandemic recovery. Three compounding compositional effects continue to explain weak trade in 2023, as activity is being driven by less trade-intensive geographies (emerging economies), demand components (consumption) and products (services). However, the weakness in global trade has bottomed out and momentum is expected to gradually improve in the remainder of 2023. This is in line with the latest data for global trade in goods (Chart 2) and also reflects the strong post-pandemic recovery in services trade, such as tourism. For the period 2024-25, global trade is projected to regain some further momentum, and to grow more in line with real GDP, expanding by 3.2% in 2024 and 3.3% in 2025. Euro area foreign demand growth is projected to remain flat this year and to increase by 3% annually over the period 2024-25. Compared with the June 2023 projections, both world imports and euro area foreign demand growth have been revised downwards in 2023 (by 1.1 percentage points and 0.4 percentage points respectively), largely on account of further downward revisions to historical data at the turn of the year and weaker than previously estimated imports in the second quarter at the cut-off date for the projections. For 2024 and 2025, downward revisions are smaller, amounting to around 0.1 percentage points per year.

Chart 2

Merchandise trade momentum

(real imports, three-month-on-three-month percentage changes)
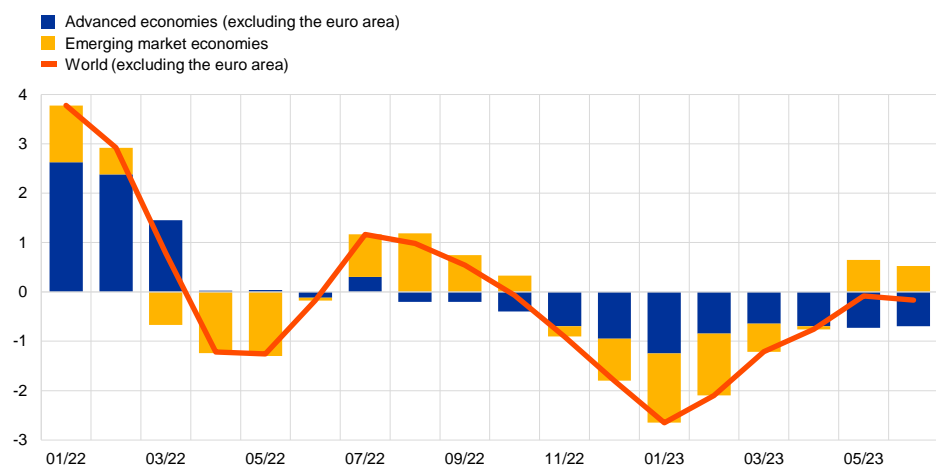
Sources: CPB and ECB staff calculations.
Note: The latest observations are for June 2023.

Headline CPI inflation has been declining globally, supported by lower energy and food prices but core inflation remains high. Headline and core (excluding food and energy) CPI inflation across the member countries of the Organisation for

Economic Co-operation and Development (OECD) increased slightly in July to 5.9% (up from 5.7% in June) and to 6.7% (up from 6.6%) respectively. This was mainly attributable to annual inflation in Türkiye, which jumped by 10 percentage points to 48%, in July. Excluding Türkiye, headline inflation remained broadly stable in July (at 4.4%, down slightly from 4.5% in June) and core inflation declined slightly (to 5.0%, down from 5.2% in June). Persistently high core inflation can largely be ascribed to developments in services. Goods price inflation fell sharply as global demand-supply imbalances were resolved in the goods market. Inflation momentum, measured as the three-month-on-three-month annualised percentage changes, eased in July for headline inflation, down to 2.8% from 3.5% in the previous month (Chart 3), and core inflation, down to 4.3% from 5.3%. Euro area competitor export prices have been on a downward path since mid-2022, owing to falling commodity prices and a gradual easing in domestic and foreign pipeline pressures. Export prices of euro area competitors have been revised downwards for this year compared with the June projections, reflecting a decline in export price inflation in key trading partners, whereas they have been revised slightly upwards for 2024, owing to higher commodity prices.

Chart 3

OECD headline inflation momentum

(three-month-on-three-month annualised percentage changes)
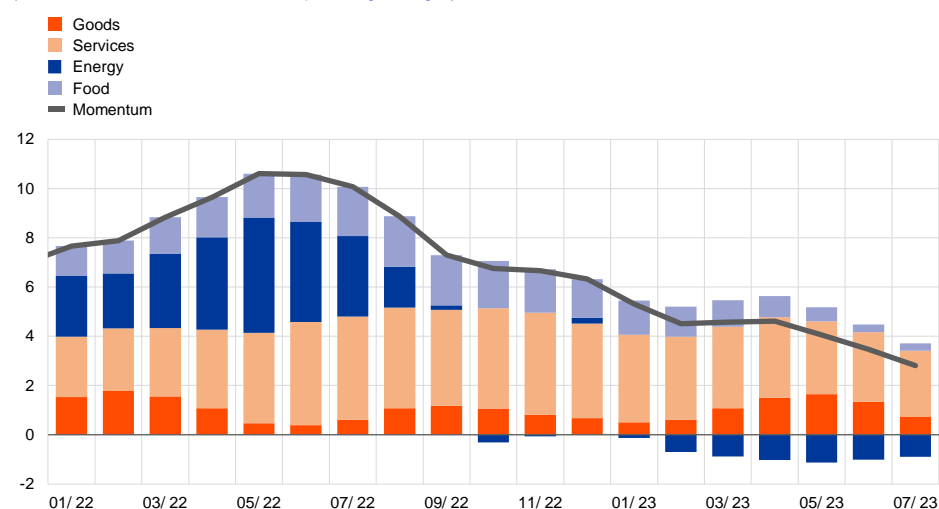
Sources: OECD and ECB calculations.
Notes: The chart excludes Türkiye. Contributions of respective components of OECD headline inflation momentum reported in the chart are constructed bottom-up using available country data, which jointly account for 84% of the OECD area aggregate. Goods inflation is computed as the residual of the contribution of total goods, less those of energy and food. The latest observations are for July 2023.

Crude oil prices are higher than in the June projections, following Saudi Arabia and Russia's agreement to extend their production cuts. In early September, Saudi Arabia and Russia extended their one-month production cuts to the rest of 2023. The production cuts correspond to around 1.3% of global supply and add to previously agreed production cuts in the OPEC+ group and further tighten the oil market which, according to the International Energy Agency, is now in a deficit of supply. The effects of the supply cuts acted as a counterweight to weaker demand in China. European gas prices have shown some volatility amid supply shortages, related to outages in Norway and more recently to strikes at liquified

natural gas terminals in Australia, but declined since the June projections, as the EU reached its 90% storage target three months ahead of schedule. While this implies that risks to supply in the short term remain limited, they cannot be ruled out fully because there may be supply outages for a prolonged period. In general, the European gas market remains very sensitive to supply disruptions, as recently illustrated by price volatility caused by outages and strikes.

Global financial conditions tightened slightly across advanced and emerging market economies. In the United States, the modest tightening of financial conditions mainly reflected an increase in long-term sovereign bond yields and an appreciation in the US dollar nominal effective exchange rate, which was partly offset by favourable risk sentiment in the domestic corporate bond market. These developments took place against a background of positive macroeconomic surprises and a further easing in inflationary pressures. Financial conditions also tightened slightly in other advanced and emerging market economies, mostly reflecting higher long-term interest rates. In emerging markets, domestic currencies that are weaker against the US dollar also contributed somewhat to tighter financial conditions, as early and aggressive interest rate hikes in some countries allowed their central banks to pause and, in some cases, to cut policy rates, while sovereign spreads and equity valuations remained stable.

In the United States, economic activity remained resilient but is expected to moderate towards the end of the year as tighter monetary policy restrains activity. Recent data on household spending and services activity suggest GDP growth will remain strong in the third quarter. Nonetheless, household consumption growth is expected to moderate somewhat amid some loosening labour market conditions. Tighter lending standards are expected to weigh on investment, leading to positive but below-potential GDP growth in the period 2024-25. A tepid recovery in real GDP growth is projected in 2025. Headline CPI inflation ticked up slightly to 3.2% in July (down from 3.0% in June), owing to a smaller disinflationary contribution from the energy component. Core inflation declined only slightly to 4.7% in July (down from 4.8% in June) amid a continued easing of goods inflation, while among services a rebound in transportation and recreation services inflation partly offsets the ongoing slow decline in shelter services inflation. Headline inflation is expected to decline, despite decreasing – albeit still strong – wage growth exerting persistent upward pressure on non-housing services inflation.

In China, growth experienced a sharp loss of momentum in the second quarter. After rebounding strongly in the first quarter of 2023, following the easing of COVID-19 related containment measures, growth momentum slowed markedly in the second quarter, driven by a renewed downturn in the housing market, which also weighed on consumer confidence. While consumption activity, especially for services, continued to normalise, net exports and private investment were weaker than expected in the June projections. Available high-frequency indicators up to August suggest continued weakness in the housing market and moderating growth in services but some stabilisation in manufacturing activity. Annual headline CPI inflation fell into negative territory in July (-0.3% year on year), while core CPI inflation continued to increase (+0.8% year on year) driven mainly by prices for

services. In month-on-month terms, headline and core inflation increased slightly, following decreases over the previous months. This suggests that annual inflation may start to pick up, yet weak domestic and external demand are likely to limit inflationary pressures.

In Japan, the economy expanded significantly in the first half of 2023, albeit amid shifting dynamics. While domestic demand was a key driver of growth earlier in the year, the surprisingly strong growth outturn in the second quarter was driven almost entirely by net exports, whereas domestic demand stagnated. Looking ahead, economic activity is projected to remain on a moderate growth trajectory. While domestic demand is expected to recover to some extent in the third quarter, growth is likely to slow compared with the first half of the year, reflecting a recovery in imports. Annual headline inflation remained unchanged at 3.3% in July, as falling energy inflation was offset by rising food inflation and higher accommodation and mobile phone charges. In the same month, core inflation increased slightly from 2.6% to 2.7%, reflecting firms' underlying price momentum. Headline inflation is expected to moderate in the second half of this year as cost pressures ease, in line with the recent deceleration in producer price inflation and falling import prices.

In the United Kingdom, growth has been muted over the past year amid high inflation and tightening financing conditions, albeit displaying some resilience. Growth in economic activity is also expected to remain subdued in the coming quarters, reflecting more persistent inflationary pressures than were expected in the June projections, while households and firms also face higher interest rates on the back of further monetary policy tightening. Recent survey data have added downside risks to the short-term outlook, with the composite PMI output index falling six points over the past four months. Activity is projected to pick up next year, supported by the recovery in real wages as inflation continues to recede. Headline CPI inflation declined strongly to 6.8% in July (down from 7.9% in June) mainly as a result of a large fall in energy bills and lower food price inflation. At the same time, core inflation remained unchanged at 6.9%, owing to persistently high services price inflation. Headline inflation is expected to decrease over time, reaching the Bank of England's target of 2% at the beginning of 2025.

2 Economic activity

The euro area economy broadly stagnated over the first half of the year. In the second quarter of 2023, real GDP growth was 0.1%, as in the first quarter. Recent indicators suggest it has also been weak in the third quarter. Lower demand for euro area exports and the impact of tight financing conditions are dampening growth, including through lower residential and business investment. The slowdown in activity is spreading to all sectors of the economy. Manufacturing output has been contracting since the fourth quarter of 2022 and is expected to remain weak, as the past impulse to production from order backlogs is declining and new orders remain subdued. Activity in the services sector, which had been more resilient, showed clear signs of slowdown at the beginning of the third quarter, suggesting that the post-pandemic boost to services demand might be fading away. Over time, economic momentum should pick up, as real incomes are expected to rise, supported by falling inflation, rising wages and a strong labour market, which should underpin consumer spending.

This outlook is broadly reflected in the September 2023 ECB staff macroeconomic projections for the euro area, which foresee annual real GDP growth slowing down to 0.7% in 2023, before recovering to 1.0% in 2024 and to 1.5% in 2025. Compared with the June 2023 Eurosystem staff macroeconomic projections, the outlook for GDP growth has been revised down over the entire projection horizon, by 0.2 percentage points in 2023, 0.5 percentage points in 2024 and 0.1 percentage points in 2025. The risks to economic growth are tilted to the downside.

The euro area economy grew by 0.1% in the second quarter of 2023, amid large variations between countries. The positive contributions of inventory accumulation and, to a lesser extent, of domestic demand were partly offset by a negative net trade contribution (Chart 4). This modest growth in activity reflects divergent dynamics across sectors: services activity grew, while manufacturing and construction activity declined. It also masked considerable divergence across the largest euro area countries, reflecting the varying extent to which these were affected by the slowdown in the global trade of goods and by the recovery of the contact-intensive services sector. Quarter on quarter, GDP increased by 0.5% in France and by 0.4% in Spain, while it remained unchanged in Germany and decreased by 0.4% in Italy and by 0.3% in the Netherlands.

Chart 4

Euro area real GDP and its components

(quarter-on-quarter percentage changes; percentage point contributions)
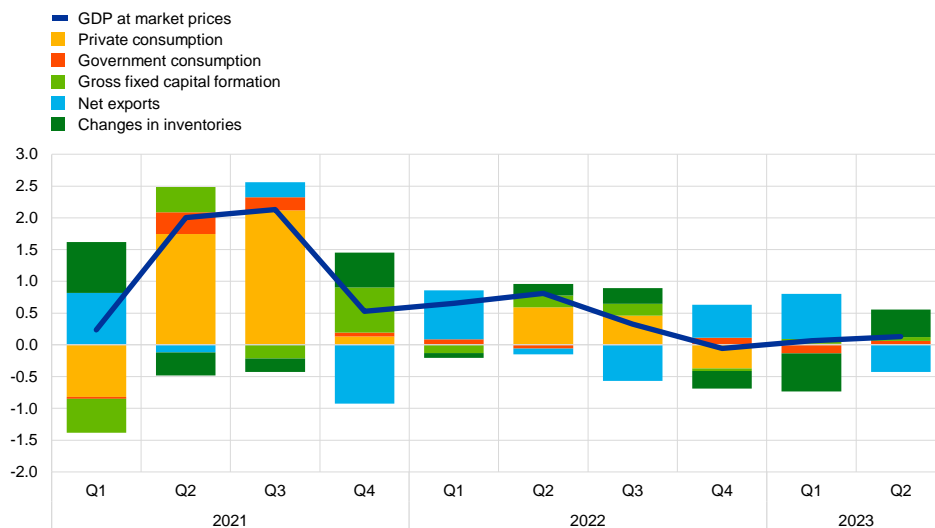
- GDP at market prices
- Private consumption
- Government consumption
- Gross fixed capital formation
- Net exports
- Changes in inventories

Sources: Eurostat and ECB calculations.
Note: The latest observations are for the second quarter of 2023.

Activity in the third quarter of 2023 is expected to remain weak. Incoming survey data point to subdued economic growth in the third quarter of 2023, driven not only by a continued weakness in manufacturing activity, but also by a deceleration in services, which had previously shown resilience. The composite output Purchasing Managers' Index (PMI) for the euro area continued to fall further below the growth threshold of 50 in July and August. The PMI for manufacturing remained in contractionary territory, as the support from the improvement of supply chain conditions has run its course, backlogs of work are easing and new orders are falling (Chart 5, panel a). However, in recent months the weakness spread to the services sector, with the PMI for services activity dropping below the zero-growth threshold in August (Chart 5, panel b). This outcome reflects the fading effect of the post-pandemic reopening on services demand, which was, until recently, a significant driver of the growth differential between manufacturing and contact-intensive services.[4] The European Commission's Economic Sentiment Indicator declined further in August across sectors, pointing to a clear weakening in growth dynamics in the third quarter. Consumer confidence declined slightly in August, interrupting the recovery that started in late 2022, and stands well below its long-term average. This suggests a weak outlook for domestic demand. Overall, the recent indicators suggest that GDP growth remains weak in the third quarter, as the subdued foreign demand and the tightening financing conditions are expected to weigh on economic growth in the euro area.

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[4] For an analysis of reopening effects and the dispersion of economic activity across countries and sectors, see the box entitled "What role do reopening effects play across countries and sectors?" in this issue of the Economic Bulletin.

Chart 5

PMI indicators across sectors of the economy

a) Manufacturing

(diffusion indices)

- Output
- New orders

b) Services

(diffusion indices)

- Business activity
- New business
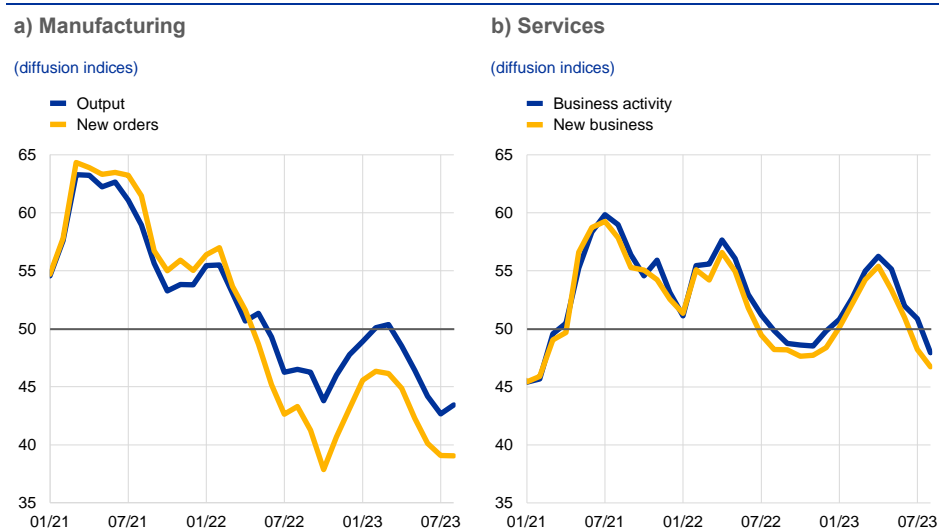
Source: S&P Global Market Intelligence.
Note: The latest observations are for August 2023.

The labour market remained resilient in the second quarter, but employment growth slowed amid weakened economic activity. Employment and total hours worked increased by 0.2% in the second quarter of 2023. Since the fourth quarter of 2019, employment has increased by 3.3% and the total number of hours worked has risen by 1.9% (Chart 6). This implies a 1.4% decline in average hours worked. This decline is related to ongoing labour hoarding (the part of labour input which is not fully utilised by a company during its production process at any given point in time), as well as to other factors. The implied labour force is estimated to have increased by about 600,000 people between January and July, but growth has slowed since April.[5] The unemployment rate in July was 6.4%, broadly unchanged compared with June and remaining at its lowest level since the creation of the euro. Labour demand remains strong, with the job vacancy rate broadly stable at 3.0%, 0.2 percentage points lower than its highest level since the start of the series.

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[5] For an analysis of the recent developments in the labour force and its drivers see the box entitled "The euro area labour force: recent developments and drivers" in this issue of the Economic Bulletin.

Chart 6

Euro area employment, the PMI assessment of employment and the unemployment rate

(left-hand scale: quarter-on-quarter percentage changes, diffusion index; right-hand scale: percentages of the labour force)

- ■ Employment (left-hand scale)
- ━ PMI assessment of employment (left-hand scale)
- ━ Unemployment rate (right-hand scale)
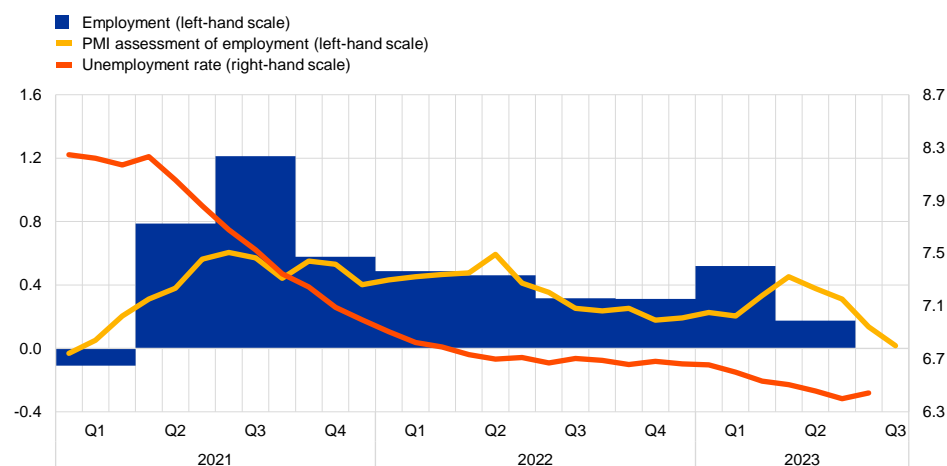
Sources: Eurostat, S&P Global Market Intelligence and ECB calculations.
Notes: The two lines indicate monthly developments, while the bars show quarterly data. The PMI is expressed in terms of the deviation from 50 divided by 10. The latest observations are for the second quarter of 2023 for employment, August 2023 for the PMI assessment of employment and July 2023 for the unemployment rate.

Short-term labour market indicators suggest a further slowdown in employment growth in the third quarter of 2023. The monthly composite PMI employment indicator declined from 51.4 in July to 50.2 in August; a value below the threshold of 50 indicates a decrease in employment. This indicator has declined substantially since April, when it reached 54.5. The recent decline has been sharper in the services sectors but the PMI remains in expansionary territory, while manufacturing and construction are below the 50 threshold. Among the services sectors, there was a larger decline in those more closely linked to manufacturing activity, such as transport and professional services.

Private consumption stagnated in the second quarter of 2023, as the continued drop in spending on goods offset the still positive demand for services (Chart 7, panel a). Quarter on quarter, retail sales increased by just 0.1% in the second quarter of 2023 before declining by 0.2% in July 2023, while new passenger car registrations fell by 0.5% in the second quarter of 2023 but rebounded by 3.7% in July. In contrast to the decline in spending on goods, in particular on durable products and food, household consumption of services increased by 0.5% in the second quarter, still benefiting from the lingering reopening effects.[6]

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[6]   See also the box entitled "What role do reopening effects play across countries and sectors?", op. cit.

Chart 7

Real private consumption indicators

a) Private consumption

(indices: fourth quarter of 2019 = 100)

- Total
- Durable goods
- Non- and semi-durables
- Services
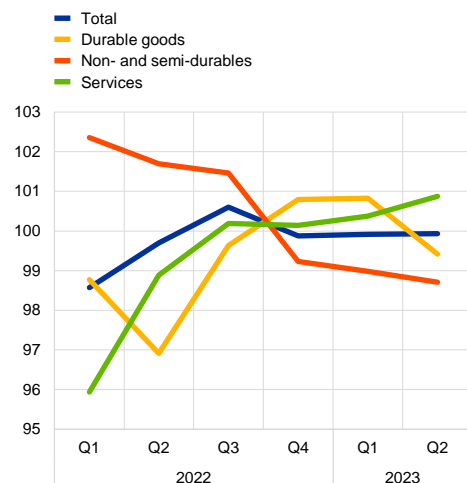
b) Firms' expectations

(standardised percentage balances)

- Contact-intensive services
- Retail trade
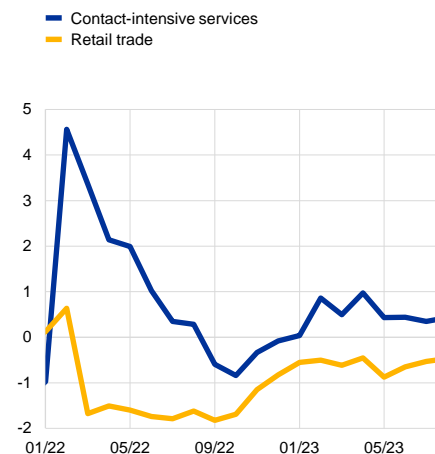
Sources: Eurostat, European Commission (Directorate-General for Economic and Financial Affairs) and ECB calculations.
Notes: In panel a), the levels of consumption components (domestic concept) are scaled to match the level of total private consumption (national concept). For panel b), expected demand for contact-intensive services in the next three months is standardised over the period 2005-19, while expected retail trade business situation in the next three months is standardised over the period 1985-2019. The latest observations are for the second quarter of 2023 for panel a) and for August 2023 for panel b).

While surveys suggest a continued weakness in spending on goods, expectations about demand for contact-intensive services have not yet been adjusted down. The European Commission's consumer confidence indicator declined in August, interrupting its recovery since late 2022, and remained below its long-term average. This reflects deteriorating expectations about the general economic outlook and households' own financial situations. At the same time, the Commission's indicators of expected major purchases by consumers and expected retail trade business situation remained subdued. In contrast, the expected demand for contact-intensive services had not yet seen any strong downward correction since May 2023 and continued to be above its historical average in August (Chart 7, panel b). Similarly, the ECB's Consumer Expectations Survey from July showed a drop in expected purchases of home appliances and other major items, thus pointing to ongoing weak spending for durable goods, but still resilient expected demand for holiday bookings. The transmission of tighter financing conditions to the real economy would likely curb household borrowing, maintain high incentives to save and keep consumer spending growth subdued in the near term.

Business investment growth slowed markedly in the second quarter of 2023 and is expected to contract in the third quarter. Excluding volatile Irish intellectual property products (IPP) data, euro area non-construction investment decelerated strongly in the second quarter (slowing to 0.4% quarter on quarter, compared with 1.2% in the first quarter).[7] The slowdown was fairly broad-based across countries but

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[7] The headline figure grew by 0.7% quarter on quarter in Q2, after contracting by 0.2% in Q1, reflecting strong inter-quarter volatility in Irish IPP data. For more on the longer-term impact of this volatility, see the box entitled "Intangible assets of multinational enterprises in Ireland and their impact on euro area GDP", *Economic Bulletin*, Issue 4, ECB, 2023.

more varied across asset classes, with investment in transport goods rebounding, IPP growing at its long-term average, and investment in machinery and equipment excluding transport contracting modestly (Chart 8).[8] The PMI capital goods' output indicator fell deep into contractionary territory in August, amid ongoing declines in both new orders and outstanding business. Confidence continues to wane and the European Commission's latest survey shows a quarter of capital goods firms now citing a lack of demand as a limit to production. The outlook remains highly uncertain. Earnings calls into August suggest an ongoing recovery since last autumn in profit sentiment (which tends to track corporate gross operating surplus reasonably well, although both indicators lag the most recent dynamics), while ongoing needs for green and digital investment, crowded in by NGEU funds, and elevated labour shortages in some sectors offer further incentives to invest.[9] However, headwinds to investment remain substantial against the backdrop of a global slowdown and worsening credit conditions.[10] Earnings calls show financial risk sentiment remains at an unprecedented level, while the S&P Global Business Outlook Survey, produced three times each year, suggests lower investment over the next 12 months, reflecting worsening expectations for activity and profitability ahead.

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[8]   Of the six euro area countries reporting an acceleration in the second quarter, only France did so without improving merely on a contraction in the first quarter.

[9]   For more details on the methodology of earnings calls data, see the box entitled "Earnings calls: new evidence on corporate profits, investment and financing conditions", *Economic Bulletin*, Issue 4, ECB, 2023. On the impact of climate change on investment, see also the box entitled "Climate change and euro area firms' green investment and financing – results from a euro area survey" in this issue of the Economic Bulletin.

[10] The July BLS anticipated further declines in firms' demand for long-term loans for fixed investment into Q3-Q4 2023, while the latest euro area projections anticipate stronger dampening effects on business investment from higher interest rates and associated credit supply restrictions (see "ECB staff macroeconomic projections for the euro area", published on the ECB's website on 14 September 2023).

Chart 8

Non-construction investment and asset class contributions

(quarter-on-quarter percentage changes and percentage point contributions)

- Non-construction investment
- Euro area excluding IPP in Ireland
- Machinery and equipment excluding transport
- Transport
- IPP in euro area excluding Ireland
- IPP in Ireland
- Other

Sources: Eurostat and ECB calculations.
Notes: IPP refers to (mainly intangible) intellectual property products. The latest observations are for the second quarter of 2023.

Following a decline in the second quarter of 2023, housing investment is likely to fall further in the near term. Quarter on quarter, housing investment decreased by 1.0% in the second quarter of 2023 following a 0.8% increase in the first quarter. Short-term indicators point to further declines in the coming quarters. Building construction output fell significantly in June, implying a negative carry-over to growth in the third quarter. Moreover, the European Commission's indicator for the development in building construction activity in the last three months fell well below its average for the second quarter in July and August, while the housing output PMI fell further below the growth threshold to 35.7 in August, its lowest level so far this year. The weak outlook for housing investment is consistent with the marked downward trend in residential building permits, which is also increasingly reflected in firms' poorer assessment of order books in the European Commission's survey. Housing sentiment, as measured by the Commission's quarterly survey of households' short-term intentions to renovate, buy or build a house, fell somewhat in the third quarter of 2023. The negative mood is mainly due to the significant rise in interest rates and its adverse impact on housing affordability, although this is offset to some extent by falling house prices. This decline in housing affordability, together with the tightening of banks' lending criteria for housing loans, is weighing on the momentum of housing investment.

Export growth remained subdued in the second quarter, reflecting weak global demand, the earlier appreciation of the euro and high energy prices. Quarterly growth in export volumes was negative in the second quarter, as weak global trade dampened foreign demand for euro area goods. In addition, the euro's appreciation, which started in September 2022, has weakened euro area competitiveness, and the energy price increase of 2022 contributed to export weakness, especially in energy-intensive sectors. At the same time, the reduction in order backlogs observed during

the previous quarters seems to be fading as a key factor supporting exports, as export order books have returned to pre-pandemic levels. Import growth turned slightly positive in the second quarter, largely reflecting a rebound from the sharp decrease in the first quarter. In year-on-year terms, however, imports declined amid weak domestic demand. Overall, net trade contributed negatively to GDP growth in the second quarter. Forward-looking indicators point to continued near-term weakness in euro area export volumes. The relative strength in services exports observed so far seems to be fading, as exporters in this sector reported a deterioration in their order books. This seems to reflect both a slowdown in pent-up demand for services following the post-pandemic reopening of contact-intensive services and some spillover from the weakness in manufacturing, where exporters reported a further decline in new orders.

Beyond the near term, euro area activity is expected to recover, supported by an increase in real incomes. GDP growth is expected to strengthen, supported by the abating inflationary pressures and resilient labour income growth, allowing for a recovery in real disposable income and private consumption. However, the impact of these positive factors should be offset by the impact of higher interest rates and tighter credit supply conditions increasingly feeding through to the real economy.

The September 2023 ECB staff macroeconomic projections for the euro area foresee annual real GDP growth slowing down to 0.7% in 2023, before recovering to 1.0% in 2024 and to 1.5% in 2025 (Chart 9). Compared with the June 2023 Eurosystem staff projections, the outlook for GDP growth has been revised down by 0.2 percentage points for 2023, 0.5 percentage points for 2024 and 0.1 percentage points for 2025, reflecting a significant downgrade of the short-term outlook on the back of deteriorating survey indicators, tighter financing conditions (including more adverse credit supply effects) and the stronger euro.

The risks to economic growth are tilted to the downside. Growth could be slower if the effects of monetary policy are more forceful than expected, or if the world economy weakens, for instance owing to a further slowdown in China. Conversely, growth could be higher than projected if the strong labour market, rising real incomes and receding uncertainty mean that people and businesses become more confident and spend more.

Chart 9

Euro area real GDP (including projections)

(index: fourth quarter of 2019 = 100; seasonally and working day-adjusted quarterly data)
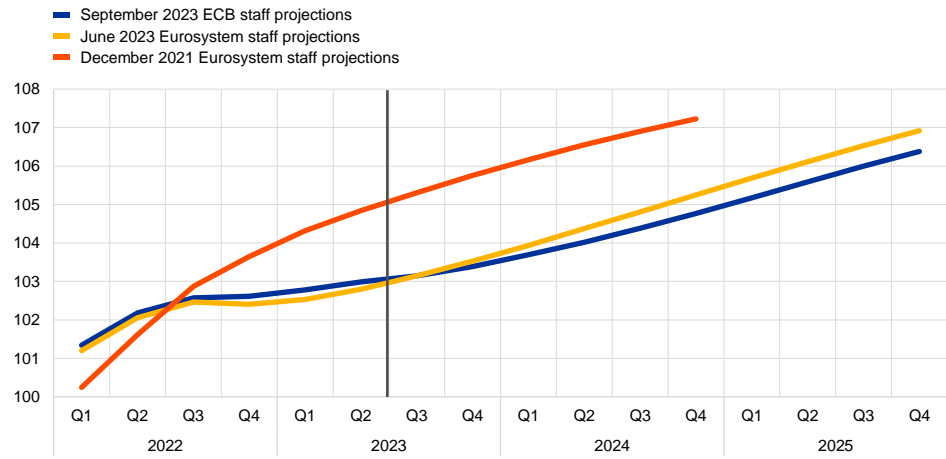
- September 2023 ECB staff projections
- June 2023 Eurosystem staff projections
- December 2021 Eurosystem staff projections

Sources: Eurostat and the September 2023 ECB staff macroeconomic projections for the euro area.
Note: The vertical line indicates the start of the projection horizon.

3 Prices and costs

According to Eurostat's flash estimate, inflation was at 5.3% in August 2023, the same as it was in July.[11] This unchanged headline inflation rate for August concealed lower rates for all main subcomponents except for energy inflation, which was less negative than in the previous month. Upside risks to inflation include potential renewed upward pressures on the costs of energy and food. Adverse weather conditions, and the unfolding climate crisis more broadly, could push food prices up by more than expected. Indicators of underlying inflation continued to decline, but remained at elevated levels that reflect, inter alia, high wage pressures. A lasting rise in inflation expectations above our target, or higher than anticipated increases in wages or profit margins, could also drive inflation higher, including over the medium term. The September 2023 ECB staff macroeconomic projections for the euro area foresee headline inflation continuing its downward path, averaging 5.6% in 2023, 3.2% in 2024 and 2.1% in 2025.

After decreasing successively for nine months following a peak in October 2022, Harmonised Index of Consumer Prices (HICP) inflation was unchanged in August 2023 (Chart 10). The unchanged headline inflation rate of 5.3% resulted from a less negative energy inflation rate offsetting lower rates for food, non-energy industrial goods (NEIG) and services. The increase in energy inflation from -6.1% in July to -3.3% in August reflects a strong month-on-month increase resulting from higher oil and, consequently, fuel prices. Food inflation declined further, falling from 10.8% in July to 9.8% in August as a result of lower rates for both unprocessed and processed food components. However, processed food inflation remained in double digits (10.4%) in August, as the recent softening in pipeline pressures is yet to show in retail prices. HICP inflation excluding energy and food (HICPX) declined to 5.3% in August, down from 5.5% in July, owing to slight decreases in both its main components, NEIG and services. NEIG inflation declined further from 5.0% in July to 4.8% in August, reflecting the easing of past pipeline price pressures from supply bottlenecks and energy prices, as well as weaker demand. By and large, services inflation remained more persistent, standing at 5.4% in June, 5.6% in July and 5.5% in August. This was likely supported by travel and hospitality-related items and by high wage growth.

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[11]   In Eurostat's final release, the headline inflation rate for August was revised down to 5.2% after the cut-off date.

Chart 10

Headline inflation and its main components

(annual percentage changes; percentage point contributions)
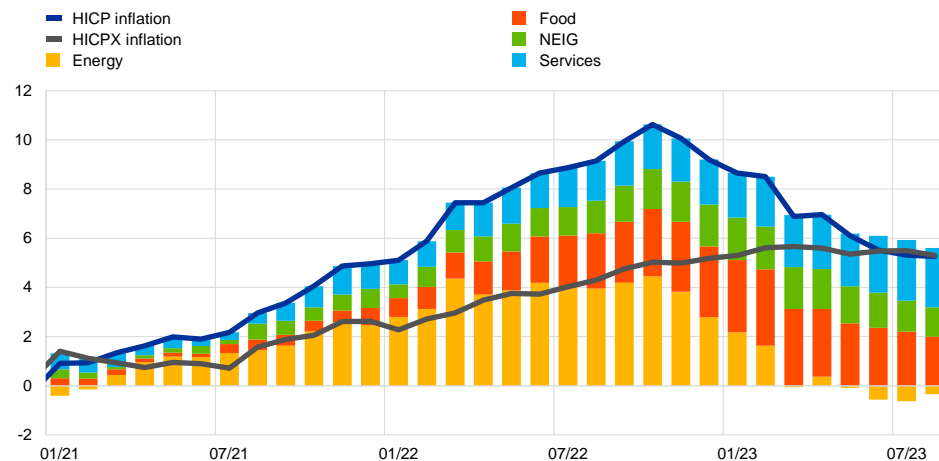
- HICP inflation
- HICPX inflation
- Energy
- Food
- NEIG
- Services

Sources: Eurostat and ECB calculations.
Note: The latest observations are for August 2023 (flash estimate).

Although they remained high overall, most indicators of underlying inflation continued to decrease, reflecting the fading effect of previous shocks to energy costs and supply chains as well as demand-supply mismatches (Chart 11). While HICPX inflation is available for August, the latest available data for other indicators of underlying inflation refer to July. Most indicators in July displayed a decline in their annual growth rates. The Supercore indicator, which comprises HICP items sensitive to the business cycle, declined from 6.0% in June to 5.8% in July, while the model-based Persistent and Common Component of Inflation (PCCI) measure declined from 2.8% to 2.6%. Although the indicators are mostly decreasing, uncertainty surrounding underlying inflation dynamics is still high, as can be seen from the wide range across measures and their elevated levels.

Chart 11

Indicators of underlying inflation

(annual percentage changes)

- Range of indicators
- HICPX
- HICPXX
- PCCI
- Supercore
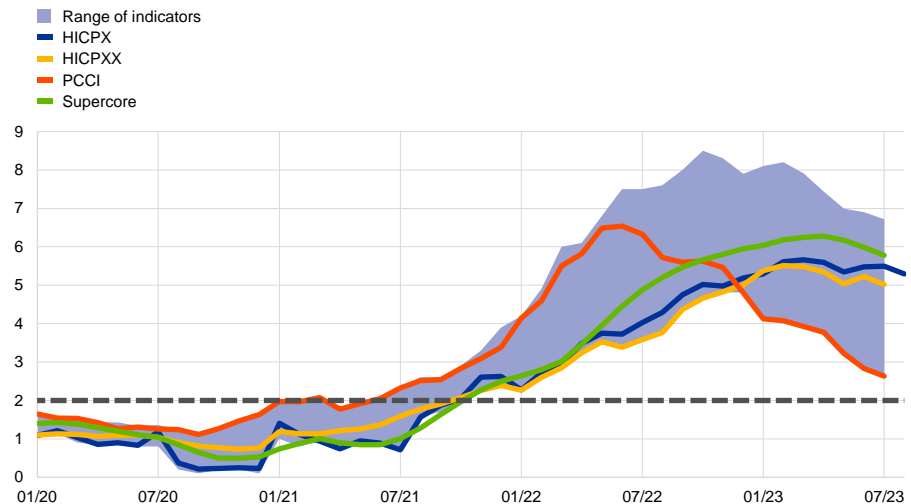
Sources: Eurostat and ECB calculations.
Notes: The range of indicators of underlying inflation includes HICP excluding energy, HICP excluding energy and unprocessed food, HICPX, HICP excluding energy, food, travel-related items, clothing and footwear (HICPXX), 10% and 30% trimmed means, PCCI and a weighted median. The grey dashed line represents the ECB's inflation target of 2% over the medium term. The latest observations are for August 2023 (flash estimate) for HICPX and July 2023 for the remaining items.

Pipeline pressures continued to ease as the cumulative effects of past price shocks further dissipated (Chart 12). At the early stages of the pricing chain, price pressures continued to decrease substantially in July. Domestic producer price inflation for intermediate goods has been negative since May and declined to -4.0% in July, down from -2.8% in June, while import prices for the same goods fell to -8.9%. Producer price inflation for energy, which has been negative since April, fell substantially to -24.3% in July, down from -16.5% in June, reflecting the fading effects of previous energy price shocks. At the later stages of the pricing chain, domestic producer price inflation for non-food consumer goods declined to 5.0% in July, confirming the gradual easing of accumulated pipeline pressures for consumer goods. The same is true for pipeline pressures in the consumer food segment, with producer price inflation for manufactured food declining further in July, though remaining at a high level of 6.6%. The annual growth rate in import prices for these categories kept declining to negative terms in July. Movements in the euro exchange rate in the past months continue to affect the magnitude and movement of import price dynamics, with its recent strengthening contributing to the easing of price pressures.

Chart 12

Indicators of pipeline pressures

(annual percentage changes)

- ▬▬ Domestic producer prices – non-food consumer goods
- ▪▪▪ Import prices – non-food consumer goods
- ▬▬ Domestic producer prices – intermediate goods
- ▪▪▪ Import prices – intermediate goods
- ▬▬ Domestic producer prices – manufacturing of food products
- ▪▪▪ Import prices – manufacturing of food products
- ▬▬ Domestic producer prices – energy (right-hand scale)
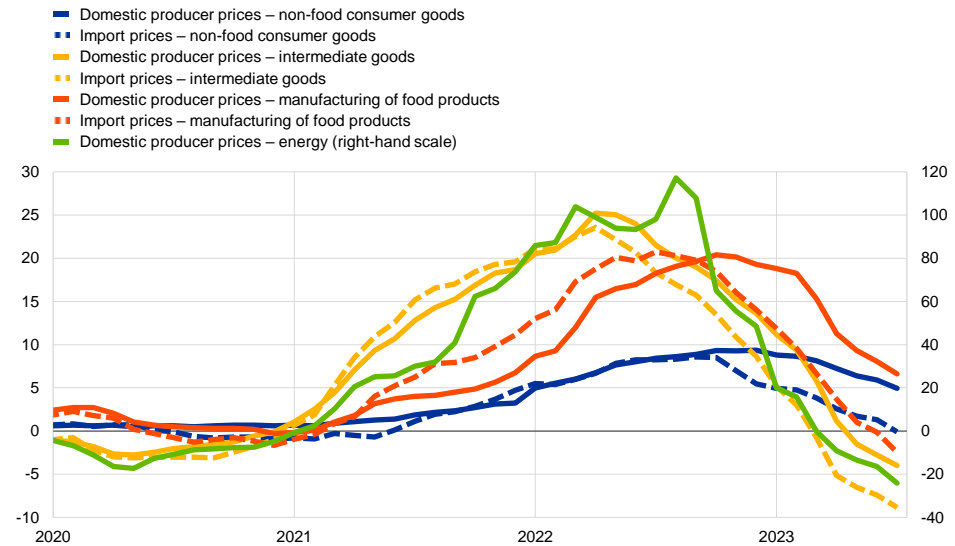
Sources: Eurostat and ECB calculations.
Note: The latest observations are for July 2023.

Domestic cost pressures, as measured by the growth in the GDP deflator, were unchanged in the second quarter of 2023, as increasing contributions from labour costs were offset by lower contributions from profits (Chart 13). The year-on-year growth rate of the GDP deflator stood at 6.2% in the second quarter of 2023, unchanged from the previous quarter. The contribution of unit profits to the GDP deflator declined to 2.3 percentage points from 3.2 percentage points in the previous quarter, offsetting the larger contribution of unit labour costs, which rose to 3.6 percentage points from 3.3 percentage points in the previous quarter, and unit taxes (net of subsidies). The rise in unit labour costs stemmed from a more negative annual growth in labour productivity, while the annual growth in compensation per employee was unchanged at 5.5%. Negotiated wage growth was also broadly unchanged in the second quarter of 2023, standing at 4.3% after 4.4% in the previous quarter. Forward-looking information from recently concluded wage negotiations does not yet show clear signals of a turning point in wage growth.

Chart 13

Breakdown of the GDP deflator

(annual percentage changes; percentage point contributions)
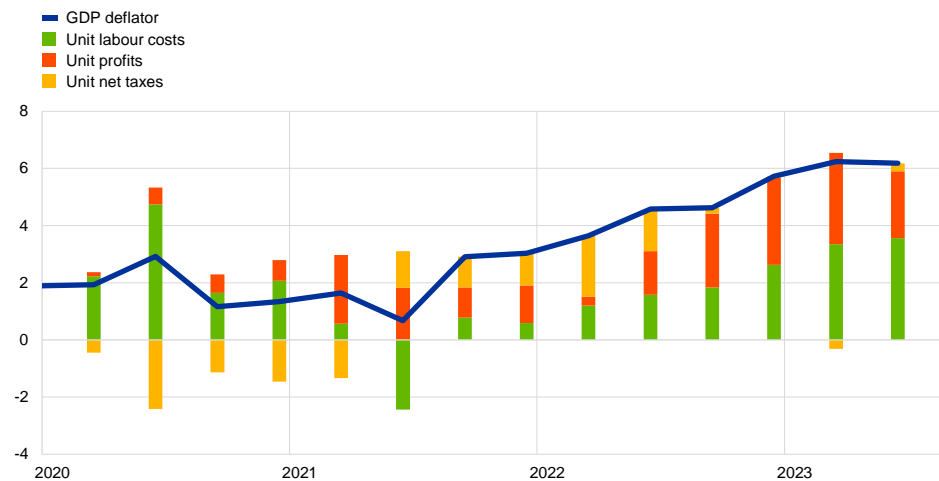
- GDP deflator
- Unit labour costs
- Unit profits
- Unit net taxes

Sources: Eurostat and ECB calculations.
Notes: The latest observations are for the second quarter of 2023. Compensation per employee and labour productivity both contribute to changes in unit labour costs.

Survey-based measures of longer-term inflation expectations, as well as market-based measures of inflation compensation adjusted for risk premia, remained around 2%. In both the ECB Survey of Professional Forecasters for the third quarter of 2023 and the September 2023 ECB Survey of Monetary Analysts, the median longer-term expectations were at 2.0%. Market-based measures of inflation compensation (based on HICP excluding tobacco) increased across maturities over the review period, as higher energy prices and persistence in underlying inflation prompted market participants to revise their inflation outlook upwards (Chart 14). These factors were, however, partially counterbalanced by the worse-than-expected growth outlook for the euro area during the latter part of the review period. Overall, the one-year forward inflation-linked swap rate one year ahead increased by around 20 basis points to 2.6%. At the longer end, the five-year forward inflation-linked swap rate five years ahead rose by 15 basis points to around 2.6%, slightly below the multi-year peak that it reached in early August. Despite following a similar pattern to those of their US breakeven counterparts, longer-term inflation-linked swap rates in the euro area remain high by historical standards. It should, however, be noted that these market-based measures of inflation compensation are not a direct gauge of the genuine inflation expectations of market participants, as these measures include inflation risk premia, which compensate for inflation risks. Model-based estimates indicate that inflation risk premia account for a significant portion of the increase in the market pricing of inflation compensation at shorter maturities and for most of the increase at longer maturities. On the consumer side, the July 2023 ECB Consumer Expectations Survey reported that median expectations for headline inflation over the next year remained unchanged at 3.4%, while those for three years ahead increased from 2.3% to 2.4%. Although measures of inflation uncertainty from the Consumer Expectations Survey have decreased slightly from their peak levels, these remain relatively high.

Chart 14

Market-based measures of inflation compensation

(percentages per annum)

- 1y1y
- 1y4y
- 5y5y
- US 5y5y
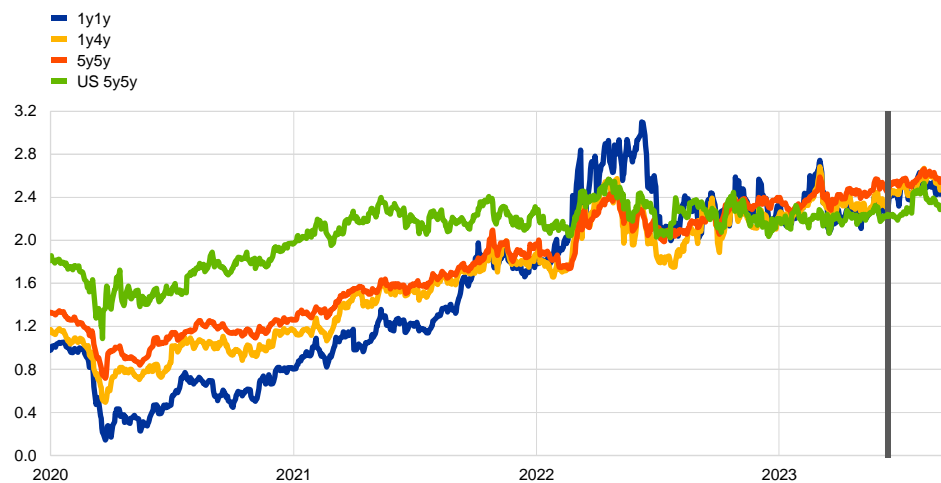
Sources: Refinitiv, Bloomberg and ECB calculations.
Notes: The chart shows inflation-linked swap forward rates over different horizons for the euro area and the five-year forward breakeven inflation rate five years ahead for the United States. The latest observations are for 13 September 2023.

The September 2023 ECB staff macroeconomic projections foresee headline inflation continuing its downward path, averaging 5.6% in 2023, 3.2% in 2024 and 2.1% in 2025 (Chart 15). This disinflationary path towards the 2% target reflects the fading effects of past energy shocks and other pipeline pressures, and the fact that longer-term inflation expectations remain anchored. The profile is also initially affected by strong downward base effects relating to energy and food inflation. Wage growth is expected to decline gradually from mid-2023 onwards, but it will remain high over the projection horizon and become the main driver of HICPX inflation. It is driven by increases in minimum wages and inflation compensation, in a context of a tight, but cooling, labour market. Profit margins, which expanded significantly last year, are expected to provide a buffer to the pass-through of labour costs to final prices in the medium term. In addition, tighter monetary policy should increasingly dampen underlying inflation. Compared with the June 2023 projections, the projections for headline inflation have been revised up by 0.2 percentage points for both 2023 and 2024 owing to a higher path for energy prices, and revised down by 0.1 percentage points for 2025, reflecting the dampening effects of the appreciation of the euro, tighter financing conditions and weaker cyclical conditions.

Chart 15

Euro area HICP and HICPX inflation

(annual percentage changes)
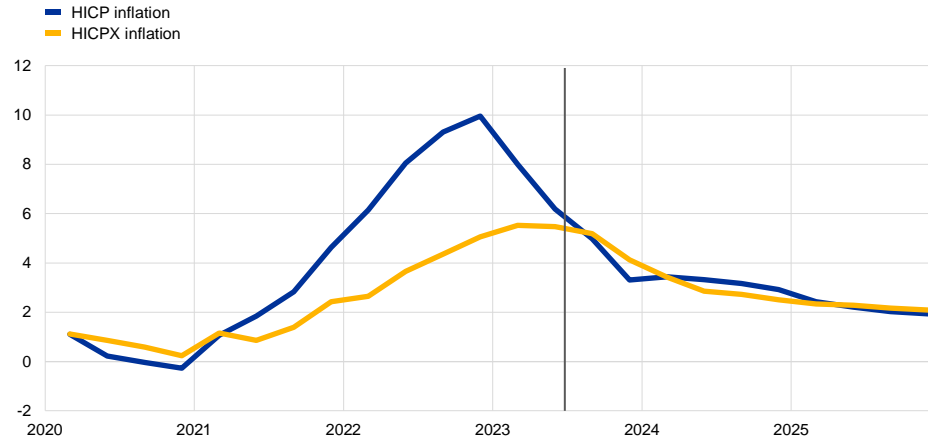
- HICP inflation
- HICPX inflation

Sources: Eurostat and the September 2023 ECB staff macroeconomic projections for the euro area.
Notes: The vertical line indicates the start of the projection horizon. The latest observations are for the second quarter of 2023 for the data and the fourth quarter of 2025 for the projections. The September 2023 ECB staff macroeconomic projections were finalised at the end of August and the cut-off date for the technical assumptions was 22 August 2023. Both historical and actual data for HICP and HICPX inflation are at quarterly frequency.

4   Financial market developments

*Euro area financial markets ended the review period (15 June to
13 September 2023) little changed overall, with some intra-period movements. Euro
area short-term interest rates increased as expectations of policy tightening firmed
amid some upward pressures on the inflation outlook. These policy rate expectations
were tempered by weaker domestic data on the real economy and some moderation
in global economic growth momentum. As a result, at the end of the review period,
the euro short-term rate (€STR) forward curve peaked at around 4.0% in the first
quarter of 2024, thus pricing in a moderate further tightening of monetary policy.
Euro area long-term interest rates increased along with, but less than, market-based
measures of inflation compensation as growth concerns weighed on government
bond yields. Sovereign bond spreads were resilient to the negative macroeconomic
surprises. In addition, the announced end of reinvestments under the asset purchase
programme (APP) as of July 2023 have been smoothly absorbed. Spreads on non-
financial corporate bonds of high-yield issuers widened slightly, consistent with the
high exposure of such issuers to the economic cycle. Broad stock market indices
declined in the euro area, as weaker earnings prospects depressed the stock market
valuation of non-financial corporations (NFCs), despite the recovery in bank stock
prices. In foreign exchange markets, the euro appreciated in trade-weighted terms.*

**At the end of the review period the peak of the €STR forward curve, at around
4.0% in the first quarter of 2024, was somewhat higher than at the beginning of
the review period in mid-June (Chart 16).** The benchmark €STR averaged 3.5%
over the review period and closely followed the changes in the deposit facility rate,
which the Governing Council had raised by 25 basis points (from 3.25% to 3.5%) at
its monetary policy meeting on 15 June 2023 and by an additional 25 basis points
(from 3.5% to 3.75%) at its meeting on 27 July. Excess liquidity decreased by €463
billion to stand at €3,681 billion, mainly reflecting repayments of the third series of
targeted longer-term refinancing operations (TLTRO III). Short and medium-term
overnight index swap (OIS) forward rates, which are based on the €STR, increased
following the June meeting, as market participants revised their policy rate
expectations upwards. Subsequently, the forward rates fell somewhat on account of
a deterioration in the domestic and global macroeconomic outlook but increased
again towards the end of the review period as expectations of policy tightening
further firmed. The Governing Council's decision in July to increase policy rates and
set the remuneration of minimum reserves at 0% did not significantly affect the
forward rates. At the end of the review period, the peak of the forward curve, at
around 4.0% in the first quarter of 2024, was somewhat later than implied by the
forward rates in mid-June. The policy rate expectations inferred from the forward
curve are broadly in line with those elicited in surveys.

Chart 16

€STR forward rates

(percentages per annum)

- Realised €STR
- €STR forward curve 14 June 2023
- €STR forward curve 26 July 2023
- €STR forward curve 13 September 2023
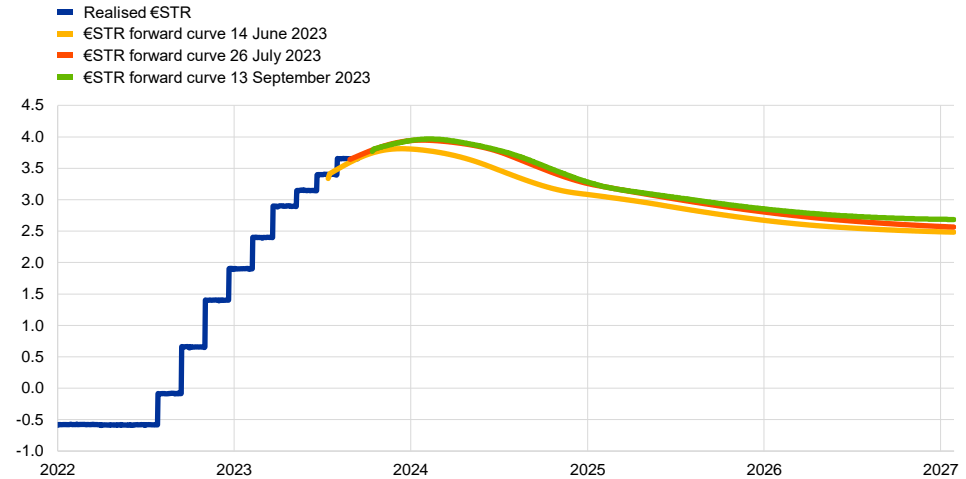
Sources: Thomson Reuters and ECB calculations.
Note: The forward curve is estimated using spot OIS (€STR) rates.

Euro area long-term risk-free rates increased slightly, only partially mirroring the increases in their US counterparts (Chart 17). Long-term risk-free rates in the euro area rose moderately, with the ten-year euro OIS rate increasing by 14 basis points to around 3.0% over the review period. The ten-year GDP-weighted euro area sovereign bond yield increased by a similar amount to 3.3%. Long-term interest rates across the euro area followed the evolution of market-based measures of inflation compensation, which rose largely on account of higher inflation risk premia (see Section 3). Long-term government bond yields increased by more in the United States than in the euro area on account of a more benign macroeconomic outlook. The divergence in macroeconomic prospects weighed on euro area long-term interest rates, especially during the latter part of the review period, as negative macroeconomic surprises led to a partial reversal of the previous increases. The inversion of the risk-free yield curve subsided slightly over the review period but remains at historically high levels.

Chart 17

Ten-year sovereign bond yields and the ten-year OIS rate based on the €STR

(percentages per annum)
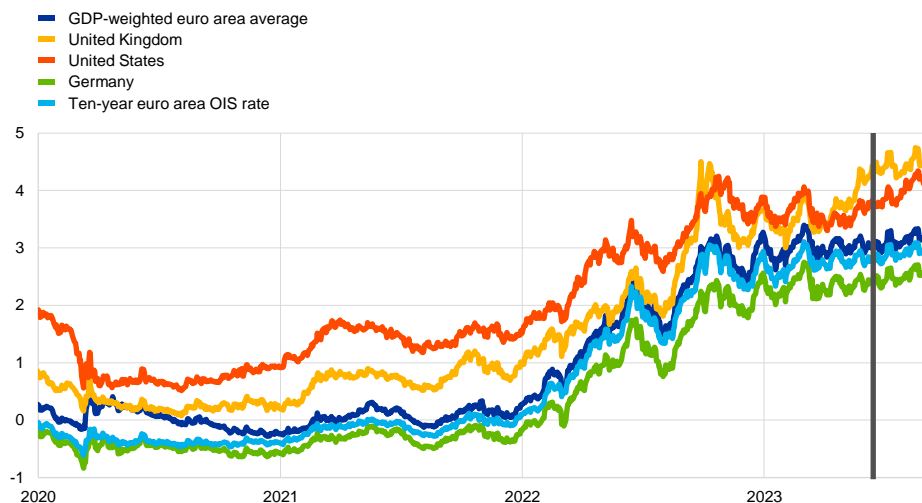
- GDP-weighted euro area average
- United Kingdom
- United States
- Germany
- Ten-year euro area OIS rate

Sources: Refinitiv and ECB calculations.
Notes: The vertical grey line denotes the start of the review period on 15 June 2023. The latest observations are for
13 September 2023.

**Euro area sovereign bond spreads rose only modestly, despite the weakening
economic outlook and the discontinuation of reinvestments under the APP
(Chart 18).** The GDP-weighted euro area average sovereign bond spread over the
OIS rate based on the €STR increased by 6 basis points over the review period, to a
level only moderately above that prevailing before the start of the ECB's monetary
policy normalisation. The sovereign spreads in different jurisdictions rose unevenly,
with the Italian and Spanish spreads recording the largest increases of 20 and 15
basis points, respectively. The sovereign bond markets showed resilience not only to
the deterioration in the macroeconomic outlook but also to the reduced market
presence of the Eurosystem. The absence of significant upward pressures on
spreads, despite the discontinuation of the reinvestment under the APP as of July
and the usual summer trough in liquidity conditions, suggests that private investors
are continuing to absorb the bonds no longer purchased by the Eurosystem without
major difficulties.

Chart 18

Ten-year euro area sovereign bond spreads vis-à-vis the ten-year OIS rate based on the €STR
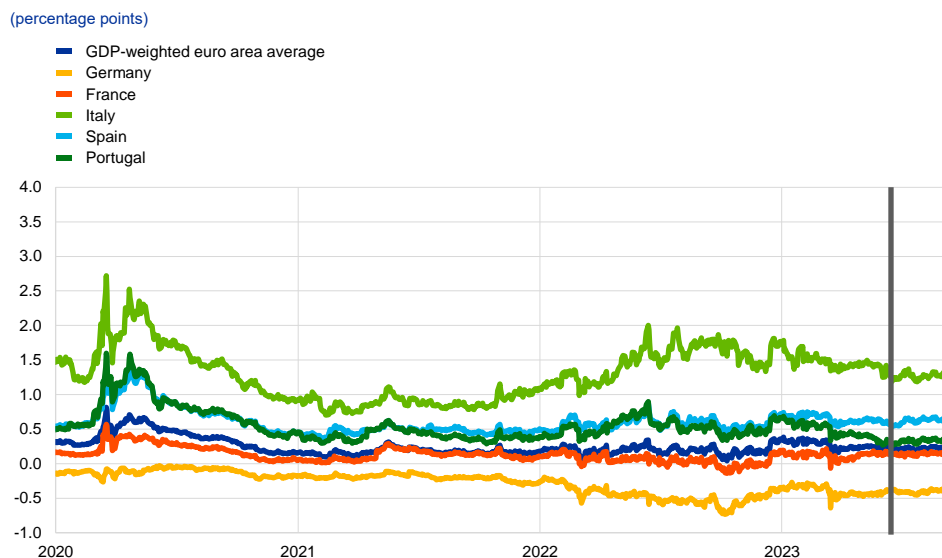
(percentage points)

- GDP-weighted euro area average
- Germany
- France
- Italy
- Spain
- Portugal

Sources: Refinitiv and ECB calculations.
Notes: The vertical grey line denotes the start of the review period on 15 June 2023. The latest observations are for 13 September 2023.

Non-financial corporate bond spreads widened slightly amid a worsening domestic economy. Spreads on corporate bonds issued by NFCs increased by 5 basis points in the high-yield segment. Financial corporations, by contrast, witnessed a narrowing of their corporate bond spreads. The divergence reflects a stronger impact of the deterioration in the economic outlook on riskier NFCs than on financial corporations, as the latter continue to benefit from higher interest rates. Gross bond issuance by high-yield NFCs remained subdued, while investment-grade NFCs issued bonds at a similar pace as in previous years, mirroring the evolution of bond spreads across the rating spectrum.

Euro area equity prices fell over the review period, as weaker earnings prospects depressed the stock market valuation of NFCs (Chart 19). Broad stock market indices in the euro area declined by 2.9% over the review period, while those in the United States increased by 1.1%. The weaker performance in the euro area reflects decreases in the stock prices of NFCs attributable to negative earnings surprises and downward revisions of expected earnings. Within the non-financial sector, stock prices fell most in the consumer discretionary, industrial and technology sectors, strongly influenced by the deterioration in the domestic and global macroeconomic outlook. By contrast, stock prices of euro area banks increased by 3.9%, outperforming their counterparts in the United States.

Chart 19

Euro area and US equity price indices

(index: 1 January 2016 = 100)
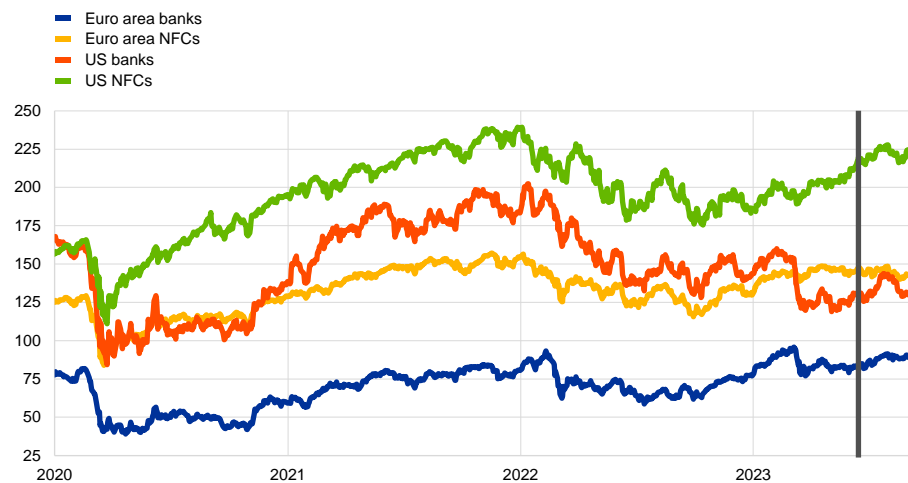
- Euro area banks
- Euro area NFCs
- US banks
- US NFCs

Sources: Refinitiv and ECB calculations.
Notes: The vertical grey line denotes the start of the review period on 15 June 2023. The latest observations are for 13 September 2023.

In foreign exchange markets, the euro appreciated in trade-weighted terms despite depreciating slightly against the US dollar (Chart 20). Over the review period the nominal effective exchange rate of the euro – as measured against the currencies of 41 of the euro area's most important trading partners – appreciated modestly (1.5%). In terms of bilateral exchange rate movements against major currencies, the euro depreciated slightly against the US dollar (-0.8%), as recent economic news has been more positive in the United States than in the euro area. Thus, the appreciation of the euro in nominal effective terms was supported by a strengthening vis-à-vis most other currencies. The euro strengthened against the Japanese yen (by 3.5%) and against the Chinese renminbi (0.8%) amid policy interventions by the Chinese authorities to counteract downward pressure on their currency linked to a deterioration in the growth outlook. The euro also appreciated against the Turkish lira (12.9%) over the review period, but it has stabilised in recent weeks amid rate increases by the Central Bank of the Republic of Türkiye.

Chart 20

Changes in the exchange rate of the euro vis-à-vis selected currencies

(percentage changes)

■ Since 15 June 2023
■ Since 14 September 2022
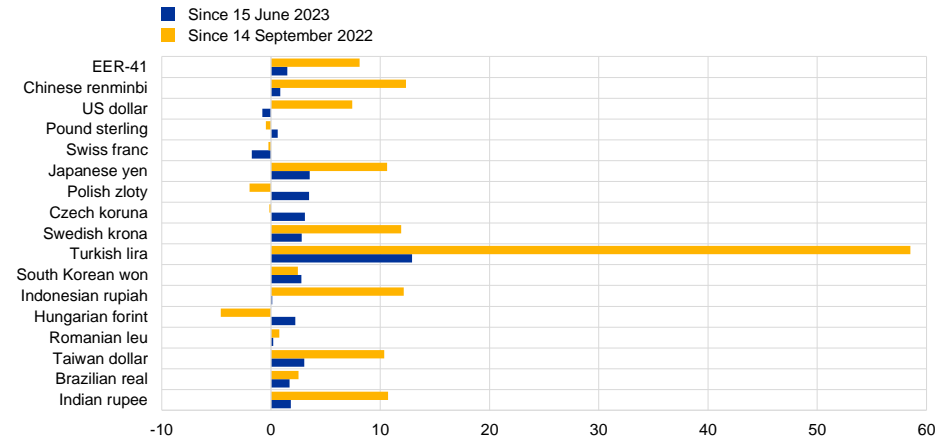
Source: ECB.
Notes: EER-41 is the nominal effective exchange rate of the euro against the currencies of 41 of the euro area's most important trading partners. A positive (negative) change corresponds to an appreciation (depreciation) of the euro. All changes have been calculated using the foreign exchange rates prevailing on 13 September 2023.

5   Financing conditions and credit developments

The transmission of the ECB's monetary policy tightening to broader financing conditions has continued to be strong. Banks' funding costs continued to rise, reflecting further increases in deposit rates and the ongoing reduction in excess liquidity. In July 2023 bank lending rates also increased further, reaching their highest levels since 2008 for firms and since 2012 for households. Over the period from 15 June to 13 September 2023, both the costs for non-financial corporations (NFCs) of market-based debt financing and, more noticeably, of equity financing increased. Weakness in bank lending to firms and households continued in July amid higher lending rates, lower loan demand on the back of spending plan cuts and tighter credit standards, as well as solid retained earnings. By July, monetary aggregates were contracting at the fastest annual pace on record, driven by subdued credit growth and a reduction in the Eurosystem balance sheet.

Euro area bank funding costs continued to rise, reflecting further increases in deposit rates. The composite cost of debt financing for euro area banks rose further in July 2023, reaching its highest level in more than ten years (Chart 21, panel a). This increase principally reflects higher deposit rates, given that bank bond yields remained broadly stable, moving in line with risk-free rates at longer maturities (Chart 21, panel b).[12] Deposit rates continued to rise steadily, with some variation across instruments and sectors (i.e. deposit rates for firms were higher than for households). Depositors have been reacting to the widening spread between time and overnight deposit rates by shifting their overnight holdings to time deposits and other instruments with higher remuneration. The pass-through to deposit rates of increases in the key ECB interest rates has varied significantly across banks. This, in turn, has been accompanied by a redistribution of deposits between banks. Savers have moved deposits from banks offering less attractive remuneration to banks that have raised their deposit rates at a faster pace. Issuances of bank bonds that are remunerated above deposit rates and the key ECB interest rates have increased since September 2022, amid the winding-down of targeted longer-term refinancing operations (TLTROs) and the decline in overnight deposits. The ongoing phase-out of TLTROs, which also contributed to a reduction in excess liquidity in an environment of still ample liquidity, has led banks to increase their reliance on debt securities and money market instruments, as well as to compete more actively for deposits.

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[12]   If the increase in the cost of interbank borrowing had also been included in the composite bank funding costs calculation, funding costs as a whole would have risen even more steeply since the hiking cycle began – albeit starting from a lower level.

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Chart 21

Composite bank funding rates in selected euro area countries

(annual percentages)

■ Euro area
■ Germany
■ France
■ Italy
■ Spain

a) Banks' composite cost of debt financing

b) Bank bond yields
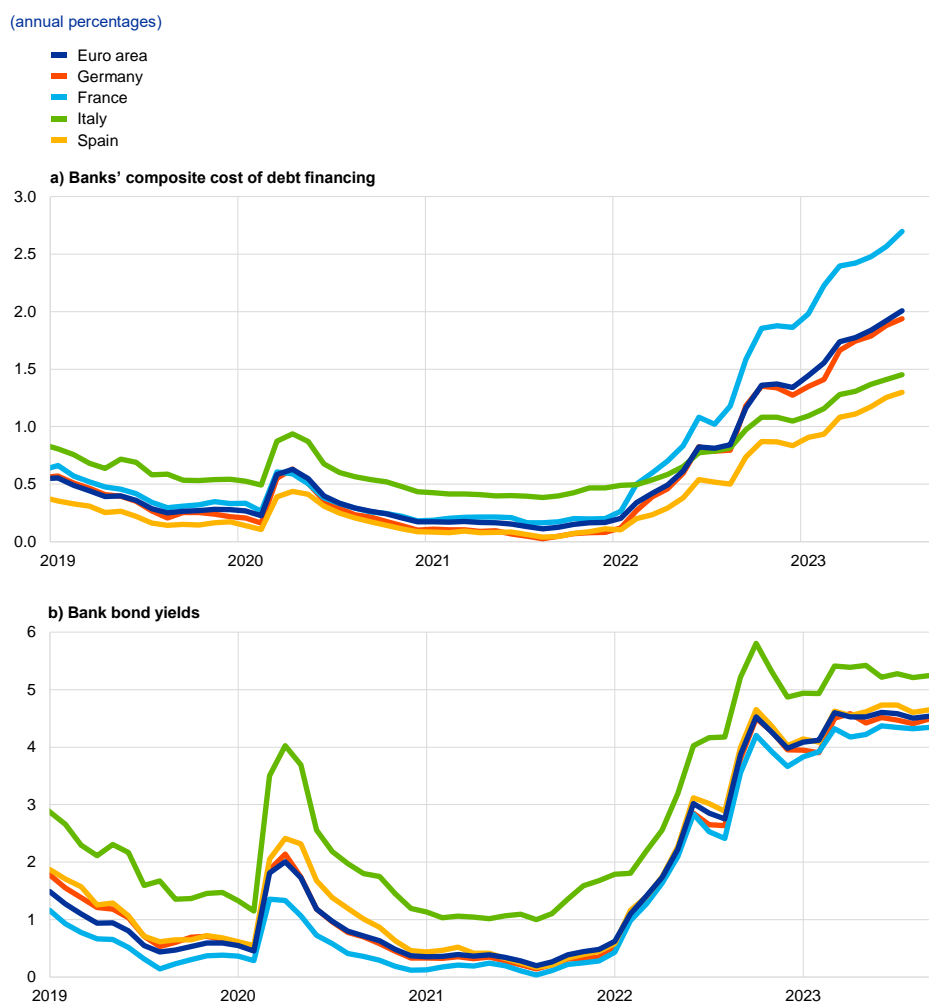
Sources: ECB, S&P Dow Jones Indices LLC and/or its affiliates and ECB calculations.
Notes: Composite bank funding rates are a weighted average of the composite cost of deposits and unsecured market-based debt financing. The composite cost of deposits is calculated as an average of new business rates on overnight deposits, deposits with an agreed maturity and deposits redeemable at notice, weighted by their respective outstanding amounts. Bank bond yields are monthly averages for senior-tranche bonds. The latest observations are for July 2023 for banks' composite cost of debt financing and 13 September 2023 for bank bond yields.

Bank balance sheets have been robust overall, despite a weakening economic environment. In the first few months of 2023, banks continued to increase their capitalisation in spite of larger payout commitments (see Box 7) and the latest stress test has confirmed the ability of euro area banks to cope with financial and economic shocks under an adverse scenario. A well-capitalised banking system is key to ensuring the sustainable provision of credit to the real economy under adequate conditions. Despite rising bank funding costs and lower lending volumes, bank profitability benefited from higher net interest rate margins in early 2023. In parallel, banks' non-performing loan ratios increased marginally amid weaker economic prospects, while provisioning costs continued to be contained.

Lending rates have increased more rapidly than in previous hiking cycles, mainly reflecting the faster pace of policy rate hikes. ECB policy rates have risen substantially over a short period of time, namely by a total of 425 basis points

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between July 2022 and 13 September 2023. These higher ECB policy rates are being transmitted to bank lending conditions, with lending rates rising and credit standards tightening sharply. The increase in lending rates is stronger for firms than for households across both countries (Chart 22) and interest rate fixation periods. Bank rates on new loans to NFCs rose to 4.93% in July, their highest level since the end of 2008. This compares with 4.78% in June 2023 and 1.83% in June 2022, before the ECB started to raise its key interest rates. This increase in loan rates was widespread, with the largest rises being for loans with an interest rate fixation period of more than one year, with some heterogeneity across countries. The spread between bank rates on small and large loans for euro area firms increased somewhat in July (to 48 basis points), albeit, historically speaking, it has remained stable at low levels and with some variation across euro area countries. In July, bank rates on new loans to households for house purchase also rose, standing at 3.75% – their highest level since January 2012 – compared with 1.97% in June 2022 and 3.70% in June 2023. The increase in July was due to higher rates on fixed rate mortgages, and more particularly on flexible rate mortgages, with some differences across countries. The results of the July 2023 ECB Consumer Expectations Survey suggest that consumers expect mortgage rates to stabilise somewhat above the current levels over the next 12 months, possibly reflecting the advanced stage of the tightening cycle. A large net percentage of survey respondents perceived credit standards to be tight and expected housing loans to become harder to obtain over that same period.

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Chart 22

Composite bank lending rates for NFCs and households in selected countries

(annual percentages; standard deviation)

- Euro area
- Germany
- France
- Italy
- Spain
- Cross-country standard deviation (right-hand scale)

a) Rates on loans to NFCs

b) Rates on loans to households for house purchase
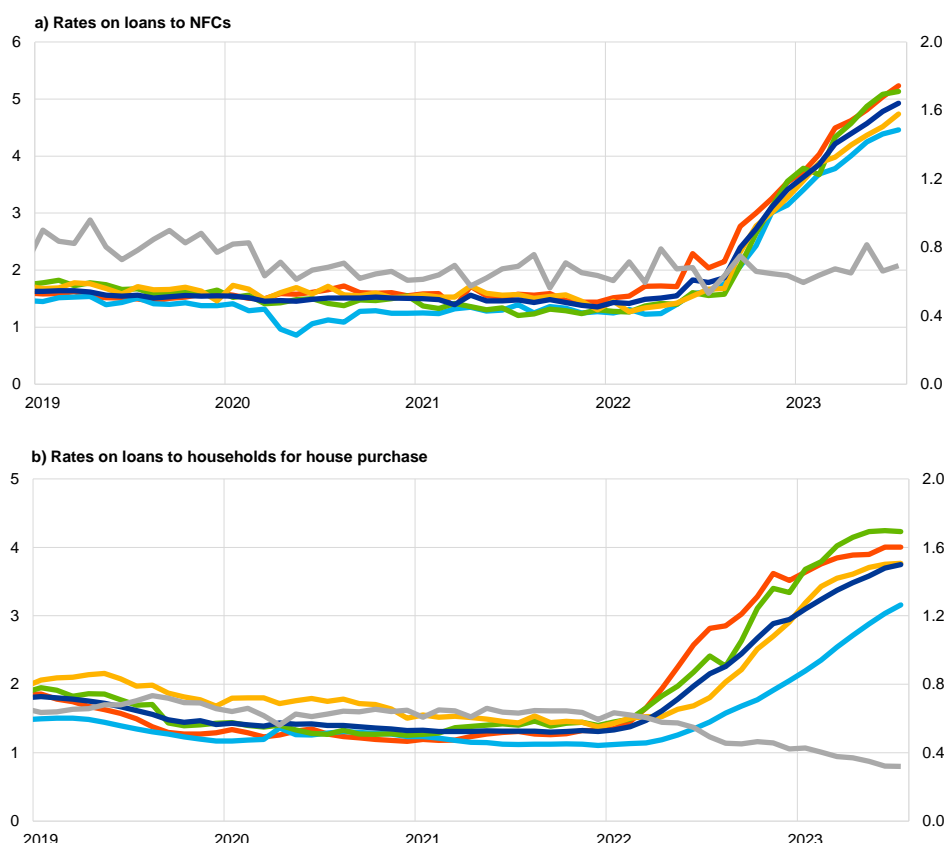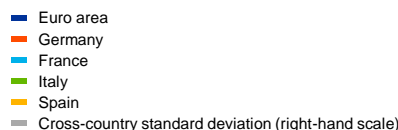
Source: ECB.
Notes: Composite bank lending rates for non-financial corporations (NFCs) are calculated by aggregating short and long-term rates using a 24-month moving average of new business volumes. The cross-country standard deviation is calculated using a fixed sample of 12 euro area countries. The latest observations are for July 2023.

From 15 June to 13 September 2023, the cost for NFCs of both market-based debt and, more significantly, equity financing increased. In July 2023, the overall cost of financing for NFCs – i.e. the composite cost of bank borrowing, market-based debt and equity – stood at 6.2%, that is to say, virtually unchanged from the previous month (Chart 23).[13] This was the result of the increase in the cost of both short-term and long-term borrowing from banks having been offset by a decline in the cost of equity and market-based debt financing over the period from the end of June to the end of July. As a result, the overall cost of financing in July remained close to the elevated levels reached in September 2022 and previously seen at the end of 2011.[14] Over the review period (i.e. until 13 September 2023), both the cost of

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[13]   Owing to lags in the data available on the cost of borrowing from banks, data on the overall cost of financing for NFCs are only available up to July 2023.

[14]   See Box 5 in this issue of the Economic Bulletin for the implications of the cost of financing on euro area firms' investments to mitigate natural hazard risks or to comply with stricter climate standards.

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market-based debt and the cost of equity rose. The increase in the cost of market-based debt was the result of higher risk-free rates and a slight widening of the spreads on bonds issued by non-financial firms in the high-yield segment (see Section 4). The increase in the risk-free rate (approximated by the ten-year overnight index swap rate), combined with the strengthening equity risk premium, led to the substantial rise in the cost of equity over the review period.

Chart 23

Nominal cost of external financing for euro area NFCs, broken down by component

(annual percentages)

- Overall cost of financing
- Cost of equity
- Cost of market-based debt
- Short-term cost of bank borrowing
- Long-term cost of bank borrowing
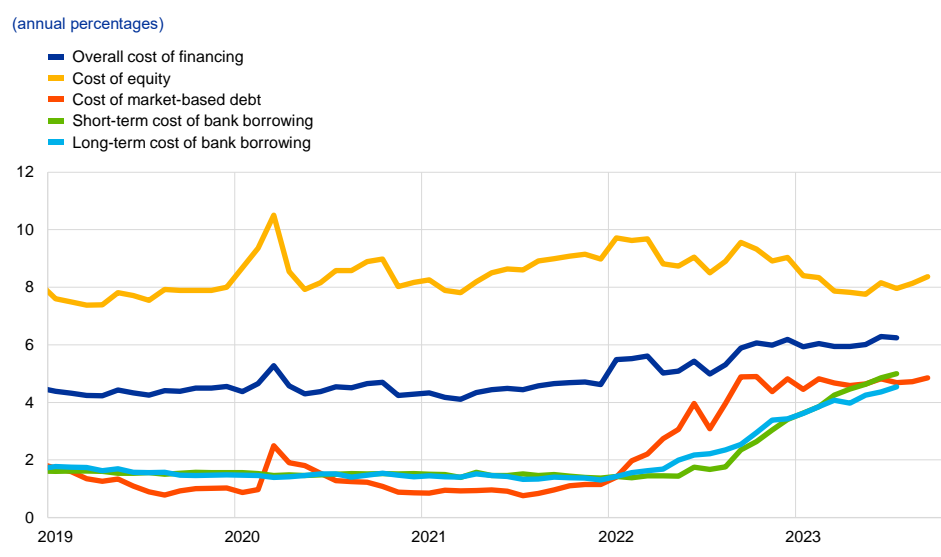
Sources: ECB and ECB estimates, Eurostat, Dealogic, Merrill Lynch, Bloomberg and Thomson Reuters.
Notes: The overall cost of financing for non-financial corporations (NFCs) is based on monthly data and is calculated as a weighted average of the cost of borrowing from banks (monthly average data), market-based debt and equity (end-of-month data), based on their respective outstanding amounts. The latest observations are for 13 September 2023 for the cost of market-based debt and cost of equity (daily data) and July 2023 for the overall cost of financing and the cost of borrowing from banks (monthly data).

Bank lending to firms and households continued to be weak in July, amid higher lending rates, lower loan demand and tighter credit standards. The annual growth rate of loans to NFCs declined to 2.2% in July, down from 3.0% in June, and was still supported by base effects (Chart 24, panel a). The slowdown was experienced across the largest euro area economies, with some country heterogeneity, and reflected the strong decrease in loan demand, in part owing to higher borrowing rates and associated spending plan cuts, as well as to a further tightening of credit standards. Monthly flows of loans to NFCs have been close to zero since November 2022 and to households negative since May 2023. The annual growth rate of loans to households declined from 1.7% in June to 1.3% in July (Chart 24, panel b), amid negative housing market prospects, a further tightening of banks' credit standards and higher lending rates. The decline was driven by all components, namely housing loans, consumer credit and loans to sole proprietors (i.e. unincorporated small businesses). The net monthly flows of lending to households were negative for the third month in a row, and, as a result, the short-term three-month annualised growth rate has now also declined to stand at -0.8%
– its lowest level since the start of the euro area.

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Chart 24

MFI loans in selected euro area countries

(annual percentage changes; standard deviation)

- Euro area
- Germany
- France
- Italy
- Spain
- Cross-country standard deviation (right-hand scale)

a) MFI loans to NFCs

b) MFI loans to households
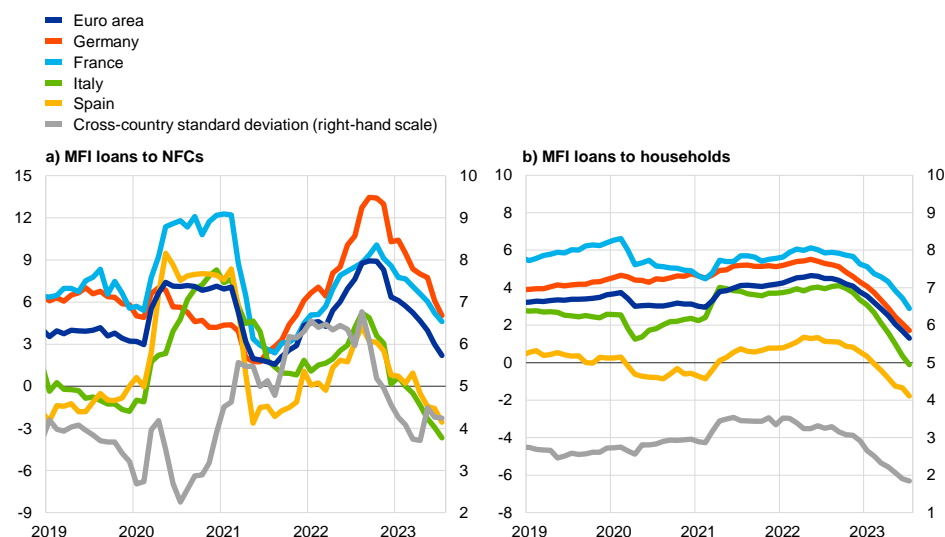
Source: ECB.
Notes: Loans from monetary financial institutions (MFIs) are adjusted for loan sales and securitisation; in the case of non-financial corporations (NFCs), loans are also adjusted for notional cash pooling. The cross-country standard deviation is calculated using a fixed sample of 12 euro area countries. The latest observations are for July 2023.

The growth of net external financing of euro area firms decreased further in the second quarter of 2023 and nearly came to a halt in July, reflecting, among others, the lower financing needs of firms. The annual growth rate of net external financing declined from 1.8% in April 2023 to 0.3% in July (Chart 25). During this period, loan flows were close to zero, reflecting firms' lower financing needs given faltering economic activity, solid retained earnings, ongoing rises in lending rates and tightening bank credit standards. The net issuance of debt securities also stagnated on the back of sustained gross issuance and redemptions of similar size. The net issuance of listed shares was subdued and became negative in May and June, reflecting one-off factors (e.g. one multinational company bought back shares and another large company was nationalised). More generally, activity in terms of initial public offerings and mergers and acquisitions has been low since 2022.

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Chart 25

Net external financing flows for euro area NFCs

(monthly flows; EUR billions)

- Total external financing
- Borrowing from banks
- Net issuance of debt securities
- Net issuance of listed shares
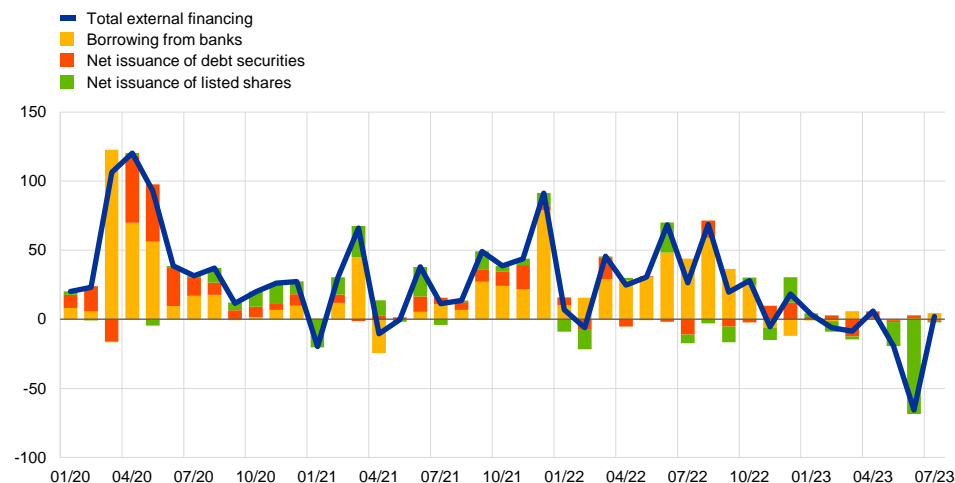
Sources: ECB, Eurostat, Dealogic and ECB calculations.
Notes: Net external financing for non-financial corporations (NFCs) is the sum of borrowing from banks (monetary financial institution (MFI) loans), net issuance of debt securities and net issuance of listed shares. MFI loans are adjusted for loan sales, securitisation and cash-pooling activities. The latest observations are for July 2023.

Overnight deposits contracted further in July, driven by the reallocation of funds to instruments with higher remuneration. After dropping by 9.2% year on year in June, the growth rate for overnight deposits fell further in July, bringing their annual growth rate down to -10.5%, the largest contraction seen since the start of Economic and Monetary Union (EMU) in 1999 (Chart 26). While interest rates are rising, the spread between time and overnight deposits has continued to widen, increasing the opportunity cost of holding liquid assets and driving the ongoing fund reallocation from overnight to time deposits. This reflects the fact that interest rates on overnight deposits have adjusted to policy rate changes more slowly than those on time deposits. This large spread provides a strong incentive for households and firms to shift their overnight and redeemable deposits to time deposits. The fact that the ECB's policy tightening has been faster than in previous tightening cycles explains the extraordinary volumes being reallocated.

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Chart 26

M3, M1 and overnight deposits

(annual growth rate, adjusted for seasonal and calendar effects)

- M3
- M1
- Overnight deposits
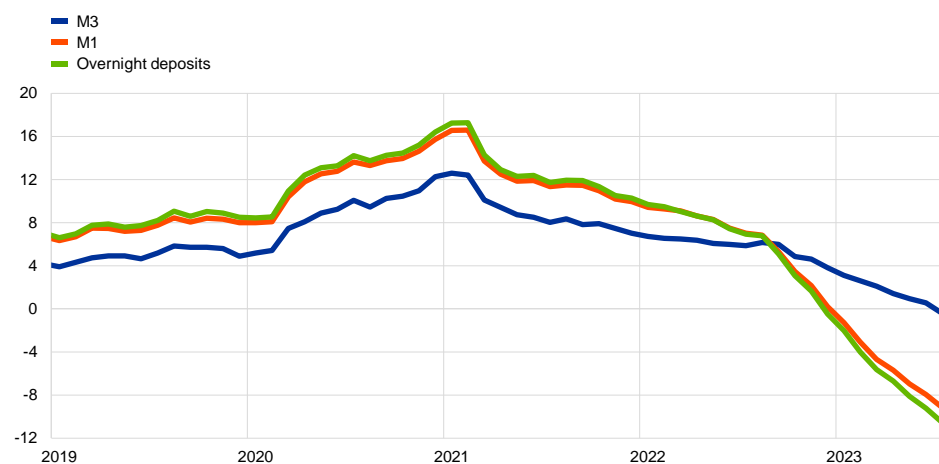
Source: ECB.
Note: The latest observations are for July 2023.

By July 2023 monetary aggregates were contracting at the fastest annual pace on record, driven by subdued credit growth and the reduction in the Eurosystem balance sheet. Euro area narrow money (M1) growth contracted further, by 9.2% in July, after having fallen by 8.0% in June; this is the largest reduction by far in its entire history. Annual broad money (M3) growth in the euro area slipped into negative territory for the first time since February 2010, dropping from 0.6% in June to -0.4% in July (Chart 26) – its lowest rate since EMU began. This marked decline in the annual M3 growth rate resulted from a large monthly outflow and base effects. Persistent monthly outflows reflected several factors. First, the contribution to monetary dynamics of lending to households and firms has fallen to zero in recent months. Second, the discontinuation in July 2023 of reinvestments of principal payments from maturing securities under the asset purchase programme has led to a reduction in the Eurosystem's asset portfolio, thereby draining liquidity from the financial system. In addition, the substitution in bank funding of long-term bonds for deposits has contributed to keeping M3 growth in negative territory. Monetary inflows from the rest of the world have, however, so far cushioned the negative impact of the other components to some extent. These inflows reflect foreign investors' preference for euro area securities due to their relatively attractive yields and the current resilient confidence levels. Without this impetus from foreign investors, the monetary dynamics for the euro area would have slid even further into negative territory.

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6 Fiscal developments

According to the September 2023 ECB staff macroeconomic projections, the euro area general government budget balance will improve moderately in 2023 and 2024 but deteriorate slightly in 2025. It is anticipated that the euro area fiscal stance will be broadly neutral in 2023 and tighten significantly in 2024, before turning broadly neutral again in 2025. Cumulatively over the projection horizon, there will be some tightening of fiscal policy. The ratio of euro area debt to GDP is projected to decline from 91% in 2022 to around 88% in 2025, but to remain well above pre-pandemic levels. As the energy shock fades, governments should continue to roll back the related support measures promptly and in a concerted manner to avoid driving up medium-term inflationary pressures, which would otherwise call for an even stronger monetary policy response. Fiscal policies should be designed to make the euro area economy more productive and to gradually bring down high public debt. In its opinion *published on 5 July 2023, the ECB urged European Union (EU) legislators to come to an agreement on the reform of the EU's economic governance framework as soon as possible, and at the latest by the end of 2023.*

According to the September 2023 ECB staff macroeconomic projections, the euro area general government budget balance will improve moderately in 2023 and 2024 but deteriorate slightly in 2025.[15] Specifically, the euro area budget deficit is projected to decline to 3.2% of GDP in 2023 and 2.8% of GDP in 2024, before increasing to 2.9% of GDP in 2025 (Chart 27). The decline in the first part of the projection horizon is driven by expectations of a lower cyclically adjusted primary deficit, while the cyclical component is expected to remain broadly stable. Interest payments are projected to increase slightly over the projection horizon. The fall in the cyclically adjusted primary deficit is shaped by the scaling back of the fiscal support measures implemented by governments in response to the energy shock and high inflation. It is now estimated that at the euro area level these measures will amount to 1.4% of GDP in 2023, declining significantly to 0.4% of GDP in 2024 and to around 0.2% of GDP in 2025.

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[15] See "ECB staff macroeconomic projections for the euro area, September 2023", published on the ECB's website on 14 September 2023.

Chart 27

Budget balance and its components

(percentages of GDP)
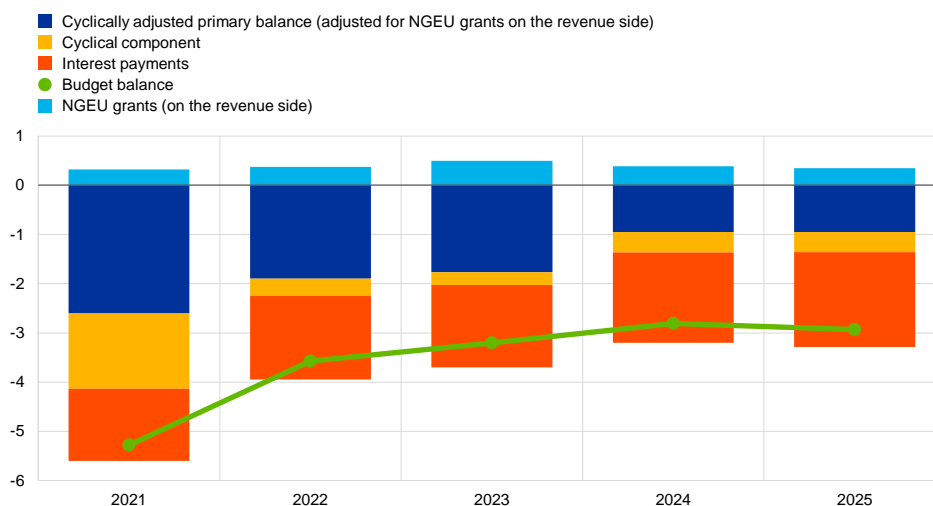
- Cyclically adjusted primary balance (adjusted for NGEU grants on the revenue side)
- Cyclical component
- Interest payments
- Budget balance
- NGEU grants (on the revenue side)

Sources: ECB calculations and ECB staff macroeconomic projections for the euro area, September 2023.
Notes: NGEU stands for Next Generation EU. The data refer to the aggregate general government sector of all 20 euro area countries (including Croatia).

The euro area fiscal stance is projected to be broadly neutral in 2023 and to tighten significantly in 2024, before turning broadly neutral again in 2025.[16] The annual change in fiscal support, adjusted for grants extended to countries under the Next Generation EU (NGEU) programme, points to cumulative tightening of fiscal policies in the euro area over the forecast period. This tightening is anticipated to mainly take place in 2024, when around 75% of the energy and inflation-related fiscal support put in place by euro area governments is expected to be phased out. In 2025 the fiscal stance is expected to be neutral as the further unwinding of the energy measures is partly offset by higher investment, supported by the NGEU programme and increased defence spending. Meanwhile, the cumulative tightening of fiscal policies over the projection horizon is not driven by average public wages and pensions, which are projected to grow at rates higher than inflation in 2024 and 2025, while overall spending on these items grows at or above the nominal potential growth rate.

The ratio of euro area government debt to GDP is projected to remain above its pre-pandemic level, declining to 89% of GDP in 2023 and broadly stabilising in 2024 and 2025. The debt ratio increased by approximately 13 percentage points to around 97% in 2020. In 2023 it is expected to decline to around 89% of GDP, followed by marginal falls in 2024 and 2025. The developments in the latter two years also reflect expectations for a significant narrowing in the negative differentials between interest rates and nominal GDP growth compared with those observed

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[16] The fiscal stance reflects the direction and size of the stimulus from fiscal policies to the economy beyond the automatic reaction of public finances to the business cycle. It is measured here as the change in the cyclically adjusted primary balance ratio net of government support to the financial sector. Given that the higher budget revenues related to NGEU grants from the EU budget do not have a contractionary impact on demand, in this context, the cyclically adjusted primary balance is adjusted to exclude those revenues. For more details on the euro area fiscal stance, see the article entitled "The euro area fiscal stance", *Economic Bulletin*, Issue 4, ECB, 2016.

between 2021 and 2023 (Chart 28). Additionally, primary deficits and positive deficit-debt adjustments are both expected to put upward pressure on the debt level. As a result, despite the decline of more than 3 percentage points between 2023 and 2025, the euro area aggregate debt ratio at the end of the horizon is expected to remain almost 5 percentage points above its pre-pandemic level.

Chart 28

Drivers of change in euro area government debt
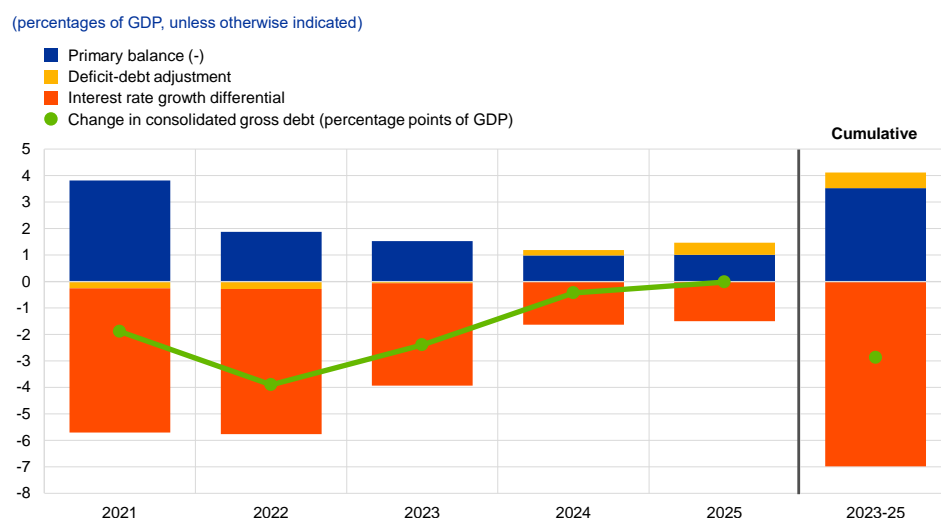
(percentages of GDP, unless otherwise indicated)

■ Primary balance (-)
■ Deficit-debt adjustment
■ Interest rate growth differential
● Change in consolidated gross debt (percentage points of GDP)

Sources: ECB calculations and ECB staff macroeconomic projections for the euro area, September 2023.
Note: The data refer to the aggregate general government sector of all 20 euro area countries (including Croatia).

The euro area budget balance for 2023 remains unchanged compared with the June 2023 Eurosystem staff macroeconomic projections but is now showing a moderately smaller improvement than previously expected in both 2024 and 2025. These downward revisions for 2024 and 2025 are mainly driven by projected changes in the primary balance resulting from higher than initially forecast primary expenditures, including higher spending on unemployment benefits as activity is expected to be weaker. In cyclically adjusted terms, revisions over the whole horizon are projected to be negligible.

As the energy shock fades, governments should roll back the related support measures promptly and in a concerted manner. This avoids driving up medium-term inflationary pressures, which would otherwise call for an even stronger monetary policy response. Fiscal policies should be designed to make the euro area economy more productive and to gradually bring down high public debt. This can best be achieved within a robust EU framework for economic and fiscal policy coordination and surveillance. As pointed out in its opinion published on 5 July 2023, the ECB welcomes the Commission's proposals on the reform of the EU's economic governance framework and offers some specific, technical observations and suggestions with a view to further enhancing the new framework and ensuring it becomes more transparent and predictable. Notably, the ECB urges EU legislators to come to an agreement on the reform of the economic governance framework as soon as possible, and at the latest by the end of 2023. As the general escape clause contained in the EU's Stability and Growth Pact will have been deactivated by then,

such an agreement will be critical in order to anchor expectations for debt sustainability and sustainable and inclusive growth. Failure to swiftly agree on and put in place a credible, transparent and predictable fiscal framework could create uncertainty and unduly delay the necessary fiscal adjustment and impetus for reforms and investment.

Boxes

1 Risks to global food commodity prices from El Niño

Prepared by Jakob Feveile Adolfsen and Marie-Sophie Lappe

The almost certain arrival of an El Niño phenomenon towards the end of 2023 implies risks to global food commodity prices. In June, the US National Oceanic and Atmospheric Administration (NOAA) announced that El Niño conditions had arrived, with an El Niño episode likely to develop at the end of this year. An El Niño event is defined as taking place when the three-month rolling average of the ocean surface temperature in the East-Central tropical Pacific has stayed at least 0.5 degrees Celsius above the 30-year average for five consecutive, overlapping three-month periods in a row.[1] The latest weather forecast points to a 99% probability that an El Niño episode will emerge in the last quarter of 2023 and a 66% probability that it will be strong – with a temperature deviation of at least 1.0 degree Celsius above the 0.5-degree threshold defining an El Niño phenomenon (Chart A).[2] This year's El Niño episode marks a departure from the previous three years, which were dominated by its colder counterpart, La Niña.[3] El Niño is likely to affect equatorial and global food supplies and prices as it affects weather developments around the globe. This box discusses the likely effects of the El Niño phenomenon on global food commodities and examines the risks to food commodity prices in case it develops into a strong El Niño. While the box focuses mainly on the impact of a strong El Niño, which might amplify the effects on food commodity prices next year, various studies show that the arrival of any El Niño conditions is likely to affect global food commodities, regardless of intensity.[4]

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[1] Following the NOAA definition, El Niño is the warm phase of the oscillation in the equatorial Pacific Ocean (also called El Niño–Southern Oscillation). In the neutral phase of the oscillation, trade winds, which are the permanent winds that blow from east to west around the equator, push warm water from South America to Asia, where it evaporates more easily. This generates the upwelling process, which is when deep, cold water rises to the ocean surface to replace warm water. During El Niño, trade winds slow down and warm water is pushed back towards South America, which causes the upwelling process to weaken or even stop.

[2] Historically, strong episodes have accounted for 8 out of the 23 El Niño episodes since 1950.

[3] The definition of La Niña is similar to the El Niño definition, but with negative anomalies in ocean surface temperatures. A La Niña phase is generated by trade winds that are stronger than usual, which amplifies the upwelling process.

[4] This box focuses on international food commodity prices and not on euro area consumer food prices, where the effects are expected to be smaller. Peersman (2022) shows that changes in international food commodity prices explain almost 30% of volatility in euro area inflation over the medium term. See Peersman, G., "International Food Commodity Prices and Missing (Dis)Inflation in the Euro Area", *The Review of Economics and Statistics*, Vol. 104, No 1, 2022, pp. 85-100. Subsidies granted to domestic producers through the EU's Common Agricultural Policy partially mitigate the effects of changes in international food commodity prices on euro area consumer food prices. See, for example, Ferrucci, G., Jiménez-Rodríguez, R. and Onorante, L., "Food Price Pass-Through in the Euro Area: Non-linearities and the Role of the Common Agricultural Policy", *International Journal of Central Banking*, Vol. 8, No 1, 2012, pp. 179-217.

Chart A
Probabilities of an El Niño event in Q4 2023

(percentages)
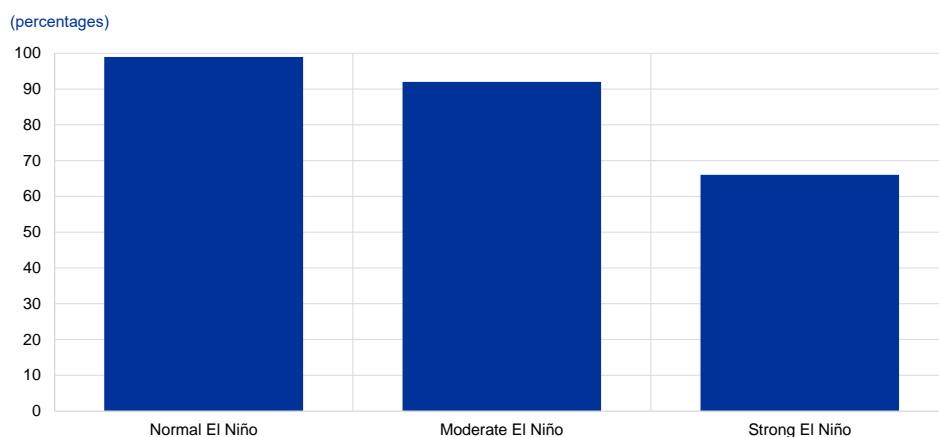
Source: US NOAA.
Notes: A normal El Niño event is defined by the NOAA as an increase in ocean surface temperatures of at least 0.5 degrees Celsius above the long-term average. A "moderate El Niño" and "strong El Niño" are defined as temperature increases of at least 1.0 and 1.5 degrees Celsius above the long-term average, respectively. The latest observations are for 10 August 2023.

Complex weather effects resulting from El Niño are likely to affect food crops around the globe, especially around the equator. El Niño is associated with a higher frequency of extreme weather events. These events differ significantly depending on the region. For example, El Niño typically leads to heatwaves with heavy rainfalls in South America and southern US states, while it leads to droughts in northern US states. The complexity of the resulting climate patterns implies that El Niño affects crop yields differently depending on crop types and growing seasons, as well as on the region in question. Effects on crop yields are also likely to vary between different El Niño cycles. Estimates of the historical effects of an El Niño phenomenon on crop yields illustrate how the impact differs across crop types, even within the same country. While an El Niño episode seems to be followed by higher soybean harvests in the United States, it usually has negative effects on US wheat and corn yields.[5] Moreover, while El Niño has historically had positive effects on soybean yields in the United States and South America, it tends to reduce soybean yields in Asia.[6] The complex effects make it challenging to predict the implications of El Niño for global food commodity prices. Substitution between food commodities further complicates price effects. To some extent, farmers perceive soybeans and corn as mutual substitutes and occasionally switch between the two crops depending on current futures prices. This implies that a potential reduction in corn yields could spill over to soybean prices, while the price effects for corn could be dampened somewhat by this substitution effect. Furthermore, the 1982-1983 El Niño episodes caused the fish population in Asia and Australia to fall, leading to a substitution in demand from fish to soybeans for animal feed.[7] Because of this complexity, and

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[5]   Soybean crops in the United States benefited mainly from favourable summer growing conditions in the Midwest, while heatwaves and droughts damaged crops in Asia. Corn crops in the United States were mainly negatively affected by the dry conditions in Southeastern states that tend to follow from El Niño.

[6]   Based on Iizumi, T., Luo, J.J., Challinor, A.J., Sakurai, G., Yokozawa, M., Sakuma, H., Brown, M.E and Yamagata, T., "Impacts of El Niño Southern Oscillation on the global yields of major crops", *Nature Communications*, 5, No 3712, 2014.

[7]   See Brenner, A.D., "El Niño and World Primary Commodity Prices: Warm Water or Hot Air?", *The Review of Economics and Statistics*, Vol. 84, No 1, 2002, pp. 176-183.

since crop yields are one of many factors that affect global food commodity prices, it would be misleading to directly extrapolate crop yield effects to price effects.

Historical analyses suggest that a normal El Niño has upward effects on global food commodity prices. Various studies examine the effect of El Niño on global food commodity prices. Brenner (2002) finds that the El Niño oscillation accounts for almost 20% of global commodity price inflation movements since 1963 and that a normal El Niño event tends to raise real commodity price inflation by around 3% for 6-12 months after its emergence, with the strongest contribution coming from food commodities.[8] Cashin et al. (2017) document variation in the impact of El Niño shocks since 1972 on economic activity across different countries, with most countries facing an increase in non-energy commodity prices.[9] Overall, they find that El Niño has an upward impact of around 5% on global non-energy commodity prices and that this impact lasts for 6-16 months.[10] Further findings suggest that inflation responds more strongly to an El Niño event in countries which have a higher weight of food in the inflation index. These studies suggest that an El Niño episode of any strength has significant effects on food commodity prices and that it generally raises prices.

Global food commodity prices could rise by up to 9% if current El Niño conditions develop into a strong El Niño. While El Niño conditions have already arrived and it is almost certain that 2023 will be declared an El Niño year, there is higher uncertainty about the strength of the El Niño event.[11] Historical estimates, where developments in the global business cycle as well as in fertiliser and energy prices have been controlled for, suggest that a rise in ocean surface temperatures corresponding to the transition from a normal to a strong El Niño would raise global food commodity prices for up to two years, with a 9% peak in price increases occurring 16 months after the start of the strong El Niño episode (Chart B, panel a). This follows from the higher risks and potential amplifications of extreme weather events that a strong El Niño would imply relative to a normal El Niño. The upside risks to food commodity prices arising from the development of a strong El Niño phenomenon are particularly pronounced for soybeans, corn and rice, while the expected price effects are upwards but insignificant for wheat and around zero for coffee and cocoa (Chart B, panel b).

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[8] Brenner, A.D., op. cit.

[9] Cashin, P., Mohaddes, K. and Raissi, M., "Fair weather or foul? The macroeconomic effects of El Niño", *Journal of International Economics*, Vol. 106, 2017, pp. 37-54.

[10] Cashin et al., ibid., use a measure not based on temperature, which does not allow for the classification of a normal or strong El Niño episode. In addition to the effect on food commodity prices, metal prices are also found to contribute to the increase in non-energy commodity prices, mainly because extreme weather events affect mining activity, as seen in Chile. See Cashin, P., Mohaddes, K. and Raissi, M., "El Niño: Good Boy or Bad?", *Finance and Development,* Vol. 53, No 1, 2016, pp. 30-33.

[11] 1.0 degree Celsius is the difference between a normal (0.5 degrees Celsius anomaly) and a strong (1.5 degrees Celsius anomaly) El Niño event. For current El Niño probabilities, see Chart A.

Chart B

Estimated global food commodity price effects of a transition from a normal to a strong El Niño

a) Price effects following the start of a strong El Niño period

(percentage changes)
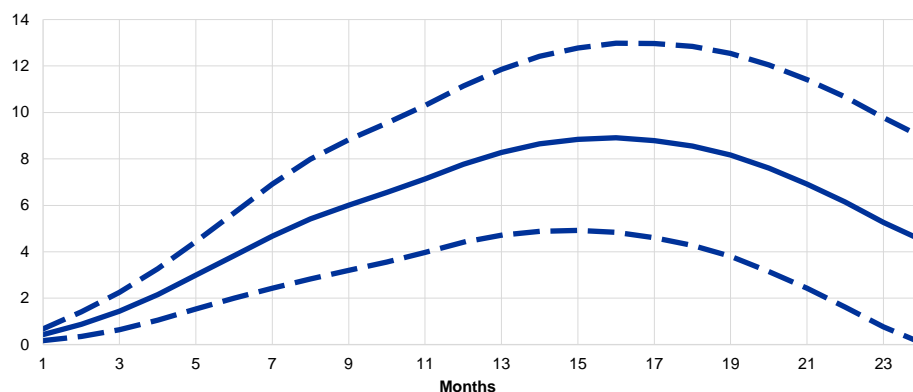
b) Effects on prices of selected food commodities

(percentage changes)
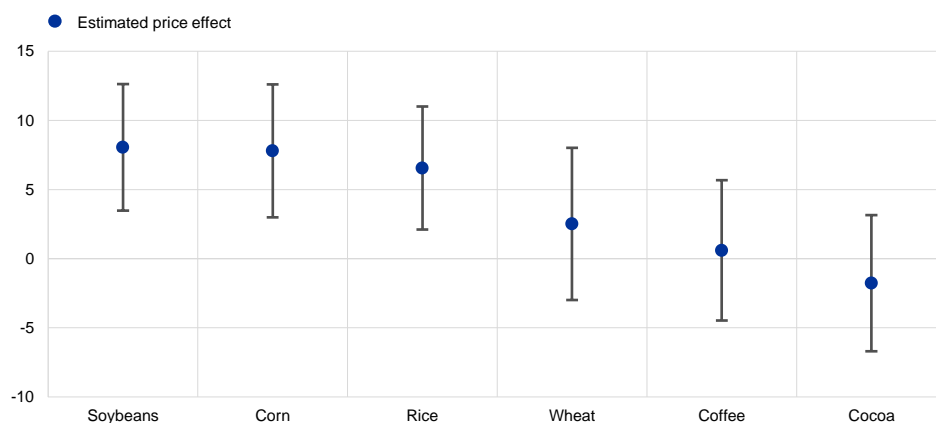
Sources: Haver, US NOAA and ECB staff calculations.
Notes: Estimated price effect shows the impact of a 1.0-degree Celsius increase in ocean surface temperatures during El Niño phenomena, controlling for fertiliser and oil prices as input costs in food production and for global industrial activity as an indicator of the global business cycle. Impulse response functions have been estimated with local projections following Jordà, Ò., "Estimation and Inference of Impulse Responses by Local Projections", Vol. 95, No 1, 2005, pp. 161-182. The charts show 68% confidence intervals. Panel b) shows the estimated price effect after 16 months, based on the peak reaction of the food commodity price aggregate in panel a). The latest observations are for April 2023.

Financial markets factor in future price increases but also higher price uncertainty. Incorporating El Niño developments improves the precision of forecasts on future food commodity price volatility.[12] This suggests that traders of commodity derivatives might incorporate the El Niño outlook when trading in the futures market. Focusing on the three main grain crops (soybeans, corn and wheat), futures prices increased in the week following the NOAA announcement on 8 June that El Niño conditions had arrived, together with a probability of around 50% assigned to the development of a strong El Niño phenomenon towards the end of the year (Chart

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[12] Su et al. show that incorporating El Niño developments improves the forecasting of future price volatility in the US grain market. See Su, Y., Liang, C., Zhang, L. and Zeng, Q., "Uncover the response of the U.S grain commodity market on El Niño–Southern Oscillation", *International Review of Economics & Finance,* Vol. 81, 2022, pp. 98-112.

C).[13] Both the level of prices and price uncertainty for soybeans and corn in the summer of 2024 increased significantly. Soybean prices increased by 12% and corn prices by 10%, while the standard deviation of the distributions increased by 24% and 23%, respectively. According to market analysts, these developments mainly reflected unfavourable weather developments in the northern hemisphere at the beginning of June, with the El Niño development imposing extra uncertainty on the outlook for crops. The impact on wheat, which has remained less sensitive to strong El Niño events historically, was smaller, with prices increasing by 7% and the standard deviation by 13%. Overall, changes in option-implied price distributions reflect potential upward pressures on food commodity prices and increases in price uncertainty triggered by ongoing El Niño developments.

Chart C

Option-implied price distributions before and after the announcement of El Niño

(x-axes: USD per bushel; y-axes: percentages)

- Price distributions before El Niño announcement
- Futures prices before El Niño announcement
- Price distributions after El Niño announcement
- Futures prices after El Niño announcement
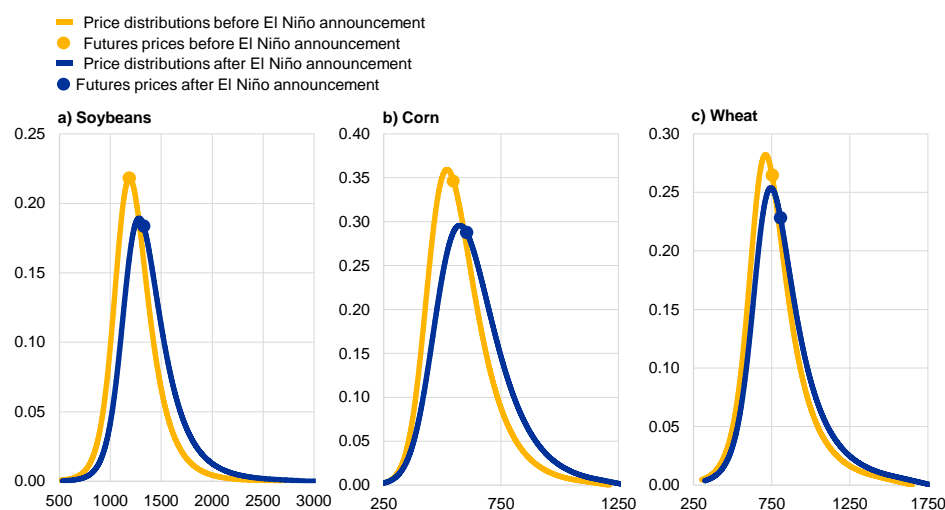
Notes: Option-implied risk-neutral distributions are calculated following Black, F. and Scholes, M., "The Pricing of Options and Corporate Liabilities", *Journal of Political Economy*, Vol. 81, No 3, 1973, pp. 637-654, based on the Chicago Board of Trade's July 2024 futures for soybeans, corn and hard red winter wheat. Overnight index swap rates are used as input for the risk-free interest rate. Price uncertainty is measured by the width of the option-implied distributions. The cut-off dates for before and after the El Niño announcement were 7 June 2023 and 16 June 2023, respectively.

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13   Respective weights of soybeans, corn and wheat in the HWWI's Index for Food and Beverages (based on EMU country imports): 14%, 14% and 8%.

2 What role do reopening effects play across countries and sectors?

Prepared by Niccolò Battistini and Johannes Gareis

This box analyses the recent dispersion of economic activity across countries and sectors and assesses the role that reopening effects have played following the lifting of coronavirus (COVID-19) restrictions last year. Output growth in the euro area has weakened significantly since the beginning of 2022. This has been accompanied by a declining, albeit persistent, dispersion of growth across countries and sectors. This persistent growth dispersion has reflected a two-speed economy, with relatively subdued growth in manufacturing, partly induced by weaker global demand and tighter euro area financing conditions, and relatively robust growth in services, supported by reopening effects. However, recent survey data suggest that this dispersion may narrow in the near future: while the impulse from reopening effects is weakening, the propagation of other forces across sectors is strengthening.

At the beginning of 2023 the dispersion of growth across euro area countries was still relatively high, while the dispersion of growth across sectors was in line with pre-pandemic levels. To take into account the economic size of countries and sectors, the dispersion of growth is measured on the basis of the weighted standard deviation of year-on-year (real gross) value-added growth in all euro area countries (excluding Ireland) and sectors.[1] Both measures reached unprecedented levels following the outbreak of COVID-19 but declined significantly in 2022, although not at the same rate (Chart A, panel a). In the first quarter of 2023 cross-country growth dispersion remained higher than before the pandemic, while cross-sector growth dispersion returned to pre-pandemic levels. The greater dispersion of growth across countries appears to be related to the continued higher dispersion of growth in contact-intensive services, which declined from the peak recorded during the pandemic but remained at a historically high level (Chart A, panel b).[2] Conversely, cross-country growth dispersion in manufacturing returned to pre-pandemic levels.

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[1] See also the box entitled "Economic growth in the euro area is broadening", *Economic Bulletin*, Issue 1, ECB, 2017.

[2] "Contact-intensive services" is used as shorthand for wholesale and retail trade, as well as transport, accommodation and food service activities (in line with the NACE Rev. 2 classification).

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Chart A

Dispersion of value-added growth

a) Dispersion of value-added growth across euro area countries and sectors

(percentage points)
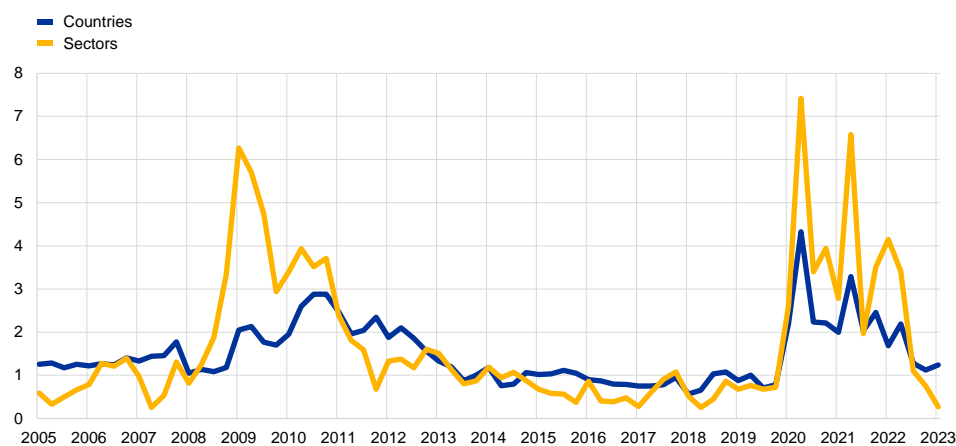
b) Dispersion of value-added growth in manufacturing and contact-intensive services across euro area countries

(percentage points)
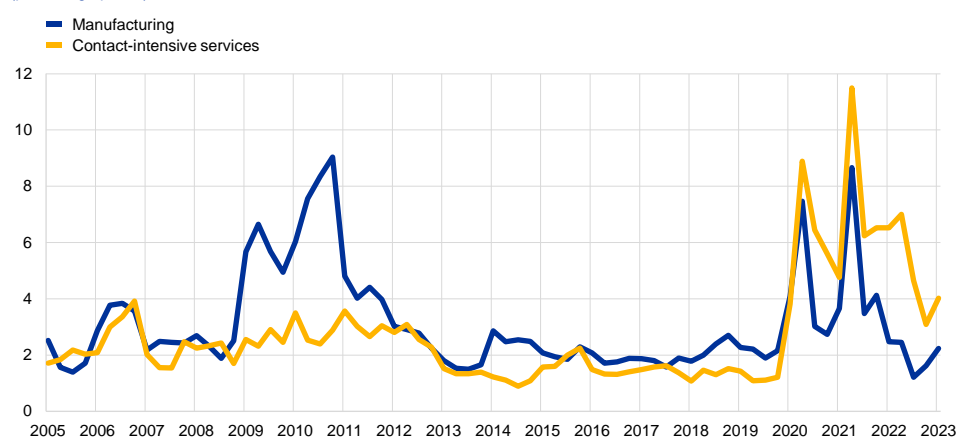
Sources: Eurostat and ECB staff calculations.
Notes: The cross-country growth dispersion is measured as the weighted standard deviation of year-on-year value-added growth in all euro area countries, excluding Ireland. The cross-sector growth dispersion is measured as the weighted standard deviation of year-on-year value-added growth in manufacturing, construction, contact-intensive services and a combination of other sectors. The cross-country growth dispersion in manufacturing and contact-intensive services is measured as the weighted standard deviation of year-on-year sector-specific value-added growth in all euro area countries, except Ireland. The latest observations are for the first quarter of 2023.

In the first quarter of 2023 economic growth remained higher in countries where contact-intensive services are more important for the overall economy.
In 2022, contact-intensive services output grew at a stronger pace in countries where these services account for a larger share of the economy (Chart B, panel a). This partly mirrors the growth pattern following the outbreak of the pandemic, when these countries experienced a relatively sharp economic downturn in contact-intensive services. The relatively strong growth in contact-intensive services in countries where these services are more important continued in the first quarter of 2023, with the level of contact-intensive services in these countries exceeding pre-pandemic levels relatively more than in those where contact-intensive services are less important. This shows that countries with a higher dependence on contact-intensive

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services continued to benefit to a greater extent from the growth impetus in this sector, which also led to relatively higher value-added growth overall (Chart B, panel b). Conversely, countries with a higher reliance on manufacturing mostly experienced lower growth in total value added in the first quarter of 2023, reflecting the somewhat weaker growth of manufacturing compared with contact-intensive services. However, manufacturing growth in euro area countries was far more evenly distributed, suggesting that the current drivers of manufacturing are being exerted more evenly across euro area countries than those of contact-intensive services.

Chart B

Relationship between the size of the contact-intensive services sector and the growth of contact-intensive services and total value added across euro area countries

a) Size of contact-intensive services sector and contact-intensive services value-added growth

(horizontal axis: average share of contact-intensive services value added in total value added in 2022, vertical axis: year-on-year growth of contact-intensive services value added)
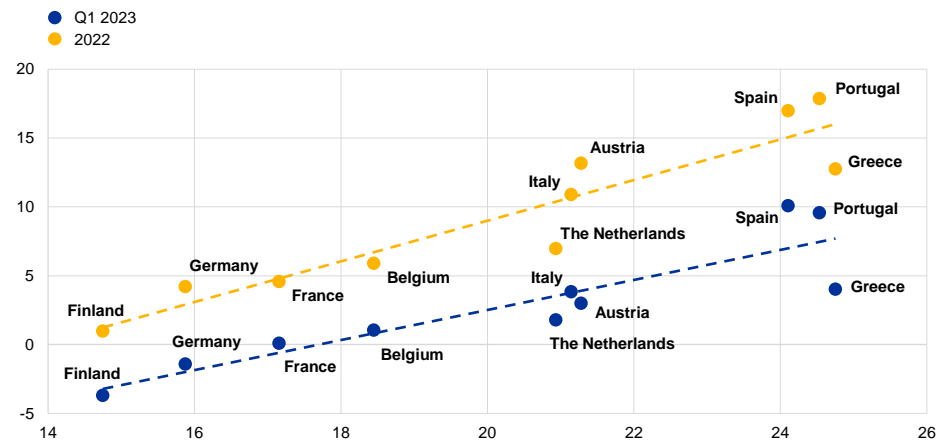
b) Size of contact-intensive services sector and total value-added growth

(horizontal axis: average share of contact-intensive services value added in total value added in 2022, vertical axis: year-on-year growth of total value added)
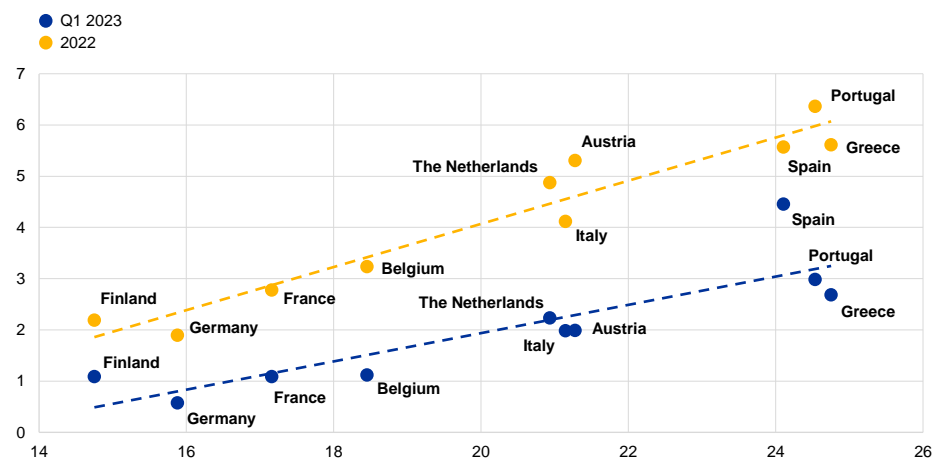
Sources: Eurostat and ECB staff calculations.
Notes: The plots show the ten largest euro area countries (excluding Ireland) – which are important to control as their results are of significance for the euro area as a whole – in line with the calculation of the dispersion of value-added growth (Chart A). Linear trend lines are shown in dashed lines. The year-on-year growth rates for 2022 refer to annual averages of the quarterly annual growth rates in 2022.

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An empirical model shows that unexpected changes in mobility restrictions disproportionately affect contact-intensive services compared with manufacturing. An estimated Bayesian vector autoregression model quantifies the impact of the reopening of the economy on value-added growth in manufacturing and contact-intensive services, based on euro area data from the first quarter of 1999 to the first quarter of 2023. The model uses the composite Google Mobility Index (GMI) to measure the impact of pandemic-related closures and the subsequent reopening of the economy through voluntary and involuntary changes in people's mobility. The model incorporates this index along with the Federal Reserve Bank of New York's Global Supply Chain Pressure Index (an indicator of external demand in the euro area), energy prices, value added in manufacturing, contact-intensive services and a combination of other sectors, the private consumption deflator, the interest rate and the exchange rate. The model identifies pandemic-related restrictions and subsequent reopening shocks (i.e. pandemic shocks) by assuming that an unexpected change in the GMI has an immediate impact on manufacturing and contact-intensive services.[3] The results show that an unexpected decline in the GMI (i.e. a pandemic-related restriction shock) leads to a substantial decline in activity in both manufacturing and contact-intensive services, with a larger decline in the latter. Symmetrically, an unexpected increase in the GMI (i.e. a reopening shock) induces a larger rise in contact-intensive services than in manufacturing (Chart C, panel a).

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[3]   This is achieved by a Cholesky decomposition in which the GMI is placed after the global variables and before the euro area-specific variables. The model includes four lags for each variable, with all variables in logarithms (except for the GMI and interest rates) and controls for the exceptionally high volatility of the data from the first quarter of 2020 to the third quarter of 2020. See Lenza, M. and Primiceri, G., "How to estimate a vector autoregression after March 2020", *Journal of Applied Econometrics*, Vol. 37, Issue 4, June/July 2022, pp. 688-699. For the Global Supply Chain Pressure Index, see Benigno, G., di Giovanni, J., Groen, J. and Noble, A., "A New Barometer of Global Supply Chain Pressures", *Federal Reserve Bank of New York Liberty Street Economics*, January 2022. The GMI is available for the period from January 2020 to October 2022; it is assumed to be zero for the other periods in the sample, implying in particular that there are no mobility restrictions after October 2022.

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Chart C

Manufacturing and contact-intensive services value added

a) Impact of an unexpected increase in the composite GMI on manufacturing and contact-intensive services activity

(percentages)

- Manufacturing
- Contact-intensive services
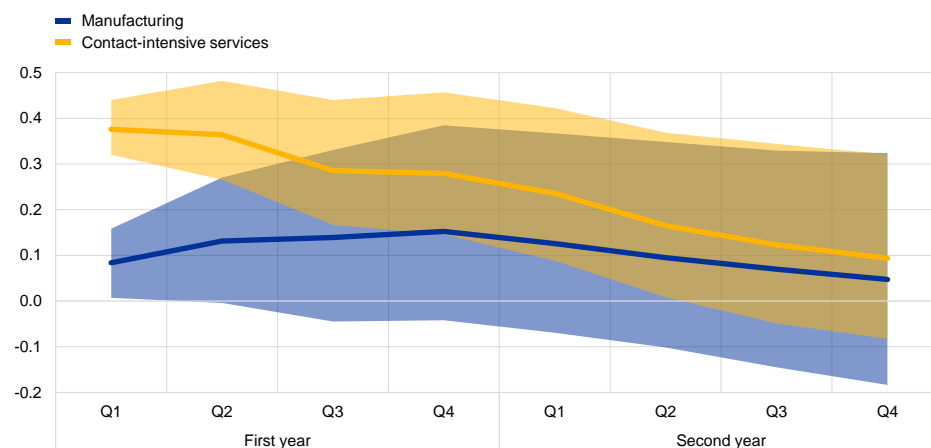
b) Estimated drivers of value-added growth in manufacturing and contact-intensive services

(year-on-year percentage changes and percentage point contributions)

- Total
- Pandemic shock
- Other shocks
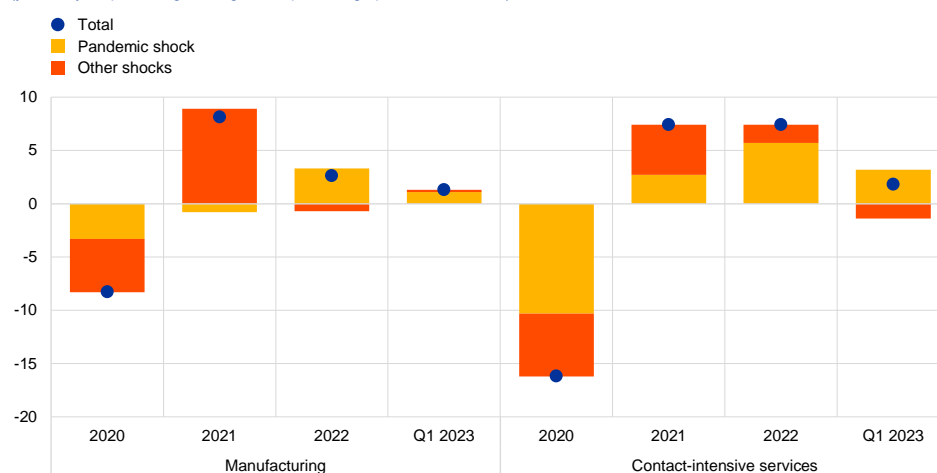
Sources: Eurostat, Google, the Federal Reserve Bank of New York, and ECB staff calculations.
Notes: The results are based on a Bayesian vector autoregression model for the euro area. The pandemic shocks have been identified with a Cholesky decomposition assuming that an unexpected change in the composite GMI has an immediate impact on manufacturing and contact-intensive services. Panel a) shows the effects of an unexpected increase in the GMI (i.e. a reopening shock). The effects of an unexpected decline in the GMI (i.e. a pandemic-related restriction shock) are symmetric to this. The shaded areas in panel a) refer to the 90% confidence bands. In panel b), the estimated contribution of the constant term (i.e. trend growth) is not shown. Moreover, annual growth rates for 2020, 2021 and 2022 refer to annual averages of quarterly annual growth rates. All growth rates are calculated in logarithms.

Reopening effects remained a significant driver of the growth differential between manufacturing and contact-intensive services in the first quarter of 2023 but weakened overall compared with 2022. The model-based decomposition of value-added growth in manufacturing and contact-intensive services suggests that the cross-sector differences in the impact of the pandemic shocks have played a large role in the differences in sectoral performance since 2020, with the shutdown and subsequent reopening of the economy having a larger impact on contact-intensive services (Chart C, panel b). At the start of 2023 reopening effects were still present, albeit with smaller growth impulses for both manufacturing and contact-intensive services compared with 2022. At the same time, other shocks have started

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to propagate to contact-intensive services and have less of an effect on manufacturing growth. The latter is consistent with easing supply-side constraints; however, these may have been offset by lower global and domestic demand, as well as tighter euro area financing conditions.[4]

Over the course of 2023 the effects of the reopening of the economy should continue to fade and other factors should become more prominent. Due to the gradual fading of reopening effects, as well as the economy-wide propagation of other forces, such as tighter financing conditions, momentum in both manufacturing and contact-intensive services is likely to weaken further in the near future, leading to a decline in growth dispersion across sectors. The waning growth impetus for contact-intensive services should also lead to a decline in the dispersion of growth in contact-intensive services value added, as well as overall economic activity, across countries. Overall, this decline in growth dispersion across sectors and countries reflects a weaker near-term outlook for economic activity, as reflected in the September 2023 ECB staff macroeconomic projections for the euro area.

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[4] Conversely, other shocks explain the more pronounced resilience and faster recovery of manufacturing after the outbreak of the pandemic, which is consistent with the early and strong recovery in global demand for manufacturing goods. This did not, however, fully feed through to manufacturing activity owing to supply chain disruptions and, later, the impact of the energy crisis. Although the shift in global demand from services to goods is related to the pandemic, it is not captured by the identified pandemic shocks per se, as these shocks measure unexpected changes in people's mobility and do not necessarily capture unexpected changes in their consumption preferences. However, the weaker response of manufacturing relative to contact-intensive services because of an unexpected change in mobility may to some extent be related to a reallocation of people's consumption from services to goods, thus partially explaining the weaker impact of the mobility shock on manufacturing relative to contact-intensive services value added.

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3 The euro area labour force: recent developments and drivers

Prepared by Agostino Consolo, António Dias da Silva, Catalina Martínez Hernández and Marco Weißler

One notable recent development in the euro area labour market has been a strong rebound in the labour force. In particular, over the last year and a half, the main source of employment growth has been the strong inflow of people joining the labour force rather than a sharp decline in the number of unemployed. This box provides an overview of recent euro area labour force developments using data from Eurostat and the ECB Consumer Expectations Survey (CES). It also analyses the drivers of the euro area labour force using a mixed-frequency Bayesian vector autoregression (MF-BVAR) to disentangle the push and pull factors behind the labour force dynamics.[1]

The labour force is now above its pre-pandemic level, which it reached at the end of 2022. More recently, it has converged back to its long-term pre-pandemic trend (Chart A), owing in particular to the contribution from foreign workers.[2] The difference between the short and long-term pre-pandemic trends captures the change in population growth, which has decelerated markedly since 2008. In June 2023, the labour force, inferred from monthly unemployment data, stood around 3.8 million above its January 2020 level. Detailed quarterly data from the EU Labour Force Survey (LFS) show that migrant workers, particularly from outside the EU, played an important role in labour force dynamics during the COVID-19 pandemic. In the first phase of the pandemic, from the fourth quarter of 2019 until the fourth quarter of 2020, the foreign labour force declined by proportionally more (2.0%) than the total labour force (1.2%). In contrast, from the first quarter of 2021 until the first quarter of 2023 foreign workers accounted for 41% of the total increase in the labour force, growing their share from 10.3% to 11.4% during that period.

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[1] In addition to the analysis of labour force developments, a comprehensive analysis of the implications of employment growth for labour market tightness and wage growth needs to consider sectoral dimensions of the labour market and the contribution from average hours worked (intensive margin). See, for example, "More jobs but fewer working hours", *ECB Blog*, 7 June 2023, on the differences between employment and total hours worked and the important role average hours worked played during the pandemic and the energy crisis. See also "The role of public employment during the COVID-19 crisis", *Economic Bulletin*, Issue 6, ECB, 2022.

[2] The increase in the euro area labour force was not homogeneous across socio-demographic groups. For instance, participation rates of low-skilled and prime-age workers have recovered less since the start of the pandemic (see Chart 9 in the article "The impact of the COVID-19 pandemic on the euro area labour market", *Economic Bulletin*, Issue 8, ECB, 2020).

Chart A

The euro area labour force and linear pre-pandemic trends

(index: Q4 2019 = 100)

Labour force
Long-term pre-pandemic trend
Pre-pandemic trend since the GFC
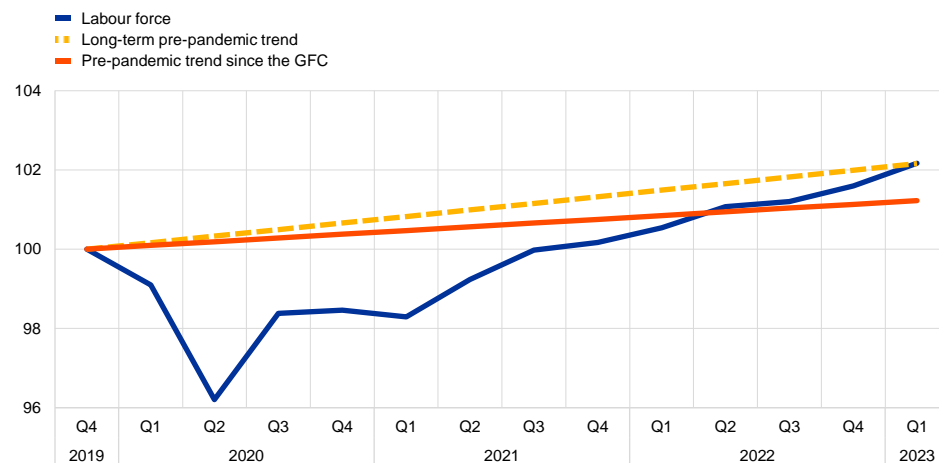
Sources: Eurostat, ECB area-wide model database and authors' calculations.
Notes: The long-term pre-pandemic trend covers 1995-2019, while the pre-pandemic trend since the global financial crisis (GFC) covers 2009-2019. The latest observation is for the first quarter of 2023.

In recent years, an increasing share of newly employed in the euro area were previously inactive. Transitions from inactivity to employment (I-E transitions) were the main driver of the growth in employment. According to CES data, transitions from unemployment to employment (U-E transitions) accounted for 1.6% of total employment, whereas I-E transitions accounted for 2.8% (Chart B). This implies that only around 37% of new hires in the first half of 2023 had been unemployed in the previous quarter. This evidence is in line with Eurostat data showing that I-E transitions accounted for 60% of the newly employed in 2022, which is in contrast to the 2011-2019 period when U-E transitions accounted for 51% of the newly employed.[3]

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[3]   Taking into account the country composition in LFS labour market transitions, I-E transitions increased from 49% in the 2011-2019 period to 55% in the 2021-2022 period. The increase in I-E transitions relative to U-E transitions may also reflect a lower unemployment rate in the recent period. In the 2011-2019 period, the average unemployment rate was 10.2%, compared with 7.3% in the 2021-2022 period.

Chart B

Transitions to employment

(share as a percentage of employment)

■ Transition from inactivity to employment
■ Transition from unemployment to employment
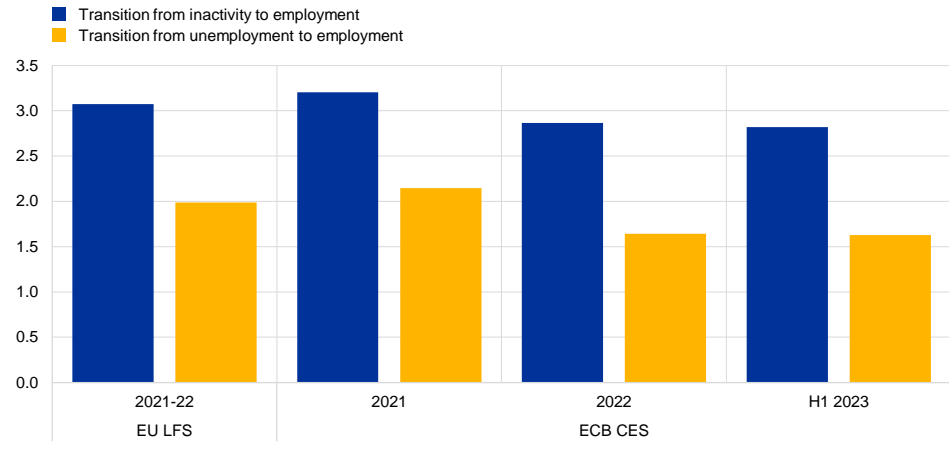
Sources: EU Labour Force Survey (LFS) and ECB Consumer Expectations Survey (CES).
Note: The latest observations are for April 2023.

According to the ECB CES, the characteristics of the newly employed and incumbents differ, including their labour income. On average, the newly employed are younger and have a lower level of education than incumbents (employed workers before the new transitions). They are also more likely to be women, work part-time and have lower levels of labour income (Chart C). Those hired from a position of unemployment earn about 55% of incumbents' labour income, whereas those transitioning directly from inactivity to employment have an average level of labour income which is equivalent to approximately 80% of the level earned by incumbents. Individual and job characteristics only partially explain the labour income differences observed. However, the composition effects on overall wage growth induced by the labour income differences between the newly employed transitioning from inactivity and from unemployment are likely to be small.

Chart C

Characteristics of the newly employed

(share as a percentage of employment, percentages)

■ Previously inactive
■ Previously unemployed
● Incumbent
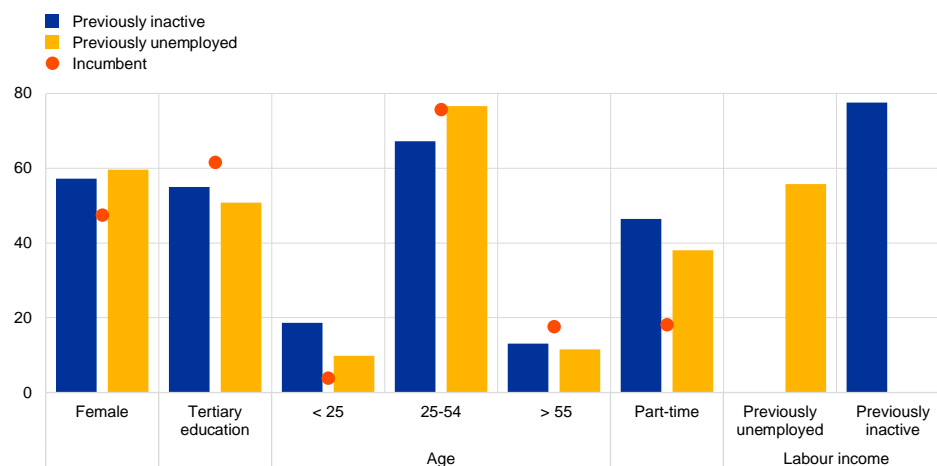
Source: ECB CES.
Notes: The right-hand columns show the labour income of the newly employed relative to that of incumbents. The latest observations are for April 2023.

The higher participation of previously inactive workers may alleviate labour market tightness. It may also contribute towards moderating wage growth, depending on the various factors driving up the labour force. If shifts in entry rates are driven by a positive demand shock (e.g. stronger demand for highly-skilled workers), then we should also observe upward wage pressure for incumbents, but if these shifts are driven by a positive supply shock (e.g. the inflow of migrants), then new labour force entrants may help to constrain incumbents' wage demands.

We use an estimated model for the euro area to quantify the key drivers of the labour force and their relative importance over the cycle.[4] The model aims to identify the effects of the underlying forces from technology and aggregate demand conditions, as well as other drivers such as demographics, job search efforts or number of hours worked (labour supply), the mismatch between labour demand and supply, and the bargaining power of workers, reflecting, for instance, adjustments in minimum wages.

The model shows that aggregate demand and supply conditions have both been key drivers since the pandemic. Each bar in Chart D represents the individual contribution of structural shocks in deviations from the deterministic components estimated over the period from the first quarter of 1998 until the first quarter of 2023. Aggregate supply conditions (blue bars) and demand conditions (yellow bars) account for the bulk of the fall in the labour force during the pandemic and the rise during the post-pandemic recovery. These drivers account for

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[4]   Based on Consolo, A., Foroni, C. and Martínez Hernández, C., "A Mixed Frequency BVAR for the Euro Area Labour Market", *Oxford Bulletin of Economics and Statistics*, Vol. 85, No 5, October 2023, pp. 1048-1082. The empirical model is an MF-BVAR estimated using information on inflation, industrial production, wages, unemployment, job vacancies and the labour force. The model is an empirical representation of a general equilibrium model in which both aggregate and labour market-specific shocks determine the dynamics of the labour force.

technological changes, pandemic-related mobility restrictions, changes in aggregate demand and asymmetric sectoral changes.

Beyond this, labour market-specific shocks provided further labour force impetus. The rise in workers' bargaining power (green bars) is probably associated with (i) the widespread increase in minimum wages, which has helped to encourage marginal workers back into the labour force, (ii) the decline in immigration during the COVID-19 years and (iii) growing labour shortages. The improved labour supply (red bars), in turn, is probably associated with the more recent catch-up in immigration flows. Misalignments between the demand and supply of sector-specific skills nevertheless continue to be a drag on the labour force, as captured by the growing negative contribution from the mismatch shock (turquoise bars).

Chart D
Model determinants of the labour force

(percentages; percentage point contributions)
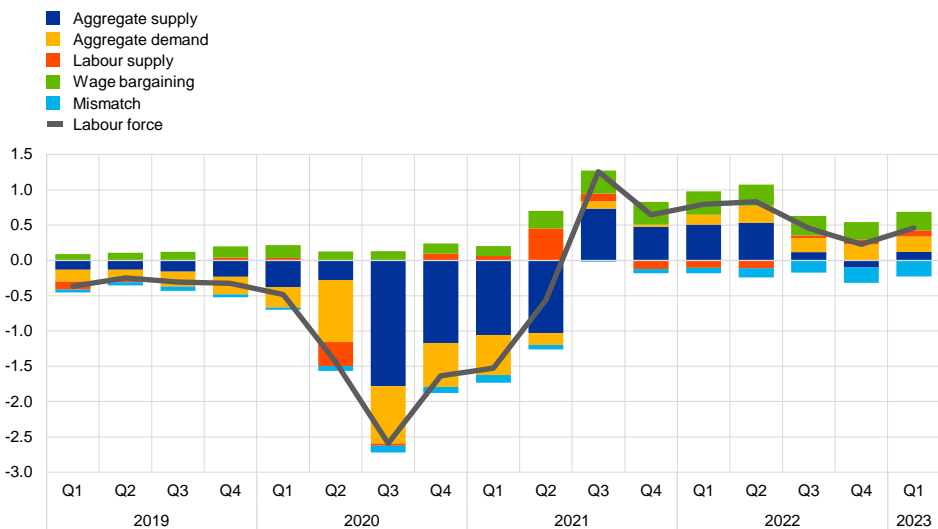
Sources: Eurostat and authors' calculations.
Notes: See footnote 4 for more information on the model. The latest observations are for the first quarter of 2023.

To conclude, the strong increase in the labour force has important implications for understanding labour market dynamics and the cyclical position of the labour market. First, as there are more people willing to work in addition to those unemployed, a cyclical measure of labour market slack needs to take account of the increasing share of transitions from inactivity to employment. Second, all other factors being equal, the increase in the labour supply is likely to have a mitigating effect on wage pressure.

4 What do consumers think is the main driver of recent inflation?

Prepared by Dimitris Georgarakos, Omiros Kouvavas, Aidan Meyler and Pedro Neves

Consumers' perceptions of the factors driving inflation can be an important determinant of their economic behaviour and their inflation expectations. In general, individual beliefs driven by prevailing narratives have an impact on both actions and expectations.[1] One such narrative that can impact economic behaviour is beliefs about the sources of inflation. The question of what is mainly behind rising prices has become more acute of late.[2] This matters, as it can affect consumer expectations about future inflation and their actual behaviour.[3] Against this backdrop, in June 2023 the ECB's Consumer Expectations Survey asked consumers what they believed was the main factor driving changes in the general level of prices for goods and services in their country over the past 12 months.[4] They were offered three possible answers, reflecting the three main accounting factors that can drive pricing from the corporate side (profits, wages and other input costs).[5]

Most consumers believe that price changes were mainly driven by input cost factors, with corporate profits ranked second and wages third. Chart A panel a) shows the distribution of responses. Other (non-wage) input costs, which includes energy and intermediate inputs, was chosen by a clear majority of respondents (around 65%). Firms' profits ranked second as an explanation, with around 25% of

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[1] For how narratives drive events and behaviour, see, for example, Shiller, R.J., *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*, Princeton University Press, 2019.

[2] See Lagarde, C., "Breaking the persistence of inflation", speech at the ECB Forum on Central Banking 2023 on "Macroeconomic stabilisation in a volatile inflation environment" in Sintra, Portugal, 27 June 2023; Bernanke, B. and Blanchard, C., "What Caused the U.S. Pandemic-Era Inflation?", paper prepared for the "The Fed: Lessons learned from the past three years" conference at the Hutchins Center on Fiscal & Monetary Policy at the Hutchins Institution, 23 May 2023; Hansen, N.-J., Toscani, F. and Zhou, J., "Europe's Inflation Outlook Depends on How Corporate Profits Absorb Wage Gains", IMF Blog, International Monetary Fund, 26 June 2023.

[3] If, for example, consumers believe that inflation is due to higher input costs (e.g. energy and raw material prices), they likely hold a more transitory view of inflation. This may lead inflation expectations to converge more quickly on the target. At the same time, if they believe that wages or profits are the main driver of inflation, this might imply more persistent and de-anchored future inflation expectations. Additionally, when consumers perceive that high prices are due to input costs for firms, they might be more willing to pay higher prices than if they think that firms' profits are the main driver.

[4] The question reads: "According to your view, what is the main factor driving the change in the general level of prices for goods and services in your country during the past 12 months". The options were: "1. The main driver is firms' profits", "2. The main driver is wage costs for firms", "3. The main driver is other input costs for firms (e.g. energy, raw material or other business costs)". The sample included the six largest euro area economies (Belgium, Germany, Spain, France, Italy and the Netherlands) and consists of 10,308 responses across all countries (Belgium: 845, Germany: 1,797, Spain: 2,268, France: 2,264, Italy: 2,267, the Netherlands: 867).

[5] Owing to the possibility of order effects, which could result in respondents favouring the first or last option, the ordering of the options was randomised for the more than 10,000 respondents. While the ordering of the options had a statistically significant impact on the responses, it was economically small and had no meaningful impact on the aggregate averages or rankings across the three options.

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respondents choosing this option, and wages third with 8%. The relative ranking of options was consistent across countries and all possible demographic breakdowns.[6]

Chart A

Perceived main drivers of inflation

a) Overall

(percentages of consumers)
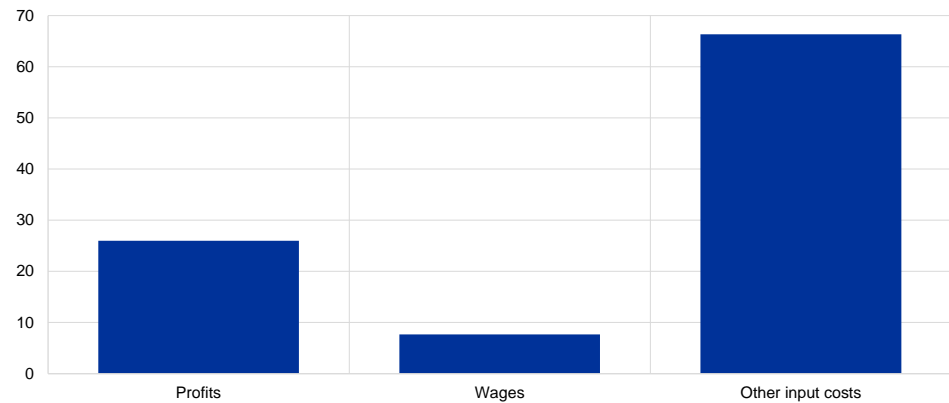
b) Breakdown by selected respondent group

(percentage points, difference in share of responses)

Source: ECB (Consumer Expectations Survey).
Notes: Panel a: weighted estimates. Share of respondents choosing each option. Panel b: weighted estimates. Differences in the share of each option by group. High financial literacy is set against non-high financial literacy (i.e. scores below 4 in the 1-5 scale). High education is considered as a bachelor's degree or higher, and the responses are set against all others. Price-setters are a subset of respondents who indicated that they have specific management responsibilities for price-setting and contract-related matters in particular.

Knowledge of the pricing strategies of firms as well as higher levels of financial literacy and education are associated with other input costs being more frequently indicated as the main driver. Chart A panel b) shows how the results change for specific characteristics of the respondents. Respondents in management positions with explicit price-setting and contract-related responsibilities (which means they have knowledge of pricing strategies) tend to respond more

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6   The relative ranking of the options is unchanged for every possible breakdown. While there are some differences in magnitudes across demographics, these do not alter the rankings.

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frequently than others that other inputs were the main reason.[7] A similar picture emerges when looking at respondents with high levels of financial literacy or education.

Although wages were ranked third (i.e. lowest) across all countries, there is a correlation between country-specific beliefs and wage developments in the country concerned. While wages were ranked lowest across all countries, there are some cross-country differences. Less than 6% of respondents from Spain and Italy chose wages as the main factor, whereas more than 10% opted for wages in Belgium and the Netherlands. Chart B panel a) shows the responses by country together with the actual figures for negotiated wage growth. Belgium and the Netherlands, which have higher percentage growth in actual wages, also have the higher number of respondents choosing wages as the main driver of inflation.

Respondents with wage-setting responsibilities are more likely to select wages as the main driving factor. Chart B panel b) ranks the wage option by group. Those who play an active role in setting wages are indeed more likely to choose this option. This might reflect a greater awareness of the importance of wages in firms' cost structures compared with consumers who only observe their personal incomes. More specifically, managers with wage-setting responsibility and respondents who are classified as self-employed with employees are more likely to choose wages as the main driver. By contrast, employees and self-employed without employees tend to refer to wages as the main driver less often.

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[7] Respondents with management responsibilities (either price- or wage-setting) account for around 14.5% of the matched sample. In more detail, respondents with management positions with contract-related and price-setting responsibilities account for 11.7% (N=1,065) of the total matched sample, while respondents with wage-setting responsibilities account for 6.4% (N=582) of the matched sample.

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Chart B

Wages perceived as the main driver of inflation

a) Breakdown by country

(percentage of respondents, annual percentage changes)

■ Wages as the main driver of inflation
● Negotiated wage growth (right-hand-scale)
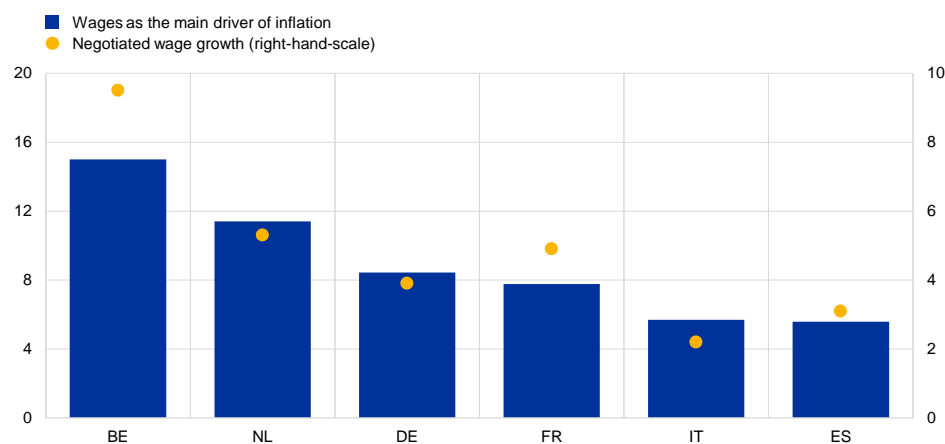
b) Breakdown by selected respondent group

(percentage of respondents)

■ Self-employed without employees
■ Employees
■ Wage-setting managers
■ Self-employed with employees
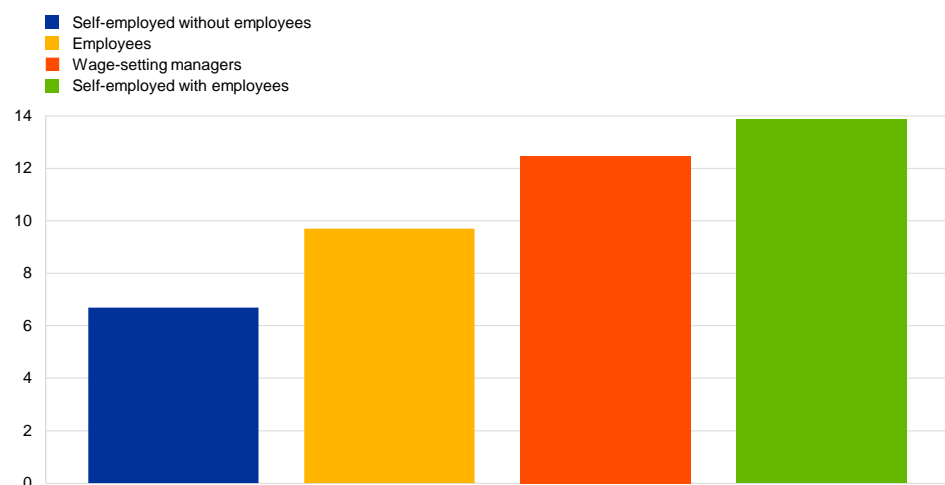
Source: ECB (Consumer Expectations Survey).
Notes: Panel a: weighted estimates. "Negotiated wage growth" refers to the annual growth rate in negotiated wages in the first quarter of 2023, including one off payments. Panel b: weighted estimates. Share of respondents in each group choosing wages as the main driver of inflation. Self-employed is split into those with and without employees. Wage-setting managers are a subset of the respondents who specifically indicate that they have wage-setting responsibilities.

Respondents stating that other input costs are the main driver expect inflation to be less persistent. Specifically, they tend to have lower medium-term inflation expectations and a lower pass-through from short-term expectations to medium-term expectations. Table A quantifies the correlation between answers and medium-term inflation expectations (controlling for education, financial literacy, country and time fixed effects).[8] The results suggest that the input cost explanation is associated with a lower level of medium-term expectations, averaging 0.46 percentage points, compared with a base group of respondents selecting profits as the main factor. Additionally, looking at the pass-through from short-term expectations to medium-

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[8]   We control for some other variables that may affect inflation expectations in an attempt to identify the pure effect of the belief in what drives inflation and not possible confounding factors like education or financial literacy.

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term expectations, the conditional impact of respondents answering "other input costs" reflects a pass-through rate of 32% compared with an unconditional pass-through rate of 60%.[9] Finally, the expected probability of the ECB maintaining price stability is 3.5-3.6 percentage points higher for respondents answering "other input costs" rather than the other two options. This positive association is stronger than the association with education, financial literacy or income.

Table A
Inflation expectations and drivers of inflation

| Model | Main drivers of inflation | | Financial literacy | | Education level | | Inflation expectations one year ahead | One year ahead interaction with wages | One year ahead interaction with other input costs | Country controls | Time fixed effects |
	Wages	Other input costs	Medium	High	Medium	High					
Dependent variable:											
Inflation expectations three years ahead	-0.2	-0.46**	-0.82***	-1.87**	-0.69**	-1.13**				Yes	Yes
	-0.156	-0.09	-0.122	-0.112	-0.134	-0.125					
Inflation expectations three years ahead	0.45	-0.31**	-0.43**	-0.91**	-0.59*	-0.89**	0.60**	0	0.03**	Yes	Yes
	-0.142	-0.086	-0.096	-0.088	-0.106	-0.099	-0.005	-0.01	-0.006		
Probability of target being met in three years		3.60**	1.51**	3.60**	-0.71	1.27**				Yes	Yes
		-0.42	-0.63	-0.58	-0.69	-0.66					
Probability of target being met in three years		3.48**	1.52**	3.33**	-0.78	1.13**	-0.37**			Yes	Yes
		-0.42	-0.68	-0.58	-0.68	-0.65	-0.02				

Source: ECB (Consumer Expectations Survey).
Notes: Weighted estimates. The sample captures most of the respondents to the drivers of inflation question (around 9,500), excluding only a few observations that were not matched. Categories are shown in relation to the base category, which is "profits" for the answers and "low" for financial literacy and education. Financial literacy is defined as: low = scores 1-2, medium = 3, high = 4-5. Education is defined as: low = up to lower secondary, medium = high school up to university, high = tertiary education.
* denotes significance at a 10% level. ** denotes significance at a 5% level. *** denotes significance at a 1% level.

The choice of "other input costs" as the main driver of inflation correlates with consumers reporting beliefs that the ECB will be able to maintain price stability in three years' time. The view that other input costs are the main factor (and therefore the likelihood that respondents interpret inflation drivers as being more transitory) strongly correlates with consumers' beliefs that the ECB will be able to deliver price stability in three years' time.[10] Chart C shows that the perceived

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[9] To calculate the conditional impact, we add the pass-through of one year ahead expectations to three-years ahead expectations (0.60) with the answer 3 dummy (-0.31) and the interaction term (0.03). The marginal effect increases (0.03) as the one year expectation increases, but it starts from a significantly lower level (-0.31) for the respondents who chose "other input costs" as the main driver.

[10] The unconditional median probability currently stands at 42%. It is, however, hard to interpret this indicator without a longer time series. The analysis therefore focuses on the cross-sectional differences. The underlying indicator was devised in the context of a research project aimed at examining the effectiveness of the ECB's communication regarding its 2021 strategy review; see Ehrmann, M., Georgarakos, D. and Kenny, G., "Credibility gains from communicating with the public: evidence from the ECB's new monetary policy strategy", *Working Paper Series*, No 2785, ECB, 2023.

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median probability of the ECB maintaining price stability in three years' time is highest when the "other input costs" explanation is chosen. It is lower when wages are chosen and lowest when profits are chosen as the main factor driving inflation.

Chart C

Perceived likelihood of the ECB maintaining price stability in three years' time and beliefs about the sources of inflation

(percentage points)
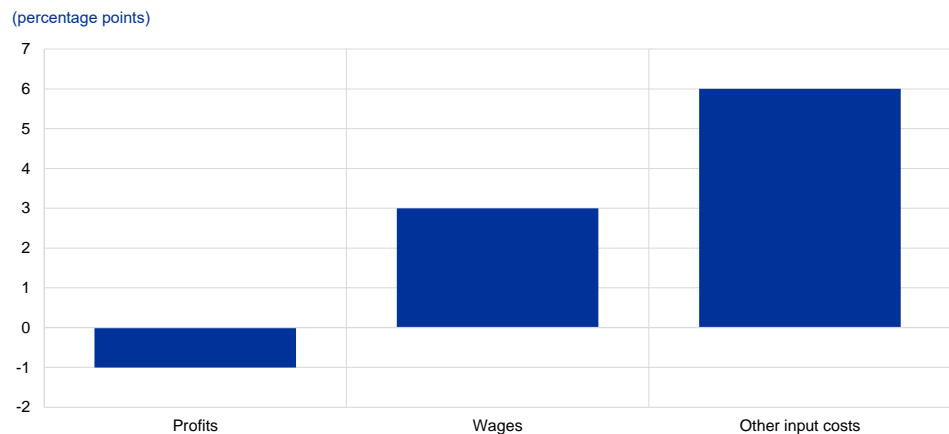
Source: ECB (Consumer Expectations Survey).
Notes: Weighted estimates. Bars report the median probability by factor minus the overall median probability. Probabilities or likelihood that the ECB will maintain price stability calculated, by answers to the question: "How likely do you think it is that the European Central Bank (ECB) will maintain price stability in the euro area economy over the next 3 years?". Possible answer range 1-100.

All in all, this new evidence from the Consumer Expectations Survey suggests that perceptions about the main drivers of current inflation are associated with how consumers form their medium-term inflation expectations. While most respondents viewed other input costs as the main driver of inflation in the 12 months to June 2023, whether profits or wages are perceived as a more prominent driver warrants close monitoring going forward. It will also be useful to track whether this would be associated with a potential upward impact on medium-term inflation expectations and with a reduced perceived likelihood of the ECB being able to maintain price stability over the medium term.

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5 Climate change and euro area firms' green investment and financing – results from the SAFE

Prepared by Annalisa Ferrando, Johannes Groß and Judit Rariga

This box examines how euro area firms perceive climate change risks as well as their investment plans and financing needs to mitigate the impacts of climate change. Between 25 May and 26 June 2023 the European Central Bank (ECB) conducted a pilot round of the Survey on the Access to Finance of Enterprises (SAFE), which for the first time included specific questions related to the impact of climate change on euro area firms.[1] Specifically, firms were asked about: i) the importance they attach to the consequences of physical and transition risks, ii) their investment behaviour to mitigate risks or reduce the negative environmental impact of their economic activities; iii) different financing sources chosen to fund climate change-related investments and iv) potential impediments to the necessary financing.

Existing literature commonly groups climate risks, based on their drivers, into physical risks and transition risks. Physical risks arise from the physical impact of climate change on the economy, including extreme weather events and changing climate patterns. Transition risks arise from the implementation of stricter climate standards, regulations and carbon pricing to foster the transition to a low-carbon economy. Physical risks can be further subdivided into acute physical risks, which are related to natural hazards such as wildfires, storms and floods, or chronic risks which are related to longer term shifts in climate patterns resulting in the degradation of natural environment and depletion of natural resources.[2]

Concerns about the consequences of climate change over the next five years are quite widespread across euro area firms (Chart A). In the survey, 60% of euro area firms indicated that transition risks related to stricter climate standards are "very important" for them.[3] Large firms were more concerned about transition risks arising from stricter climate standards, regulation and carbon pricing than small and

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[1] The aim of this SAFE pilot round was to assess several changes that are foreseen for the survey, namely (i) increasing the frequency of the survey from semi-annual to quarterly to provide more timely information on the financing conditions of firms, (ii) including new quantitative forward-looking questions on key economic variables and (iii) allowing for new ad-hoc questions. The results of this pilot round have not to date been published on the ECB website. The publication is envisaged after the completion of the quality assessment of the replies. The SAFE pilot round included a smaller sample of euro area firms compared with the regular survey. The sample was chosen using a stratified random sampling by country, size classes and economic activity to keep it representative of the population of euro area firms. The total sample size was 5,733 firms, of which 5,233 (91%) were SMEs (with fewer than 250 employees). The pilot survey covers firms in Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Slovakia and Spain.

[2] See Bank for International Settlements, Climate-related risk drivers and their transmission channels, April 2021 and Network for Greening the Financial System, Macroeconomic and financial stability implications of climate change, July 2019. See also the ECB blog post by Frank Elderson The economy and banks need nature to survive, June 2023.

[3] Similar results were found in the ECB survey of leading firms on the impact of climate change on economic activity and prices, run in early 2022. When asked about the main impact of climate change on their business, around two-thirds of respondents referred to risks associated with the transition to a net-zero economy, while half of them also pointed to physical risks originating from the changing climate. The impact of climate change on activity and prices – insights from a survey of leading firms, *Economic Bulletin*, Issue 4, ECB, 2022.

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medium-sized enterprises (SMEs). Moreover, 39% of the respondents were very concerned about natural hazards (score of 7 and above on a scale of 1 to 10), while 48% reported the same level of concern about environmental degradation. This indicates that there are more firms concerned about the consequences of environmental degradation, even if they do not judge their own activities to be vulnerable to immediate natural hazards.

Chart A

Importance of climate change consequences for euro area firms over the next five years
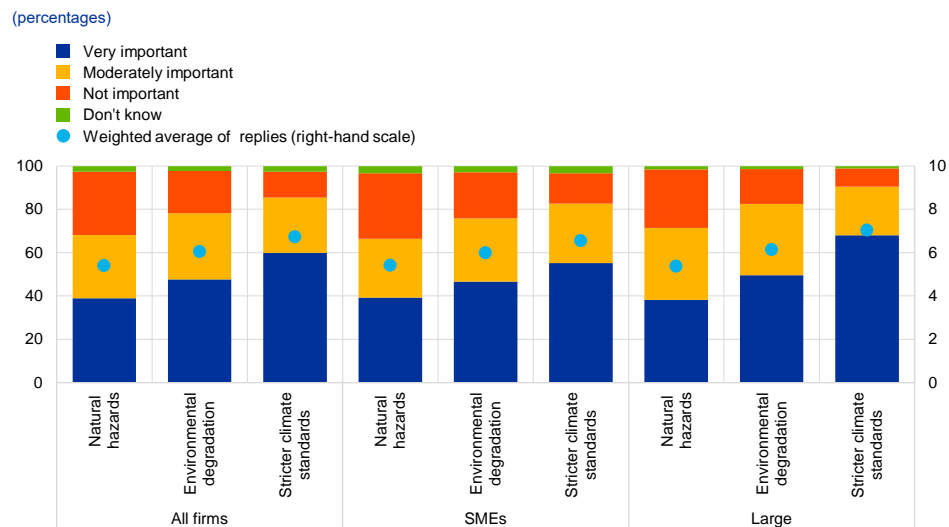
(percentages)

Sources: ECB and European Commission SAFE.
Notes: Firms were asked to indicate how important the consequences of climate change are for their current business model five years ahead on a scale of 1 (not at all important) to 10 (extremely important). On the chart, the scale has been divided into three categories: low (1-3), moderate (4-6) and high importance (7-10). The average score is weighted by size class, economic activity and country to reflect the economic structure of the underlying population of firms.

Firms are concerned about physical risk originating from climate change particularly in coastal areas and regions where the occurrence of wildfires has been higher, whereas transition risk concerns are more evenly spread across regions in the euro area (Chart B). A regional analysis of the importance that firms attach to the consequences of climate change reveals that concerns over natural hazards are more prominent in coastal regions or areas historically vulnerable to droughts, wildfires or floods, particularly in Southern European and Nordic countries (Chart B, panel a, left). By contrast, concerns about environmental degradation are concentrated mostly in regions affected by tourism or heavy industry (Chart B, panel a, right). Meanwhile, transition risk is not only a concern for more firms than physical risk is, as shown in Chart A, but is also more uniformly distributed across euro area regions (Chart B, panel b). Since climate regulations are mainly determined at national or European level, the level of importance that firms attach to transition risk is more homogeneous within each country compared with concerns about physical risk, which are more regionally clustered.

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Chart B

Importance of consequences of climate change for the next five years – geographical distribution

a) Physical risk

(weighted average scores)

Natural hazard risk
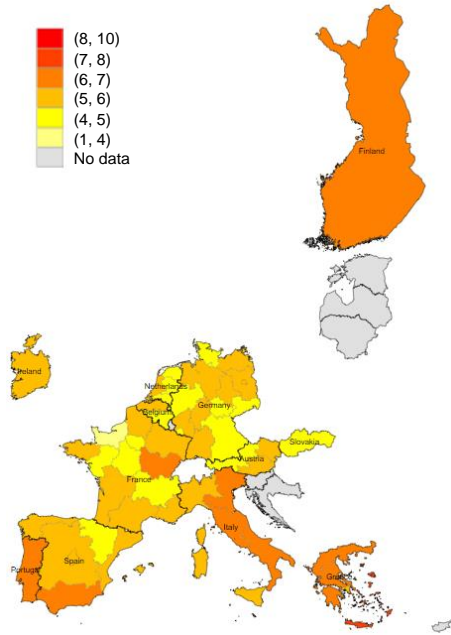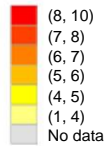
Degradation risk
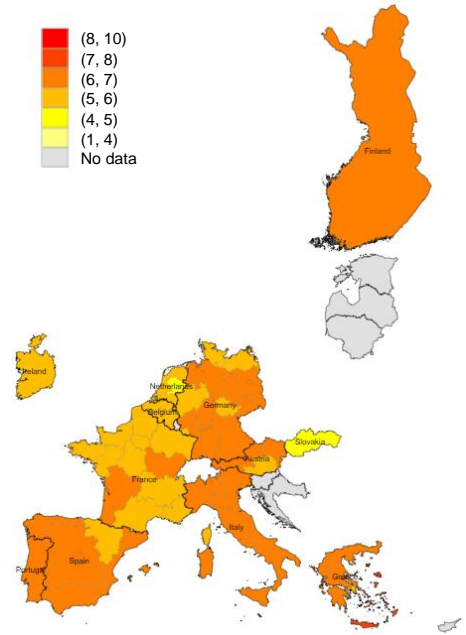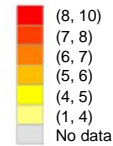
b) Transition risk

(weighted average scores)
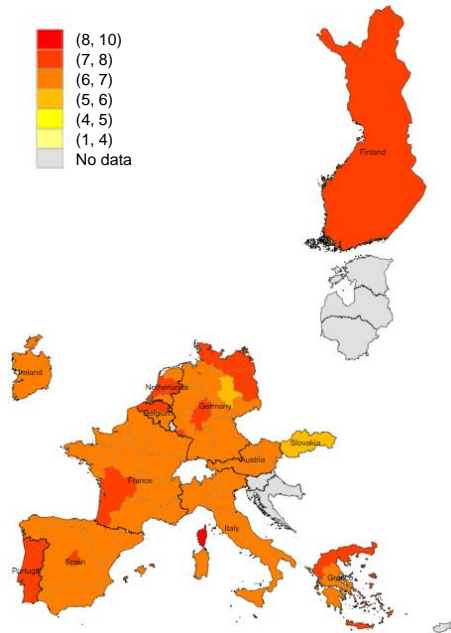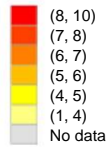
Sources: ECB and European Commission SAFE.
Notes: The maps show the weighted average score for the importance of consequences of climate change for firms over the next five years by main socio-economic regions based on NUTS1 (2016 classification) in the euro area. Firms were asked to indicate how important the consequences of climate change (natural hazards, environmental degradation and stricter climate standards) are for their current business model five years ahead on a scale of 1 (not at all important) to 10 (extremely important). The weighted average scores at NUTS1 level are averages of the responses within each bracket weighted by size class, economic activity and country to reflect the economic structure of the underlying population of firms.

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Concerns of firms about natural hazard risks at country level reflect past losses and are correlated with expected future risks (Chart C). The upper panel of Chart C shows a clear positive relationship between the survey-derived weighted average score of the relevance of natural hazard risks for firms' business activity and cumulative past losses incurred from different disasters in the last 40 years at country level.[4] However, the correlation is less strong when comparing survey-based country scores – grouped into low, medium and high risk buckets – with a forward looking measure derived from approximating banks' expected annual losses on corporate loans due to natural hazards in a climate baseline scenario (Chart C, bottom).[5] Higher risk assessments by firms are only weakly correlated with significantly higher expected future losses stemming from climate change. Moreover, in buckets where firms attach high importance to the risk of natural hazards, the distribution of expected losses is wider. This could indicate that future climate change developments are not yet fully accounted for in the risk assessments of firms, given the degree of uncertainty surrounding future climate scenarios.

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[4]   See Natural Catastrophe Database (CATDAT) for more information related to data on past losses due to climate change.

[5]   Based on the European Commission Joint Research Centre (JRC) baseline scenario (JRC 2017), the expected annual losses at country level due to natural hazards (coastal and river flooding and windstorms) are approximated by the sum of firm-level risk scores exposure-weighted by firms' share of loans, debt and equity exposures vis-à-vis financial institutions. The firm-level risk scores indicate the portfolio share annually at risk in terms of total assets estimated using JRC damage functions (Huizinga, De Moel and Szewczyk 2017). For further details on the analytical indicators on physical risks and methodology see ECB Climate-Related Indicators – Analytical indicators on physical risks.

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Chart C

Importance of natural hazard risks five years ahead with respect to past and expected losses due to hazard risk

a) Historical hazard risk losses

(y-axis: weighted average scores for survey replies; x-axis: EUR millions)
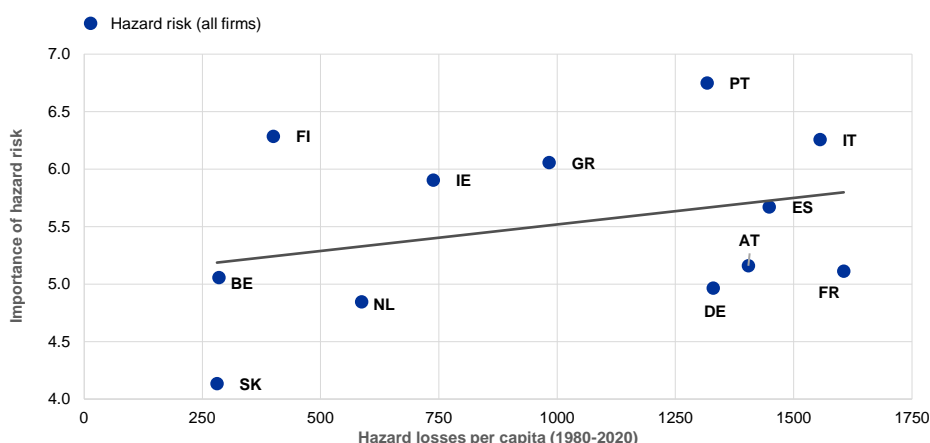
b) Expected future risks

(y-axis: percentage; x-axis: risk groups of survey replies)
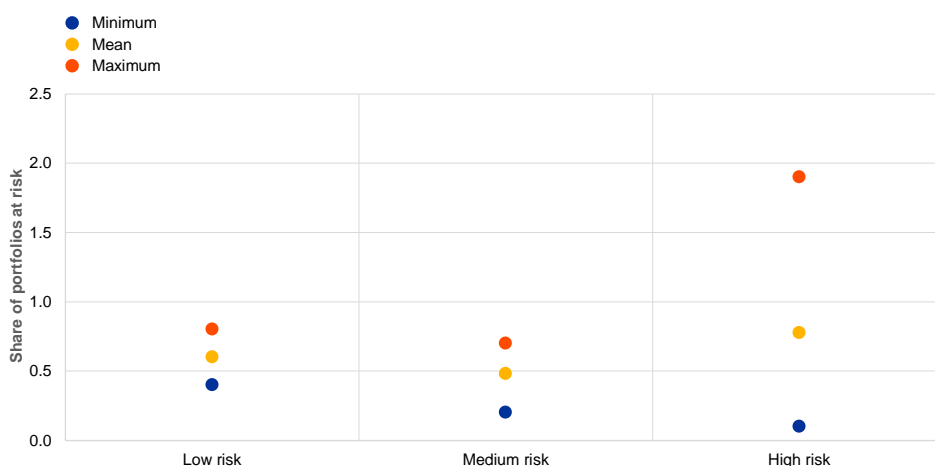
Sources: ECB and European Commission SAFE, Integrated Natural Catastrophe Database (CATDAT), ECB analytical indicators on physical risk and ECB calculations.
Notes: Firms in SAFE were asked to indicate how important the consequences of natural hazard risks are for their current business model five years ahead on a scale of 1 (not at all important) to 10 (extremely important). The weighted average scores plotted on the y-axis of panel a are averages of the responses at country level using the weighted number of respondents. The x-axis in panel a indicates the value of economic damage caused by weather and climate-related extreme events for the period 1980-2020. The y-axis in panel b shows the distribution of normalised exposure at risk, which quantifies from banks' perspective the share of portfolio at risk via their loans, debt, and equity exposures to non-financial corporations at country level. On the x-axis of panel b, countries with average hazard risk score values below 5 are classified as low-risk, medium risk if the value ranges between 5 and 6 and high risk in case the value is above 6. Panel b excludes NL since the expected annual loss measure does not consider the current and future mitigation measures leading to NL being classified as an outlier.

Most firms judged to have sufficiently invested or plan to invest to address climate change. Half of euro area firms judge that they have sufficiently invested to dampen their own negative environmental impact, while 24% of firms plan to invest within the next five years. At the same time, 32% indicated that they have invested and 23% that they plan to do so within the next five years to mitigate the impact of natural hazard risk. Across size classes, large firms seem to be more active in reducing the negative environmental impact of their activity.

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Stricter climate standards provide a stronger incentive for firms to invest in climate change mitigation than natural hazards or the degradation of the environment (Chart D). Reduced-form regressions investigating the joint impact of the three main risks of climate change on firms' climate-related investments suggest that stricter climate standards might drive firms to invest relatively more (10 pp) than natural hazard risks (7 pp) or environmental degradation (6 pp).[6] However, when focusing only on SMEs, stricter climate standards are not significantly more likely to affect investments compared with concerns related to natural hazards or the degradation of the natural environment. By contrast, for large firms, stricter climate standards are more important for their investment plans. Overall, it might be easier for firms to assess the costs associated with stricter standards (e.g. a carbon tax), than the likelihood and consequences of a natural disaster. Therefore, stricter standards might provide a stronger incentive for firms to invest in climate change mitigation. Large firms should be also more aware of their climate impact given the increasing pressure to report on sustainability issues.[7]

Chart D

Consequences of climate change and investment to mitigate its impact
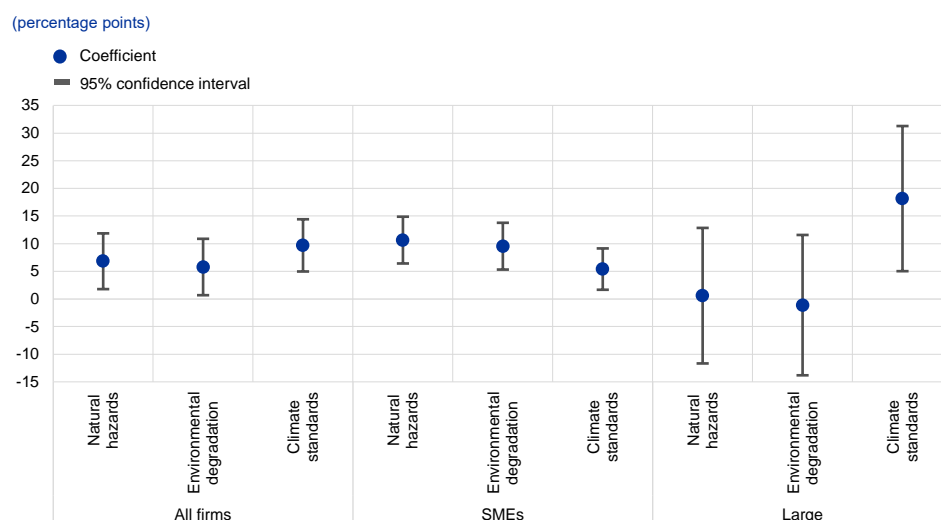
Sources: ECB, European Commission SAFE and ECB calculations.
Notes: The chart plots regression coefficients showing the impact of consequences of climate change for euro area firms for the next five years on realised or planned climate-related investment. Dummy variables natural hazards, environmental degradation and stricter climate standards take value 1 if the firm indicates that these concerns are very important, i.e. taking at least value 7 on a scale from 1 (not at all important) to 10 (extremely important). The outcome variable is 1 if firms have invested or plan to invest within the next 5 years in mitigating the risk of natural hazards or their own negative environmental impact. We control for firms' turnover, labour costs, non-labour input costs, interest expenses and the regression covers firm size (employment), time, industry and location fixed effects on the NUTS1 level. Whiskers represent 95% confidence intervals.

Several obstacles were indicated as hampering access to the financing necessary for investments to mitigate natural hazard risks or comply with

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6   Existing literature also emphasises the role of carbon taxes in encouraging production and innovation in green technologies. See Acemoglu, D., Aghion, P., Bursztyn, L. and D. Hemous, "The Environment and Directed Technical Change", *American Economic Review*, Vol. 102, No. 1, February 2012 and Acemoglu, D., Akcigit, U., Hanley, D. and W. Kerr, "Transition to Clean Technology", *Journal of Political Economy*, Volume 124, No. 1, February 2016. While most EU firms are concerned about physical risk, few invest to become more resilient, see European Investment Bank, "What drives firms' investment in climate action? Evidence from the 2022-2023 EIB Investment Survey", 14 June 2023.

7   See more details on the European Union's legislation on Corporate Sustainability Reporting concerning large and listed firms (including listed SMEs).

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stricter climate standards (Chart E). More than half of the firms indicated too high interest rates or financing costs and insufficient public subsidies as being very important obstacles to securing climate-related investment.[8] Firms may consider the costs to be high as they might not be sufficiently internalising the benefits of addressing climate change risks. Too high environmental reporting costs were also quoted as a very important obstacle by 45% of firms, whereas 37% of firms considered the lack of investors' willingness to finance green investment a very important concern. For SMEs, all obstacles to securing financing for investment are of greater concern than for large firms.

Chart E

Obstacles to securing financing for investments to mitigate natural hazard risks or comply with stricter climate standards

(percentages)
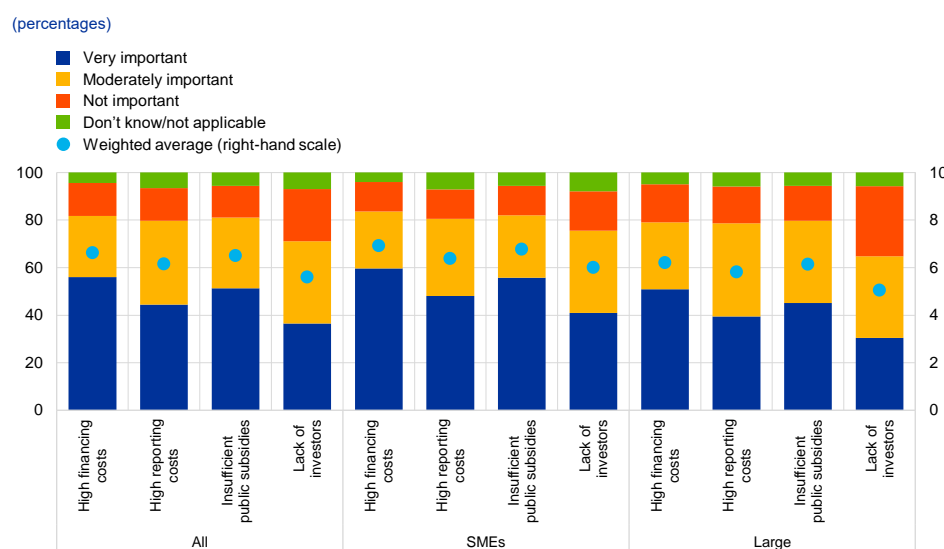
Sources: ECB and European Commission SAFE.
Notes: Firms were asked to indicate how important the obstacles are to securing financing for investments to mitigate natural hazard risks or comply with stricter climate standards on a scale of 1 (not at all important) to 10 (extremely important). On the chart, the scale has been divided into three categories: low (1-3), moderate (4-6) and high importance (7-10). The sample comprises firms that already invested or plan to invest in green policies.

Survey results highlight the important role played by public loan guarantees and private sector funds in directing resources towards the greening of the economy (Chart F). Besides non-subsidised loans and retained earnings, subsidised loans are a relevant source of financing for enterprises, more so for SMEs than for large firms. In the first half of 2023, the SAFE indicate that 19% of firms used non-subsidised loans to finance their business, whereas only 9% of firms used subsidised loans. At the same time, for climate-related investment purposes, 24% of firms plan to use non-subsidised loans and a larger share of firms plans to use subsidised loans (34%). Recent results from the ECB's euro area bank lending survey highlight banks' enhanced attention to climate risks and that the increasing reporting requirements alongside with fiscal support measures have a beneficial

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8   De Haas, R., Martin, R., Muûls, M. and Schweiger, H., "Managerial and financial barriers to the green transition", using firm survey data, find that credit constraints as well as weak green management practices hold back corporate investment in green technologies.

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impact on loans for green firms.[9] For instance, banks reported an easing of credit standards and of terms and conditions for new loans to green firms, while an overall tightening was reported for non-green firms. In this regard, banks arguably might still perceive lending to non-green firms riskier compared to their green counterparts.[10] The use of public guarantees might thus mitigate this risk, thereby facilitating the climate transition process also for firms that, while having transition plans, are not considered green by banks.

From the side of firms, reduced-form regressions investigating the joint impact of the sources of finance on climate related investments confirm that the use of subsidised loans and retained earnings increases investment probability by 7 pp and 8 pp, respectively (Chart F, panel b). In addition, results highlight the importance of equity capital to foster firm investment in mitigating natural hazard risk and their own negative environmental impact.[11]

9   See "The euro area bank lending survey – Second quarter of 2023", ECB, 25 July 2023. Depending on data availability, banks surveyed in the BLS used a range of sources to distinguish between green and non-green firms, such as firm-specific information from financial statements, sustainability reports on emission data and, if available, transition plans, especially for larger firms, as well as information collected for new lending to borrowers based on questionnaires (typically related to environmental, social and governance criteria). To assess the climate risk for loans to SMEs, sector-average information and estimates were often used instead, according to the banks.

10 See Buchetti, B., Miquel-Flores, I., Perdichizzi, S. and Reghezza, A., "Greening the Economy: How Public-Guaranteed Loans Influence Firm-Level Resource Allocation", June 2023; Lamperti, F., Bosetti V., Roventini A., Tavoni M. and Treibich T. "Three green financial policies to address climate risks", *Journal of Financial Stability*, Volume 54, June 2021.

11 See De Haas, R. and Popov A., "Finance and Green Growth", *The Economic Journal*, Vol. 133, Issue 650, February 2023, pp. 637–668.

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Chart F

The use of financing sources for investment to mitigate exposure to hazards and climate policy risks

a) Use of financing sources

(percentages)

- Relevant source of financing
- Used in the first and second quarter of 2023
- Used/planned to use for green investment
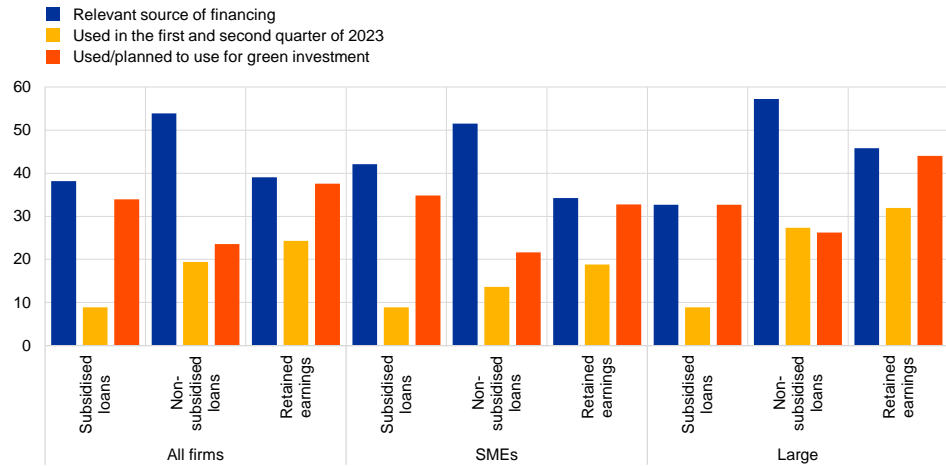
b) Impact of sources of finance on climate related investment

(percentage points)

- ● Coefficient
- — 90 % confidence interval
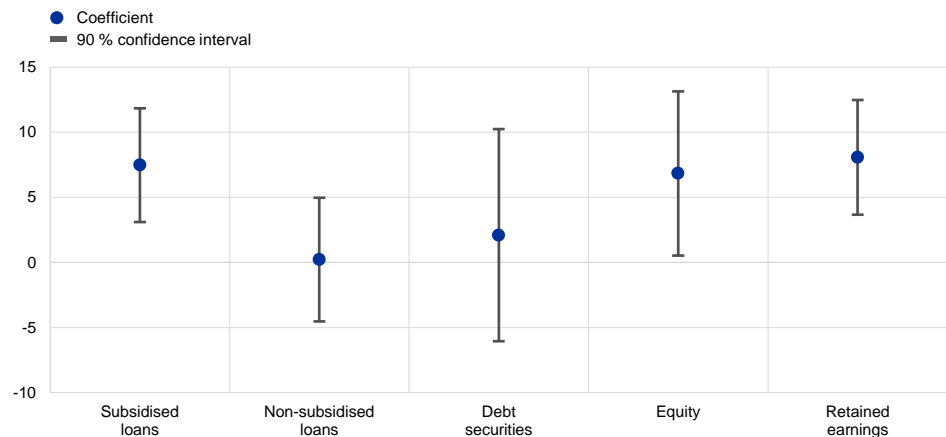
Sources: ECB, European Commission SAFE and ECB calculations.
Notes: Data refer to enterprises that have already invested or plan to invest in green policies. In panel a, blue bars show the share of firms that consider certain types of financing relevant for their business (have used them in the past or consider using them in the future), whereas yellow bars show the share of firms that have used a certain type of finance in the first quarter or the first two quarters of 2023. Red bars show the share of firms that used or plan to use certain types of financing for investment to mitigate exposure to hazards and climate policy risks. Panel b shows regression coefficients for sources of financing for euro area enterprises on realised or planned investment with climate-related purposes. Dummy variables subsidised loans, non-subsidised loans, debt securities, equity and retained earnings take value 1 if the firm indicates that it uses or plans to use these sources of financing for green investment. The dependent variable is a dummy variable that takes the value 1 if firms have invested or plan to invest within the next five years in mitigating the risk of natural hazards or their own negative environmental impact and 0 if the firm has not invested. The regression covers size, time, industry and location fixed effects on the NUTS1 level. Whiskers represent 90% confidence intervals.

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6 Liquidity conditions and monetary policy operations from 10 May to 1 August 2023

Prepared by Jens Budde and Petra Fricke

This box describes liquidity conditions and the Eurosystem's monetary policy operations during the third and fourth reserve maintenance periods of 2023. Together, these two maintenance periods ran from 10 May to 1 August 2023 (the "review period").

The Governing Council raised its three policy rates by 25 basis points at each of its meetings on 4 May 2023 and 15 June 2023. These increases took effect in the third and fourth reserve maintenance periods of 2023 respectively.

Excess liquidity in the euro area banking system declined significantly during the review period. This was due to the maturing of the fourth operation under the third series of targeted longer-term refinancing operations (TLTRO III) and banks' early repayments of other TLTRO funds on 28 June 2023. Another contributing factor, albeit to a lesser extent, was the gradual reduction in the size of the asset purchase programme (APP) portfolio following the Eurosystem's discontinuation of the reinvestments under the APP from 1 July. However, the continued decline in net autonomous factors, which added liquidity to the system, partly offset the reduction in excess liquidity. Net autonomous factors have been falling since the end of the negative interest rate environment in July 2022, owing mainly to the decrease in government deposits.

Liquidity needs

The average daily liquidity needs of the banking system, defined as the sum of net autonomous factors and reserve requirements, decreased by €189.8 billion to €1,836.9 billion in the review period. Compared with the first and second maintenance periods of 2023, this was due almost entirely to a €189.4 billion fall in net autonomous factors to €1,671.9 billion (see the section of Table A entitled "Other liquidity-based information"), driven by a decline in liquidity-absorbing autonomous factors and an increase in liquidity-providing autonomous factors. Minimum reserve requirements decreased only marginally by €0.3 billion to €165 billion.

Liquidity-absorbing autonomous factors decreased by €127.6 billion to €2,804.4 billion in the review period, owing mainly to a decline in government deposits and other autonomous factors. Government deposits (see the section of Table A entitled "Liabilities") fell on average by €113.9 billion over the review period to €255.8 billion, with most of the decline taking place in the third maintenance period. This decline reflects the continued normalisation in the cash buffers held by national treasuries and an adjustment in their cash management strategies as a result of the lower ceiling for the remuneration of government deposits by the national central banks that took effect on 1 May 2023. The average value of

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banknotes in circulation increased by €8.2 billion over the review period to €1,565.3 billion.

Liquidity-providing autonomous factors rose by €62 billion, to stand at €1,133 billion. Net assets denominated in euro increased by €55.7 billion in the review period. This increase was largely the result of a continued fall in the liabilities to non-euro area residents denominated in euro in the third maintenance period. This in turn reflects an adjustment in the cash management strategies of customers of the Eurosystem reserve management services (ERMS), since the remuneration of deposits held under the ERMS framework was also adjusted as of 1 May 2023. Net foreign assets increased by €6.2 billion.

Table A provides an overview of the autonomous factors discussed above and their changes.[1]

Table A

Eurosystem liquidity conditions

Liabilities

(averages; EUR billions)

	Current review period: 10 May 2023-1 August 2023						Previous review period: 8 February 2023-9 May 2023	
	Third and fourth maintenance periods		Third maintenance period: 10 May-20 June		Fourth maintenance period: 21 June-1 August		First and second maintenance periods	
Liquidity-absorbing autonomous factors	2,804.4	(-127.6)	2,823.8	(-104.1)	2,784.5	(-39.3)	2,932.0	(-136.5)
Banknotes in circulation	1,565.3	(+8.2)	1,563.7	(+3.8)	1,567.0	(+3.3)	1,557.1	(-6.1)
Government deposits	255.8	(-113.9)	256.4	(-104.3)	255.2	(-1.2)	369.7	(-62.9)
Other autonomous factors (net)[1]	983.3	(-21.9)	1,003.7	(-3.7)	962.3	(-41.4)	1,005.2	(-67.5)
Current accounts above minimum reserve requirements	14.4	(-6.9)	16.8	(-0.1)	11.8	(-5.0)	21.3	(-16.1)
Minimum reserve requirements[2]	165.0	(-0.3)	164.8	(-1.0)	165.1	(+0.3)	165.3	(-2.0)
Deposit facility	3,919.0	(-126.4)	4,126.4	(+130.3)	3,706.6	(-419.8)	4,045.4	(-241.1)
Liquidity-absorbing fine-tuning operations	0.0	(+0.0)	0.0	(+0.0)	0.0	(+0.0)	0.0	(+0.0)

Source: ECB.
Notes: All figures in the table are rounded to the nearest €0.1 billion. Figures in brackets denote the change from the previous review or maintenance period.
1) Computed as the sum of the revaluation accounts, other claims and liabilities of euro area residents, capital and reserves.
2) Memo item that does not appear on the Eurosystem balance sheet and should therefore not be included in the calculation of total liabilities.

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[1]   For further details on autonomous factors, see the article entitled "The liquidity management of the ECB", *Monthly Bulletin*, ECB, May 2002.

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Assets

(averages; EUR billions)

	Current review period: 10 May 2023-1 August 2023						Previous review period: 8 February 2023- 9 May 2023	
	Third and fourth maintenance periods		Third maintenance period: 10 May-20 June		Fourth maintenance period: 21 June-1 August		First and second maintenance periods	
Liquidity-providing autonomous factors	1,133.0	(+62.0)	1,145.8	(+63.4)	1,119.9	(-25.9)	1,071.0	(+81.8)
Net foreign assets	938.2	(+6.2)	948.2	(+3.3)	927.9	(-20.4)	932.0	(-18.5)
Net assets denominated in euro	194.8	(+55.7)	197.5	(+60.1)	192.0	(-5.5)	139.0	(+100.3)
Monetary policy instruments	5,766.7	(-326.6)	5,986.4	(-38.5)	5,546.8	(-439.6)	6,093.4	(-477.6)
Open market operations	5,766.6	(-326.7)	5,986.3	(-38.5)	5,546.7	(-439.6)	6,093.3	(-477.6)
Credit operations	897.5	(-274.7)	1,102.2	(-17.0)	692.9	(-409.3)	1,172.3	(-454.5)
MROs	6.3	(+5.0)	1.6	(+0.2)	10.9	(+9.2)	1.2	(-0.4)
Three-month LTROs	3.8	(+1.4)	2.1	(-0.0)	5.5	(+3.4)	2.5	(+0.1)
TLTRO III operations	887.5	(-281.1)	1,098.4	(-17.1)	676.5	(-421.9)	1,168.6	(-453.3)
Outright portfolios[1]	4,869.1	(-51.9)	4,884.1	(-21.5)	4,853.8	(-30.4)	4,921.0	(-23.1)
Marginal lending facility	0.1	(+0.1)	0.1	(+0.0)	0.1	(+0.0)	0.1	(+0.0)

Source: ECB.
Notes: All figures in the table are rounded to the nearest €0.1 billion. Figures in brackets denote the change from the previous review or maintenance period. "MROs" denotes main refinancing operations and "LTROs" denotes longer-term refinancing operations.
1) With the discontinuation of net asset purchases, the individual breakdown of outright portfolios is no longer shown.

Other liquidity-based information

(averages; EUR billions)

	Current review period: 10 May 2023-1 August 2023						Previous review period: 8 February 2023- 9 May 2023	
	Third and fourth maintenance periods		Third maintenance period: 10 May-20 June		Fourth maintenance period: 21 June-1 August		First and second maintenance periods	
Aggregate liquidity needs[1]	1,836.9	(-189.8)	1,843.2	(-168.6)	1,830.3	(-12.9)	2,026.6	(-220.4)
Net autonomous factors[2]	1,671.9	(-189.4)	1,678.4	(-167.6)	1,665.2	(-13.2)	1,861.3	(-218.3)
Excess liquidity[3]	3,933.3	(-133.4)	4,143.1	(+130.2)	3,718.3	(-424.8)	4,066.7	(-257.2)

Source: ECB.
Notes: All figures in the table are rounded to the nearest €0.1 billion. Figures in brackets denote the change from the previous review or maintenance period.
1) Computed as the sum of net autonomous factors and minimum reserve requirements.
2) Computed as the difference between autonomous liquidity factors on the liabilities side and autonomous liquidity factors on the assets side. For the purposes of this table, items in the course of settlement are also added to net autonomous factors.
3) Computed as the sum of current accounts above minimum reserve requirements and the recourse to the deposit facility minus the recourse to the marginal lending facility.

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Interest rate developments

(averages; percentages and percentage points)

	Current review period: 10 May 2023-1 August 2023				Previous review period: 8 February 2023-9 May 2023			
	Third maintenance period: 10 May-20 June		Fourth maintenance period: 21 June-1 August		First maintenance period		Second maintenance periods	
MROs	3.75	(+0.25)	4.00	(+0.25)	3.00	(+0.50)	3.50	(+0.50)
Marginal lending facility	4.00	(+0.25)	4.25	(+0.25)	3.25	(+0.50)	3.75	(+0.50)
Deposit facility	3.25	(+0.25)	3.50	(+0.25)	2.50	(+0.50)	3.00	(+0.50)
€STR	3.148	(+0.250)	3.401	(+0.253)	2.400	(+0.498)	2..898	(+0.498)
RepoFunds Rate Euro	3.134	(+0.253)	3.400	(+0.266)	2.402	(+0.774)	2.881	(+0.480)

Sources: ECB, CME Group and Bloomberg.
Notes: Figures in brackets denote the change in percentage points from the previous review or maintenance period. The €STR is the euro short-term rate.

Liquidity provided through monetary policy instruments

The average amount of liquidity provided through monetary policy instruments decreased by €326.6 billion to €5,766.7 billion during the review period (Chart A). The reduction in liquidity was driven primarily by a decline in credit operations.

The average amount of liquidity provided through credit operations fell by €274.7 billion during the review period. This decrease largely reflects the decline in outstanding TLTRO III amounts owing to the maturing of the fourth operation under TLTRO III (€476.8 billion) and banks' early repayments of other TLTRO funds (€29.5 billion) on 28 June in the fourth maintenance period. At the same time, outstanding amounts under the standard Eurosystem refinancing operations (MROs and three-month LTROs) increased slightly in the fourth maintenance period.

The average amount of liquidity provided via holdings of outright portfolios decreased by €51.9 billion during the review period. Net asset purchases under the pandemic emergency purchase programme were discontinued at the end of March 2022, and since then the Eurosystem has been fully reinvesting the principal payments from maturing securities purchased under that programme. With regard to the APP, in line with the decision of the Governing Council, reinvestments of principal payments from maturing securities were reduced on average by €15 billion a month until the end of June and stopped completely as of 1 July.[2]

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[2] Securities held in the outright portfolios are carried at amortised cost and revalued at the end of each quarter, which also has an impact on the total averages and the changes in the outright portfolios.

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Chart A

Changes in liquidity provided through open market operations and excess liquidity

(EUR billions)

- Credit operations
- Outright portfolios
- Excess liquidity
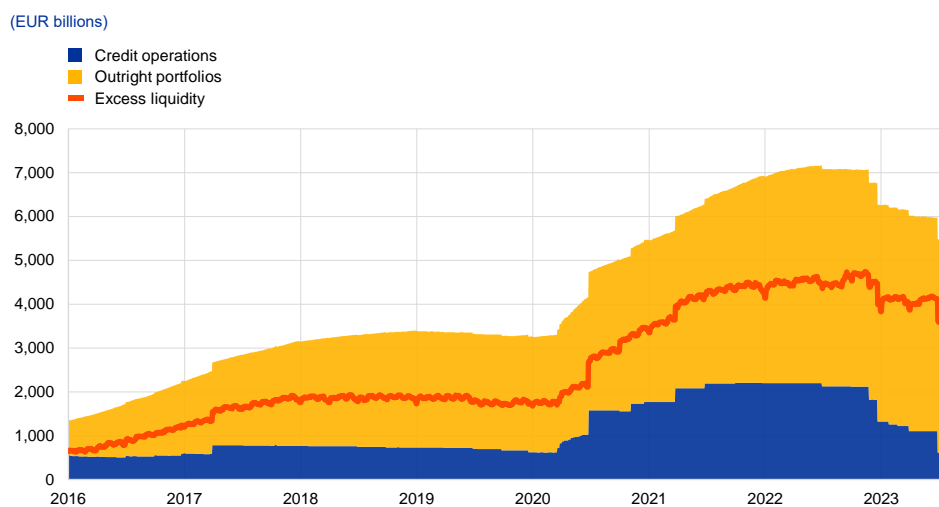
Source: ECB.
Note: The latest observations are for 1 August 2023.

Excess liquidity

Excess liquidity decreased by €467.8 billion from €4,114 billion on the last day of the previous review period, to stand at €3,646.1 billion on 1 August, the last day of the current review period. Average excess liquidity fell by €133.4 billion over the review period, to stand at €3,933.3 billion. Excess liquidity is the sum of banks' reserves above the reserve requirements and the recourse to the deposit facility net of the recourse to the marginal lending facility. It reflects the difference between the total liquidity provided to the banking system and banks' liquidity needs. After peaking at €4,748 billion in November 2022, excess liquidity has progressively decreased, mainly as a result of maturing operations and early repayments under TLTRO III, net of the effects of autonomous factors.

Interest rate developments

The euro short-term rate (€STR) increased by 51 basis points, from 2.894% on 9 May, the last day of the previous review period, to 3.404% on 1 August[3], the last day of the current review period, reflecting the ECB's policy rate hikes. The pass-through of the policy rate increases in May and June 2023 to unsecured overnight money market rates was complete and immediate. On average, the €STR traded at 10.1 basis points below the deposit facility rate during the current review period, similarly to the first two maintenance periods of 2023.

The euro area repo rate, as measured by the RepoFunds Rate Euro index, increased by 55.7 basis points, from 2.881% on 9 May to 3.438% on 1 August

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[3]   The rate on 1 August was also influenced by end-of-month effects in July.

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(see footnote 3). The pass-through of the policy rate increases to the secured money market was also immediate and complete. The functioning of the repo market remained orderly owing to several factors, including higher net issuances since the beginning of the year and the release of mobilised collateral on the back of the maturing TLTROs, as well as a decline in the outstanding APP holdings.

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7 Banks' capital distributions and implications for monetary policy

Prepared by Cyril Couaillier, Maria Dimou and Conor Parle

Banks distribute capital to equity investors by either paying dividends or buying back shares, with ambiguous implications for the transmission of monetary policy via banks. On one hand, capital distributions can be beneficial for monetary transmission in the long run by making banks attractive to investors. First, a capital distribution signals managers' confidence in their bank's expected stream of profits or an assessment that the bank's current stock price is undervalued. Second, dividend distributions enable investors to increase control of the cash generated by the bank and benefit from the accompanying payouts, rather than keeping it fully at the disposal of management. Through these two channels, capital distribution can signal the soundness of a bank to equity investors. This feeds into a lower cost of equity for the bank, making it easier for it to tap financial markets. Ultimately, a lower cost of equity can support banks' financial health, preserving their ability to smoothly transmit monetary policy. On the other hand, capital distributions lower banks' capital ratios, all other factors being equal. These distributions could be a manifestation of past or future economic weakness, as banks may distribute capital that they did not have the opportunity, and do not anticipate the need, to deploy to satisfy loan demand for investments. Distributions would then be consistent with the transmission of monetary policy tightening. Moreover, the reduced intermediation capacity would also feed into the bank-based transmission of the tightening of monetary policy, as lower capital buffers would help to tighten credit conditions. However, in particular during times of uncertainty, excessive or ill-timed payouts can amplify stress and hamper the smooth transmission of monetary policy in a situation where the financial system has been hit by a shock.[1] In some circumstances, this may make the financial system more prone to the risk of financial instability. Banks should therefore follow prudent payout policies.

Since the end of the most acute phase of the pandemic and the expiry of ECB Banking Supervision's recommendation to restrict payouts, banks in the euro area have distributed capital at a rapid pace, especially via significant buyback programmes (Chart A), catching up on forgone distributions in previous years. A new bank-level database of dividends and buybacks of euro area banks, sourced from annual reports, sheds light on the dynamics behind the distribution of equity. These data allow the expected payouts for the financial year 2022 (i.e. planned to be paid out in 2023) to be examined and payout dynamics to be assessed at both a micro and a macro level. ECB Banking Supervision's recommendation in March 2020 to halt capital payouts during the pandemic led to a sharp fall in capital distribution in that year, as many banks cancelled payments they had planned to make out of profits from 2019 (Chart A). In December 2020 this recommendation

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[1] For instance, share buybacks could be the result of chief executive officers' remuneration being tied to the share price. A capital distribution not driven by fundamentals could deplete bank intermediation capacity.

was changed to ask banks to refrain from or limit payouts. Since the expiry of the latter recommendation in September 2021, euro area banks have resumed their payouts, with increased volumes compared with the pre-pandemic years but still short of the distributions that had been planned for 2020 and 2021. While dividends are slightly above their pre-pandemic level, the bulk of the increase in capital distributions stems from share buybacks. These account for 33% of payouts based on 2021 profits and 29% of planned payouts on 2022 profits (Chart A, yellow bars), whereas between 2017 and 2019 buybacks were virtually non-existent.

Chart A

Distributions of dividends and buybacks as a percentage of total assets

(percentages of total assets)

■ Dividends
■ Buybacks
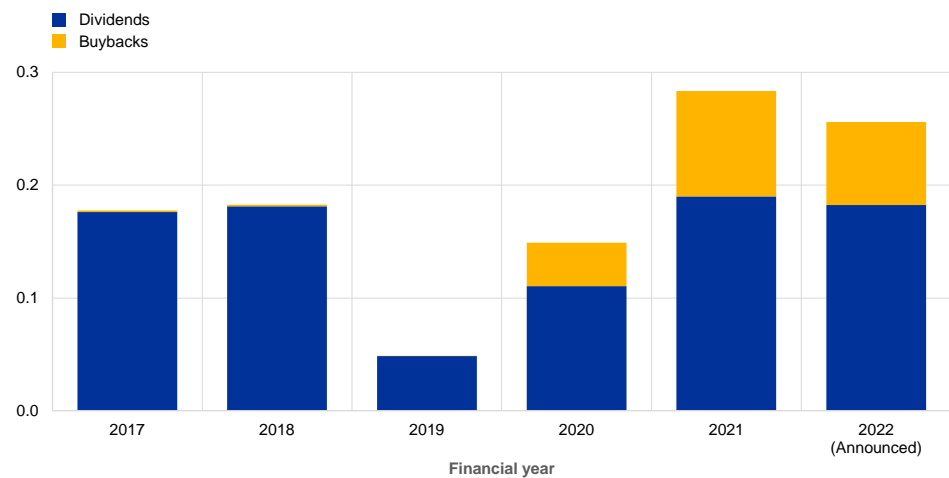
Sources: Banks' financial accounts and ECB calculations.
Notes: The chart shows the aggregate annual value of dividend payments and share buybacks for cancellation purposes for a sample of 57 euro area banks scaled by the sum of the averages of total assets across each year for each bank. Where data for a given financial year are unavailable, total assets for the next financial year are used. Values are taken from annual reports for each bank and represent the sum of both interim payments made before the end of the reference financial year and final payments made after the end of the year, with both types of payment being related to profits during the reference financial year. The latest observations are for the distribution of 2022 profits (to be paid out in 2023).

Chart B

Bank-level realised payout ratios for 2022 profits and target minimum payout ratios
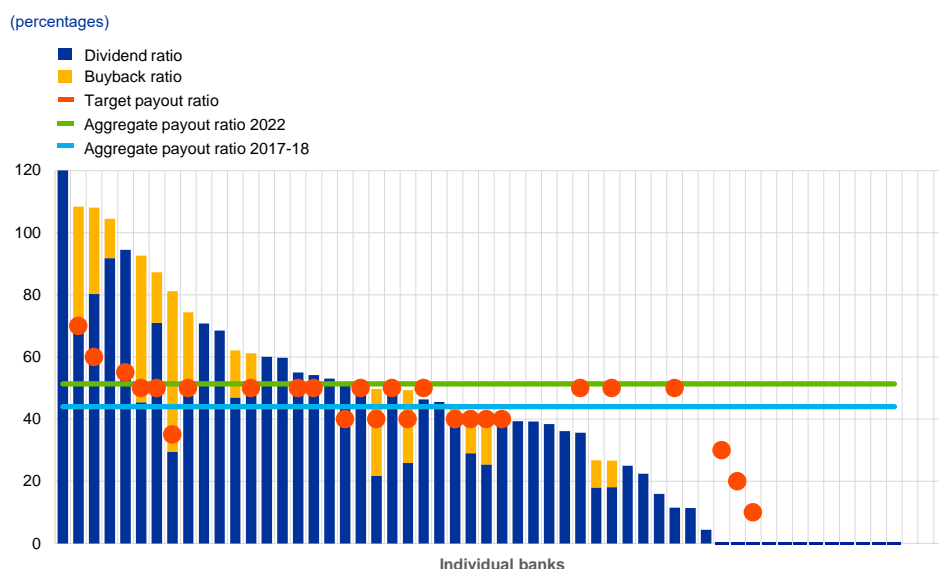
(percentages)

Legend:
- Dividend ratio
- Buyback ratio
- Target payout ratio
- Aggregate payout ratio 2022
- Aggregate payout ratio 2017-18

Individual banks

Sources: Banks' financial accounts, ECB supervisory reporting and ECB calculations.
Notes: The chart plots the total buybacks and dividends for profits attributable to the 2022 financial year as a proportion of net profit for individual banks in that year. The far left bar represents a total ratio of 350% for a bank that made an extraordinary payment in 2023 related to the 2022 financial year. The dots show target minimum payout ratios for a subsample of banks for which such targets are published. The green and light blue solid lines show the aggregate payout ratios (defined as the sum of total payouts divided by the sum of net profits for all banks in the sample) for 2022 and 2017-18 respectively. The period 2019-21 is not included since it was at least partly affected by the pandemic. The small bars on the right-hand side equal to zero correspond to banks with no planned dividends or buybacks for financial year 2022 at the time of the analysis. All ratios relate to the distribution of 2022 profits (to be paid out in 2023).

Payout volumes vary substantially across banks in terms of both the total payout and the importance of extraordinary buybacks (Chart B), while banks' stated plans suggest a further increase in dividends is likely. On aggregate, a sample of listed euro area banks have paid out or intend to pay out approximately 50% of their overall 2022 profits in dividends and buybacks (solid green line in Chart B), considerably above the aggregate payout ratio of 44% for the financial years 2017 and 2018 (the last two years unaffected by the pandemic, solid light blue line in Chart B) but broadly in line with a catch-up vis-à-vis forgone distributions.[2] However, aggregate volumes mask considerable differences across banks, particularly regarding share buybacks (yellow bars in Chart B). The stated reasons for buybacks vary, with some being marked as a structural component, but most being extraordinary.[3] This is suggested, for example, by the fact that most of the differences between actual payout ratios and payout ratio targets taken from banks' public reports correspond to share buybacks. Most banks target payout ratios between 40% and 60%, while others have much lower ratios if they are rebuilding capital after stress periods such as the global financial crisis and sovereign debt crisis (orange dots in Chart B). Moreover, despite the rise in dividends compared with the pre-pandemic period, many banks are still below their targets or do not

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[2] The payout ratio for 2019 profits was low following the ECB's recommendation, and was followed by a considerably larger ratio for 2020 profits as payouts to some extent resumed. The payout ratio for 2019 and 2020 combined was broadly in line with the pre-pandemic figures, suggesting some degree of catch-up.

[3] The annual reports of some banks link exceptional buybacks to the sale of subsidiaries. Other banks state the direct aim as being to reduce excess capital in order to maintain an efficient capital structure, or describe buybacks as a part of normal payout policies.

distribute dividends at all. It is possible that banks with more limited capital available, or facing other regulatory constraints, will raise dividends as their situation normalises and peer pressure increases, resulting in a further increase in aggregate dividends in the future.

Banks tend to distribute more capital when they are more profitable, have higher asset quality (measured by non-performing loan ratios) and more liquidity, and also tend to smooth distributions over time, as captured by lagged distribution (Chart C). These correlations are confirmed by a multi-year econometric analysis which indicates that banks' payout yields (i.e. payouts as a percentage of bank equity) are driven by their own lags and by banks' return on equity (ROE) and non-performing loan (NPL) ratios (Chart D), in line with the literature.[4] According to the estimates, each additional percentage point of ROE for the banking sector as a whole translates into €2 billion of higher payouts. The increase in bank net interest margins against the backdrop of the monetary policy tightening since mid-2022 is likely to have contributed positively to banks' capital distributions so far. At the same time, the impact of the tightening is likely to compress profitability over time as loan growth weakens, credit risk increases and deposit rates rise, limiting the space for further payouts. Moreover, the analysis also suggests that banks with better liquidity positions, as captured by the liquidity coverage ratio (LCR), also make higher payouts. Overall, it seems that the banks distributing the most dividends over recent years were those in the soundest position to do so.[5]

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[4] See, among others, Belloni, M., Grodzicki, M. and Jarmuzek, M., "Why European banks adjust their dividend payouts?", *Working Paper Series*, No 2765, ECB, January 2023; Theis, J. and Dutta, A.S., "Explanatory factors of bank dividend policy: revisited", *Managerial Finance*, Vol. 35, Issue 6, 2009; and Dickens, R.N., Casey, K.M. and Newman, J.A., "Bank Dividend Policy: Explanatory Factors", *Quarterly Journal of Business and Economics,* Vol. 41, No 1/2, 2002, pp. 3-12.

[5] Moreover, further calculations show that the relationship between payouts and the capital available also stems from the fact that, for the sample of banks announcing their target capital ratio to investors, banks with more excess capital pay out more.

Chart C

Payouts on 2022 profits versus their own lag, ROE, the NPL ratio and the LCR

(x-axis: percentages of equity (first and second panels), percentages of loans (third panel) and liquidity coverage ratio (fourth panel); y-axis: percentages of equity)
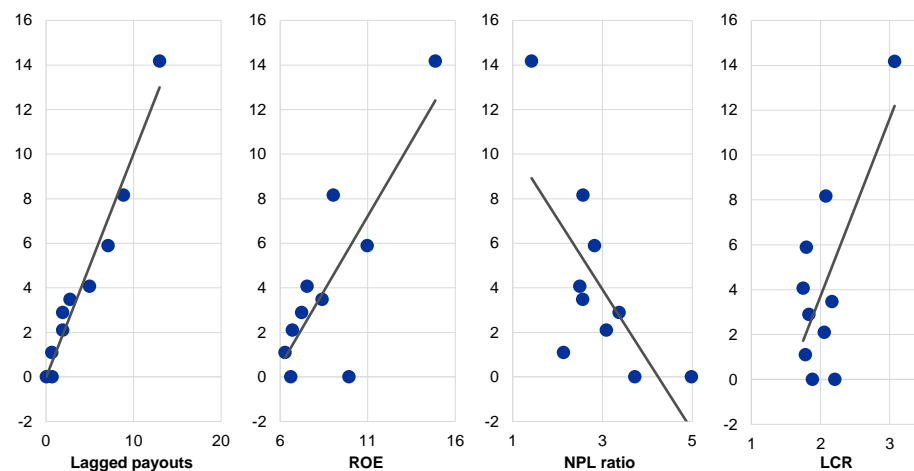
Sources: Banks' financial accounts, ECB supervisory reporting and ECB calculations.
Notes: The chart plots deciles of the distribution of banks' annual payout yields (dividends and share buybacks divided by the book value of equity) on 2022 profits against their own lag (first panel) and against lagged values of ROE (second panel), the NPL ratio (third panel), and the LCR (fourth panel). ROE, the LCR and the NPL ratio are lagged by one year.

Chart D

Regression coefficients explaining payout yields for profits from 2016 to 2022

(regression coefficients showing the impact of 1 percentage point of lagged payout yield, ROE, LCR, growth of total assets, CET1 ratio and NPL ratio, and 1 unit of the log of total assets, on payout yield in percentage points)
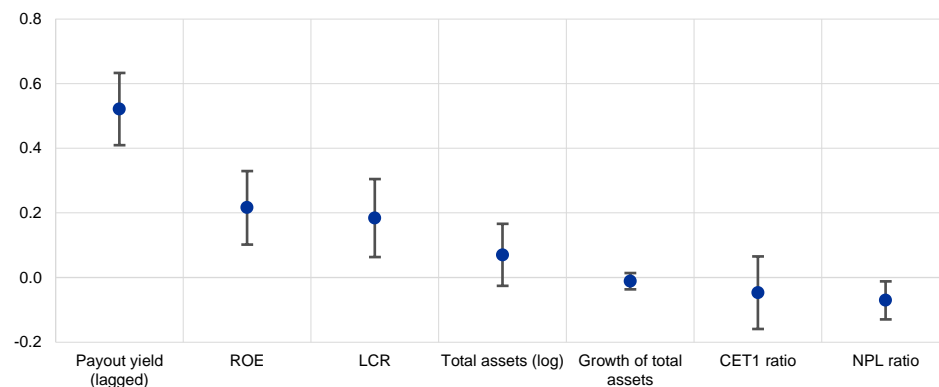
Sources: Banks' financial accounts, ECB supervisory reporting and ECB calculations.
Notes: The chart shows coefficients of the regression of banks' annual payout yields (dividends and share buybacks divided by the book value of equity) on their own lag and lagged values of ROE, the LCR, bank size (the log of total assets), the annual growth rate of total assets, the Common Equity Tier 1 (CET1) capital ratio and the NPL ratio. Regressions also include year fixed effects. Explanatory variables are lagged by one year. Variables are scaled (mean zero and standard error 1). Error bars show 90% confidence intervals. Standard errors are clustered at bank level. The sample period covers the financial years 2016 to 2022, excluding 2019 owing to the ECB Banking Supervision recommendation on dividends and share buybacks. The latest observations are for the distribution of 2022 profits (to be paid out in 2023). Results relate to a sample of 57 euro area banks.

While recent payouts have had a positive signalling effect on financial markets, higher payout commitments have been associated with lower bank credit supply and higher lending rates, therefore possibly contributing to the transmission of the monetary policy tightening impulse so far. Banks that announced larger payout yields based on 2022 profits experienced a lower increase in the cost of equity during the financial market turmoil episode of March 2023 (Chart E). This could be due to the fact that the larger payouts were made by banks with

better financial results, but also to some extent to a signalling effect. This effect would be consistent with the findings of other recent work and suggests that the larger payouts announced in recent years could support banks' intermediation capacity in times of stress.[6] At the same time, there is some tentative evidence of a negative relationship between pre-announced payouts and credit supply since the start of the normalisation of monetary policy. On the basis of granular data from the euro area register of corporate credit (AnaCredit), controlling for loan demand and other confounding factors, dividends on 2021 profits (paid in 2022) appear negatively linked to credit growth and positively linked to bank lending rates in 2022, suggesting lower credit supply over 2022 for banks with higher dividend ratios (see Chart F). By the same token, announced payouts for the financial year 2022 also show a negative link to banks' 2022 credit supply, suggesting that banks planned their distribution of capital on the basis of preliminary earnings for the year to date and projections of end-of-year profits, and calibrated their lending and more generally their asset-liability management decisions over the course of 2022 taking into account their plans to distribute dividends the following year based on the proceeds from 2022.[7] According to the estimates, the fact that payouts on 2022 profits were around 1 percentage point of payout yield higher than pre-pandemic standards would be associated with a decrease of around 1% in loan volumes, although this correlation could also capture factors related to the overall slowdown in loan growth in the context of monetary policy tightening. The financial year 2022 coincided with the first phase of the tightening cycle, which may have encouraged banks to restrict credit supply in order to distribute capital when it was viable to do so from a profitability perspective. It is therefore important to monitor payouts, against the backdrop of the interplay between capital distributions and the transmission mechanism of monetary policy in coming years.

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[6]   See the box entitled, "Dividend payouts and share buybacks of global banks", *Financial Stability Review*, ECB, May 2020.

[7]   This is in line with the tendency of banks, as mentioned above, to smooth their dividends over time. Some announce multi-year target payouts, meaning that they enter a new year knowing the dividend aimed at for the year, even considering the uncertainty surrounding end-of-year results. Regressing the credit supply for 2022 on the dividends and payouts on 2022 profits may give rise to reverse causality. However, the bias would be conservative, as higher profits due to higher loans should result in higher dividends. As such, the coefficients thus estimated are likely a lower bound. This conservative bias would be accentuated since profits in 2021 are more likely to have been affected by recovery of payouts following the pandemic, which should further bias the coefficient towards zero in that specification.

Chart E

Change in banks' cost of equity between February and March 2023 and payout yields for 2022 profits

(x-axis: payout yield (percentage points); y-axis: change in the cost of equity (percentages))
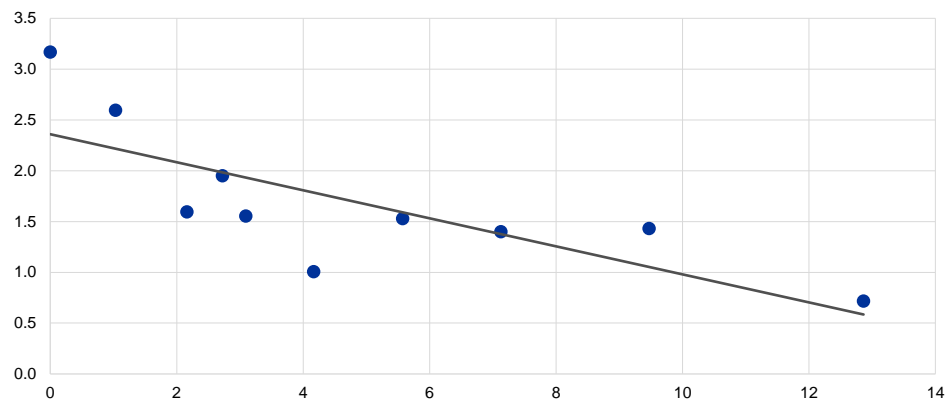
Sources: Banks' financial accounts, Bloomberg, Refinitiv and ECB calculations
Notes: The chart shows deciles of the distribution of banks' annual payout yields (dividends and share buybacks divided by the book value of equity) for 2022 profits on the x-axis against the change in banks' cost of equity between February and March 2023 on the y-axis. Cost of equity is an average across ten model-based estimates (as available at the bank level) from Altavilla, C. et al., "Measuring the cost of equity of euro area banks", *Occasional Paper Series*, No 254, ECB, January 2021. The solid line shows the line of best fit for the scatter relationship.

Chart F

Impact of payouts from 2021 and 2022 profits on credit growth and interest rates in 2022

(regression coefficients showing the impact of 1 percentage point of dividend or payout yield on credit growth in percentage points and interest rates in basis points)
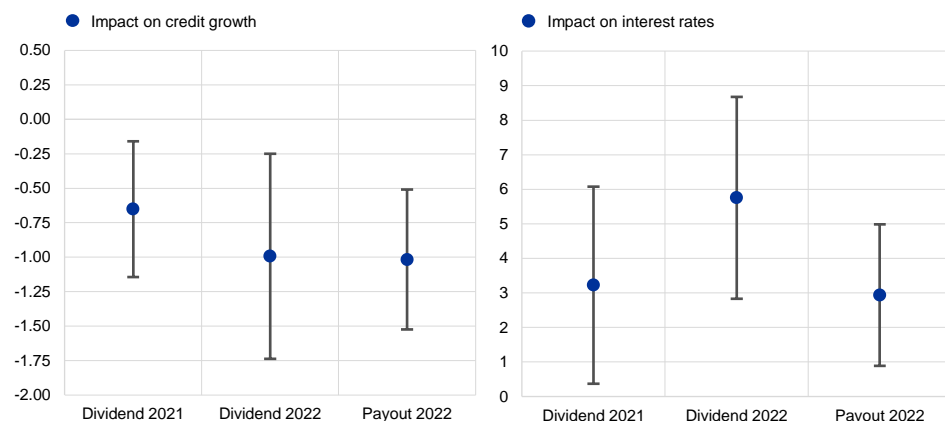
Sources: Banks' financial accounts, ECB supervisory reporting and ECB calculations.
Notes: The chart shows coefficients of the regression of credit growth and the change in interest rates at bank level in 2022 on banks' annual dividend yields (dividends divided by the book value of equity) for 2021 and 2022 profits, as well as the payout yield (dividends and share buybacks divided by the book value of equity) for 2022 profits. Control variables are ROE, the LCR, CET1 headroom above capital requirements, the annual growth rate of total assets, bank size (the log of total assets), the NPL ratio and firm fixed effects. Explanatory variables are lagged by one year. Error bars show 90% confidence intervals. The latest observations are for the distribution of 2022 profits (to be paid out in 2023).

8 The fiscal impact of financial sector support measures 15 years after the great financial crisis

Prepared by Marien Ferdinandusse and Benoit Lichtenauer

During and after the global financial crisis, most euro area governments provided support to individual financial institutions to safeguard financial stability.[1] Interventions included measures such as injecting capital, nationalising banks, taking over impaired assets through public financial defeasance structures (also known as "bad banks") and providing loans. This box looks at the direct impact of the assistance on euro area public finances, which is still visible 15 years later. The impact on public finances can be summarised as follows:

- Where these operations showed a clear loss for the government, they are classified as capital transfers that increase the budget deficit.

- Where the government received shares in a bank or debt securities considered of equal value to the capital injection provided, the support measure is considered a financial transaction that affects general government gross debt, but not the deficit.

- Where the government also issued guarantees to support the financial sector, these represent contingent liabilities that only affect public finances should they be called on.

The impact of financial support measures enacted during the great financial crisis has declined considerably, but these still leave a mark on public finances today. For the euro area as a whole, financial support measures undertaken since 2007 increased public debt up to 2012, when the impact peaked at more than 6 percentage points of GDP (Chart A). Since then the debt impact has fallen, as governments have been able to sell the equity stakes they took in banks during the crisis and dispose of assets (mainly non-performing loans) held by bad banks. However, euro area government debt was still more than 3% of GDP higher in 2022 as a consequence of financial sector support, while outstanding guarantees amounted to around 0.5% of GDP (Chart A). The financing of financial sector

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[1] For a description of the financial crisis and fiscal and financial measures taken, see "Euro area fiscal policies and the crisis", *Occasional Paper Series*, No 109, ECB, Frankfurt am Main, April 2010, and "Extraordinary measures in extraordinary times – public measures in support of the financial sector in the EU and the United States", *Occasional Paper Series*, No 117, ECB, Frankfurt am Main, July 2010. For more information on the statistical classification of support measures and their impact on public finances, see the article entitled "The fiscal impact of financial sector support during the crisis", *Economic Bulletin*, Issue 6, ECB, 2015; "Financial assistance measures in the euro area from 2008 to 2013: statistical framework and fiscal impact", *Statistics Paper Series*, No 7, ECB, Frankfurt am Main, April 2015; and the box entitled "The fiscal impact of financial sector support measures: where do we stand a decade on from the financial crisis?", *Economic Bulletin*, Issue 6, ECB, 2018. The national accounts rules applicable to the statistical recording of support for financial institutions have been revised over time. As a consequence, the historical impact of the public interventions have sometimes changed significantly compared with these previous publications. Since Eurostat's first decision on the statistical recording of public interventions to support financial institutions in 2009, the rules have been further revised until very recently (see the updated chapter 4.5 "Government intervention to support financial institutions: financial bailouts and defeasance structures" in the newly released 2022 edition of the Manual on Government Deficit and Debt).

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support comprised debt securities (just over half), loans (17.7%) and other liabilities of general government entities (28.8%).[2] The latter category mainly consists of debt of (i) banks that were nationalised and reclassified under the general government sector and (ii) bad banks.

Chart A

Impact of financial sector support measures on euro area debt and the potential impact on debt from outstanding contingent liabilities, 2008-22

(percentages of GDP)
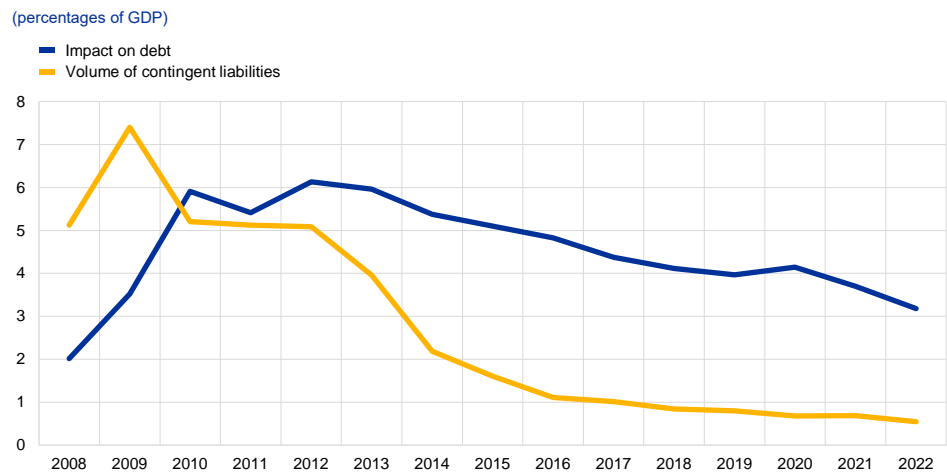
Source: Eurostat.
Notes: General government liabilities resulting from financial sector support measures affect observable debt. Contingent liabilities are obligations in the form of explicit guarantees which do not have any effect on the government accounts (aside from the revenues provided by guarantee fees) unless or until a particular event occurs in the future.

The support measures have increased the euro area government deficit every year since the financial crisis, although the impact has become very small in recent years (Chart B). In some of the earlier years, the deficit impact was dominated by capital transfers. In later years, expenditure related to the support, which is mainly interest payable and, to a lesser extent, capital transfers, has been larger than the associated revenues, which are mainly interest and dividends received.[3]

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[2]   For more detail, see Eurostat's background note of April 2023 on government interventions to support financial institutions.

[3]   In this respect, the fiscal impact of energy support measures in the euro area during the first two years of the energy crisis provides an insightful comparison. The cumulative net impact of the support to the financial sector between 2008 and 2022 on the euro area deficit was around 2.6% of 2022 GDP, while the net impact of energy support measures in the first two years of the energy crisis (2021-2022) was around 1.9% of GDP. See also the box entitled "Update on euro area fiscal policy responses to the energy crisis and high inflation", *Economic Bulletin*, Issue 2, ECB, 2023.

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Chart B

Impact of financial sector support measures on the euro area deficit

(percentages of GDP)

■ Impact on deficit of financial sector support measures - net
▨ Impact on deficit of financial sector support measures - gross
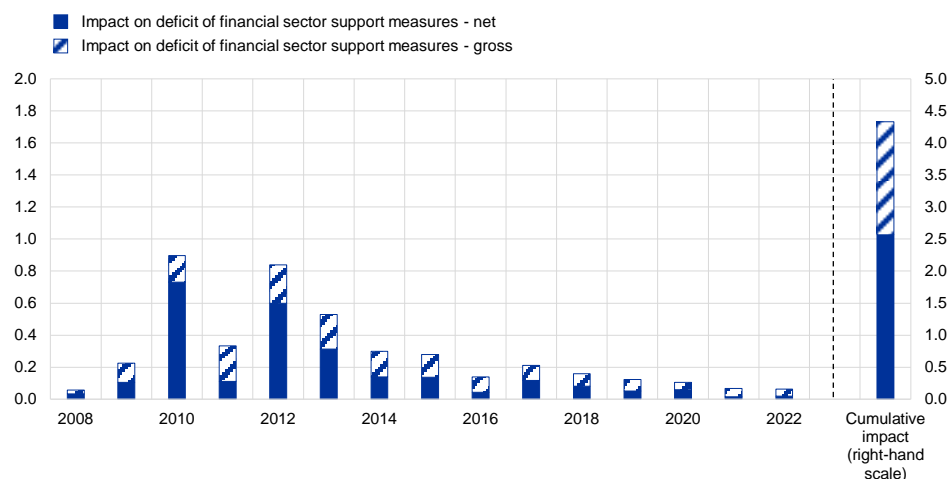
Source: Eurostat.

The fiscal impact of financial sector support measures differs considerably across euro area countries. A few countries took no action, or almost none, while the maximum impact on the debt/GDP ratio was close to 10% or more in ten euro area countries, including Germany, the Netherlands, Latvia, Austria, Slovenia, the four euro area countries that required an EU/International Monetary Fund (IMF) adjustment programme (Ireland, Greece, Cyprus and Portugal), and Spain[4], which requested financial assistance from the European Financial Stability Facility/European Stability Mechanism in 2012. The debt impact in the beneficiaries of EU/IMF adjustment programmes was still above 10 percentage points in 2022, in some cases well above (Chart C).[5]

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[4]   In Spain, the impact of public support to the financial sector on government debt was significantly revised in 2021 (including the past data) when the asset management company Sociedad de Gestión de Activos procedentes de la Reestructuración Bancaria (SAREB) was reclassified under the government sector retrospectively since its creation in 2012. For more information, see the letter of 16 February 2021 from Eurostat to the Instituto Nacional de Estadística on the sector classification of SAREB.

[5]   For Ireland, the debt impact is better measured as a percentage of modified gross national income (GNI*), rather than GDP, on account of the impact of tax operations of multinational companies on GDP. The debt impact of the financial sector support peaked at 53% of GNI* in 2013 and was 25% in 2022.

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Chart C

Impact of financial sector support measures on general government gross debt

(percentages of GDP)
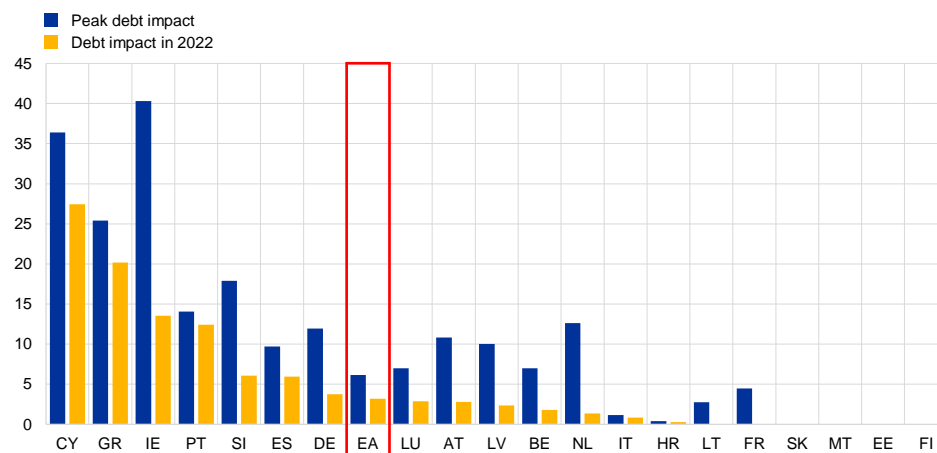
Source: Eurostat.
Notes: The chart shows maximum general government liabilities expressed as a percentage GDP over the period 2007-2022 and in 2022. Countries are ranked by 2022 value.

The long-lasting direct impact of financial sector support measures on public finances shown in this box is only part of the overall economic costs of a financial crisis. These have also materialised in the form of lost output and higher unemployment. In addition, in some countries, adverse developments in the financial sector and government finances reinforced each other, pushing sovereign funding costs higher and exacerbating the financial and economic crisis. This caused an increase in the debt/GDP ratio that is not included in the estimates in this box. All of these factors illustrate the importance of having the necessary institutional framework in place to prevent episodes of macroeconomic and financial instability occurring and to mitigate their cost should they materialise. Since the great financial crisis, reforms have been undertaken in the EU to improve supervision of the financial sector, orderly resolution of failing financial institutions, sustainability of public finances and resilience of sovereign borrowers, for example by establishing the Single Supervisory Mechanism, the Single Resolution Mechanism and the European Fiscal Board.[6]

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[6]   See the following links for more information on the Single Supervisory Mechanism, the Single Resolution Mechanism and the European Fiscal Board.

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The fiscal impact of financial sector support measures 15 years after the great financial crisis

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Articles

1   The euro area current account after the pandemic and energy shock

Prepared by Lorenz Emter, Michael Fidora, Fausto Pastoris and Martin Schmitz

1   Introduction

In 2022 the euro area current account balance recorded a deficit of 0.8% of euro area GDP compared with a surplus of 2.8% in 2021 – a deterioration of 3.6 percentage points.[1] This constituted the biggest annual change in the euro area current account balance on record as the terms-of-trade shock from rising energy prices following Russia's invasion of Ukraine triggered a substantial worsening of the euro area trade balance.[2] Since the introduction of the euro in 1999, the euro area current account balance has been through several distinct phases. After being in deficit in the early 2000s, it maintained a roughly balanced position until the global financial crisis, when it sharply deteriorated to reach a historically high deficit of close to 2% of GDP in 2008. Following a period of consolidation, the euro area current account balance then recorded sustained surpluses between 2013 and 2019, before exhibiting some pandemic-induced volatility already in 2020 and 2021.[3]

Changes in the current account balance capture information that can have implications for the conduct of monetary policy. For instance, a decline in the current account balance due to a surge in import prices and a deterioration in the terms of trade, as in the recent energy crisis, will on the one hand increase inflationary pressures through a change in relative prices. On the other hand, it will also depress domestic demand via the accompanying decline in real income, which over time will lead to a correction of the current account balance and mitigate the inflationary pressures. This has important implications for the required degree and duration of monetary tightening in response to a terms-of-trade shock.

This article provides an in-depth analysis of the factors driving the sharp reversal in the euro area current account balance in 2022 by considering developments in the various current account components and discussing the prospects for the recovery of the current account balance based on its medium-term determinants.

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[1] The evolution of the euro area current account balance is closely linked to economic developments abroad. It measures transactions between euro area residents and non-euro area residents. It consists of the balance of trade in goods and services, net income from abroad recorded as primary income (such as interest and dividends) and net transfers recorded as secondary income (such as remittances and transfers related to the EU budget).

[2] The terms of trade measures export prices relative to import prices.

[3] See "Developments in the euro area current account during the pandemic", *Economic Bulletin*, Issue 4, ECB, 2021.

2 The euro area current account after the pandemic and energy shock

After having been in surplus since 2012, the euro area current account balance fell sharply into deficit in 2022. The deficit amounted to 0.8% of euro area GDP in 2022, a fall of 3.6 percentage points compared with a surplus of 2.8% in 2021. This was the largest annual shift in the euro area current account balance on record (Chart 1).

Chart 1

Euro area current account balance

(left: annual flows; right: quarterly flows, as a percentage of GDP)
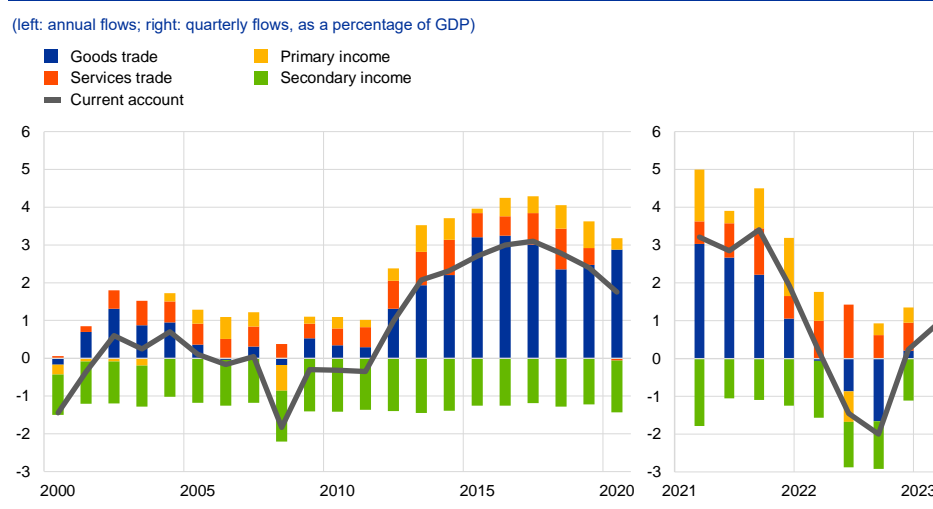
Source: ECB.

The deterioration in the current account balance was largely driven by goods trade. The goods trade balance switched from a surplus of 2.2% of GDP in 2021 to a deficit of 0.6% in 2022. At the same time, the surplus in the primary income balance declined from 1.1% to 0.2% of GDP. These developments were slightly offset by an increase in the surplus on trade in services from 0.8% to 0.9% of GDP, while the deficit on secondary income remained unchanged at 1.3% of GDP.

The shift in the goods trade balance from a surplus to a deficit largely reflected a temporary increase in the price of net energy imports. The energy goods trade deficit amounted to 4.0% of GDP in 2022, more than double its level of 1.9% in the previous year. A decomposition of exports and imports by product group into price and volume effects shows that this increase was in turn driven by higher energy prices (Box 1). These prices had already started to rise towards the end of 2021 and accelerated sharply following Russia's invasion of Ukraine in February 2022. The volume of imports showed smaller movements, as energy imports increased marginally until mid-2022, reflecting efforts to increase gas storage levels ahead of the winter. However, energy imports started to decline as of the autumn of 2022, on the back of energy conservation measures and favourable weather conditions. As energy prices receded in early 2023 the goods trade balance recovered and even returned to surplus in quarterly terms, also reflecting a recovery in non-energy goods net export volumes (Chart 2).

Chart 2

Euro area goods trade balance

(quarterly, as a percentage of GDP)

- Balance
- Energy, volume
- Energy, price
- Non-energy, volume
- Non-energy, price
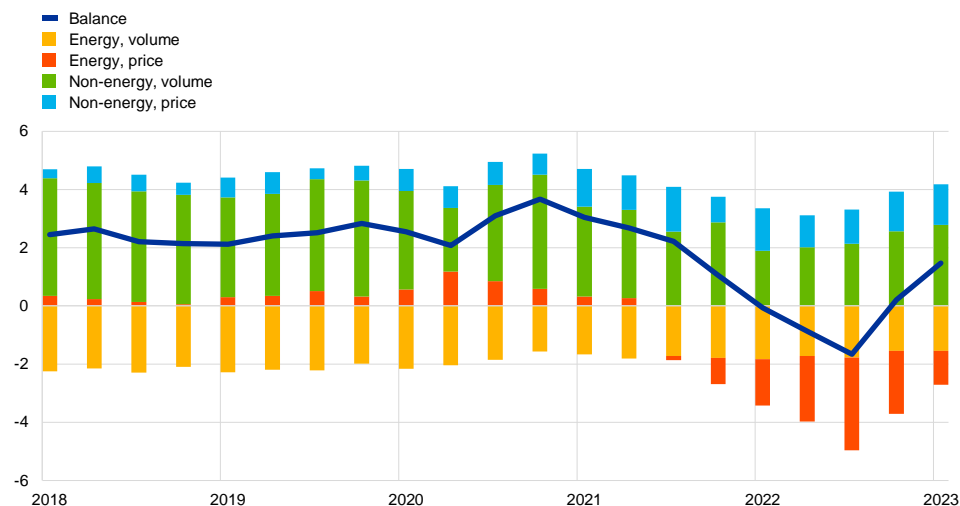
Source: ECB staff calculations.
Notes: The latest observations are for the first quarter of 2023. Decomposition of the goods trade balance in the balance of payments (BoP) is performed using the methods described in Box 1 of this article. The BoP breakdown by product category is derived from International Trade in Goods Statistics. Energy includes trade under Standard International Trade Classification, Revision 3. Decomposition into price and volume components is performed by multiplying values by trade-weighted sums of individual quantity indices within respective product categories and subtracting them from the nominal trade values.

The balance of trade in non-energy goods also declined for most of 2022. The decline in the surplus in non-energy goods in the first half of 2022 reflected anaemic growth in non-energy export volumes, which fell short of the increase in the volume of non-energy goods imports. The latter grew robustly, despite the depreciation of the euro and moderate domestic demand, on account of a strong rise in imports of manufactured goods with a high energy content as euro area domestic production became less competitive given the asymmetric energy price shock.[4]

Supply bottlenecks, including energy supply shocks, continued to hold back euro area goods export growth in 2022. The response to the coronavirus (COVID-19) pandemic included lockdowns that restricted supply, which together with fiscal transfers created buoyant demand for goods. These supply bottlenecks were amplified following Russia's invasion of Ukraine at the end of February 2022 and only began to ease from August of 2022. Chart 3 displays a historical decomposition obtained from a structural vector autoregression model. The results suggest that supply bottlenecks dampened euro area goods export growth through 2022. Indeed, the negative drag of supply chain disruptions was still present in the early months of 2023 before the easing of supply bottlenecks eventually provided a boost to export growth in March of this year.[5] The energy supply shock initially played a minor role in euro area export performance but gained importance following Russia's invasion of Ukraine. These factors were partly offset by the depreciation in the nominal effective

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[4] See the box entitled "How have higher energy prices affected industrial production and imports?", *Economic Bulletin*, Issue 1, ECB, 2023.

[5] The supply bottlenecks implied that euro area exporters could not fully meet foreign demand which provided positive impetus to euro area export growth on average in 2022 which however faded in the most recent months.

exchange rate of the euro last year, which increased price competitiveness during 2022.

Chart 3

Historical decomposition of goods export volumes

(three-month moving year-on-year percentage change, percentage point contributions)
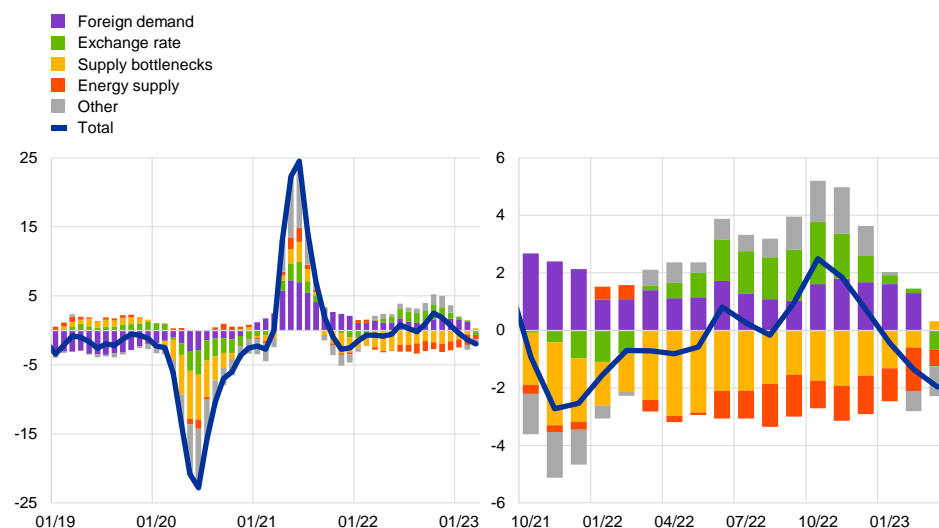
Source: ECB.
Notes: The chart shows deviations from steady state based on a structural vector autoregression model for data from January 2003 to March 2023. Sign restrictions on impact: (1) foreign demand, (2) bottlenecks, (3) energy supply, and (4) nominal-effective exchange rate shocks: euro area synthetic energy price index 3:(+); euro area energy intensive to non-energy intensive industrial production 2:(+), 3:(-); world imports 1:(+), 2:(-), 3:(-); euro area harmonised index of consumer prices 1:(+), 2:(+), 3:(+), 4:(-); supply chain pressure 1:(+), 2:(+); euro area exports 1:(+), 2:(-), 3:(-), 4:(-); nominal effective exchange rate 1:(+), 4:(+).

The surplus in the services balance provided a buffer to the euro area current account balance during the energy shock. Compared to before the pandemic, the main change was a larger surplus for information and telecommunication technology services which increased from 0.6% to 1.1% of euro area GDP in the latest four-quarter period (Chart 4), due to higher exports amid dynamic growth of this industry. The euro area surpluses in travel and transport services recovered to values close to their pre-pandemic levels, following the slump observed at the height of the pandemic in 2020 due to travel restrictions and the collapse in shipments of goods. In recent years sizeable deficits have been incurred on charges for the use of intellectual property, which have increased to 0.7% of GDP in the four most recent quarters. Sizeable deficits have also been incurred on research and development services, which exhibited pronounced volatility in euro area imports in recent years, linked to tax planning by large multinational enterprises (MNEs).[6]

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[6]   For additional information on the impact of multinationals' operations on the euro area's external accounts see the article entitled "Multinational enterprises, financial centres and their implications for external imbalances: a euro area perspective", *Economic Bulletin*, Issue 2, ECB, 2020; and Lane, P.R., "Maximising the user value of statistics: lessons from globalisation and the pandemic", speech at the European Statistical Forum (virtual), 26 April 2021; and the box entitled, "Intangible assets of multinational enterprises in Ireland and their impact on euro area GDP", *Economic Bulletin*, Issue 3, ECB, 2023.

Chart 4

Developments in the euro area services trade balance by main type of service

(percentage of GDP)
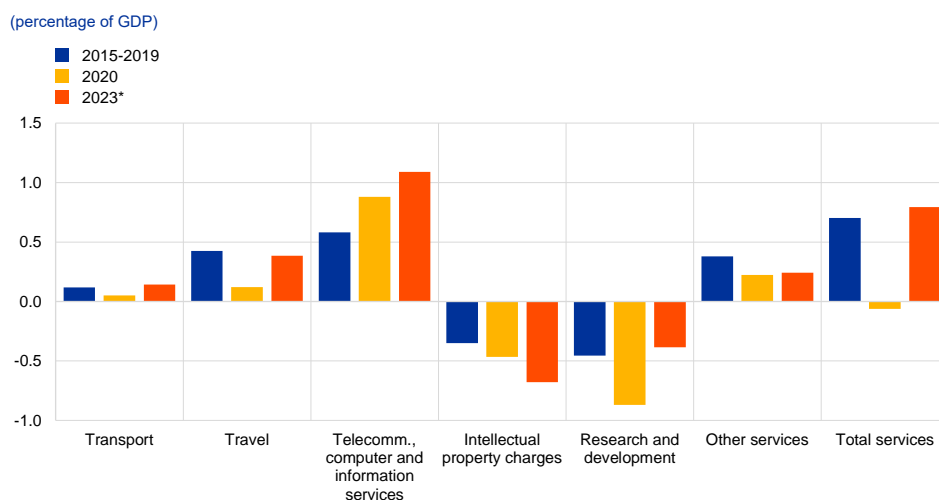
- 2015-2019
- 2020
- 2023*

Sources: ECB and Eurostat.
Notes: "Other services" comprises the services trade categories not shown elsewhere in the chart. Average for the period 2015-2019 shown.
* 2023 refers to the period between the second quarter of 2022 and the first quarter of 2023.

In 2022 the euro area trade balance worsened particularly vis-à-vis China, Russia and the United States. The largest bilateral deficits were recorded with China, because of strong increases in goods imports, Russia, on account of imported energy products and plummeting exports after the onset of the war and the imposition of export sanctions, and a residual group of other countries including OPEC countries and Norway, due to imports of energy products (Chart 5). The trade deficit with Russia and China subsequently decreased slightly in the beginning of 2023, in line with an overall decline in energy prices and diversification of energy suppliers, as well as the lifting of COVID-19 restrictions in China. The decline in the trade surplus with the United States in 2022 was partly driven by the volatile development of services transactions related to the operations of large MNEs, as the euro area has since 2019 tripled its bilateral deficit in payments for the use of intellectual property and other business services.[7] Additionally, euro area imports of goods from the United States increased substantially in the course of 2022, in line with increased demand for US liquified natural gas.[8] The largest bilateral trade surpluses in 2022 were recorded with the United Kingdom, Switzerland and other EU countries.

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[7] The substantial increase in payments to the United States that is related to charges for the use of intellectual property rights and other business services in the past two years is reflected in a corresponding decrease of such imports from offshore centres, to where most of these payments from the euro area were directed in 2019-2020. This points to recent restructuring operations by large MNEs including the relocation to the United States of intellectual property assets, previously held in subsidiaries in offshore centres. From the euro area perspective, these transactions mostly involve Ireland and the Netherlands, due to their role as hubs for large MNEs in the euro area.

[8] For additional information on the EU natural gas market see the box entitled "Global risks to the EU natural gas market", *Economic Bulletin*, Issue 1, ECB, 2023.

Chart 5

Euro area trade balance by trading partners

(four-quarter cumulated flows as a percentage of euro area GDP)

Legend:
- Total
- Other EU
- UK
- United States
- China
- Switzerland
- Japan
- Offshore centres
- Russia
- Other countries
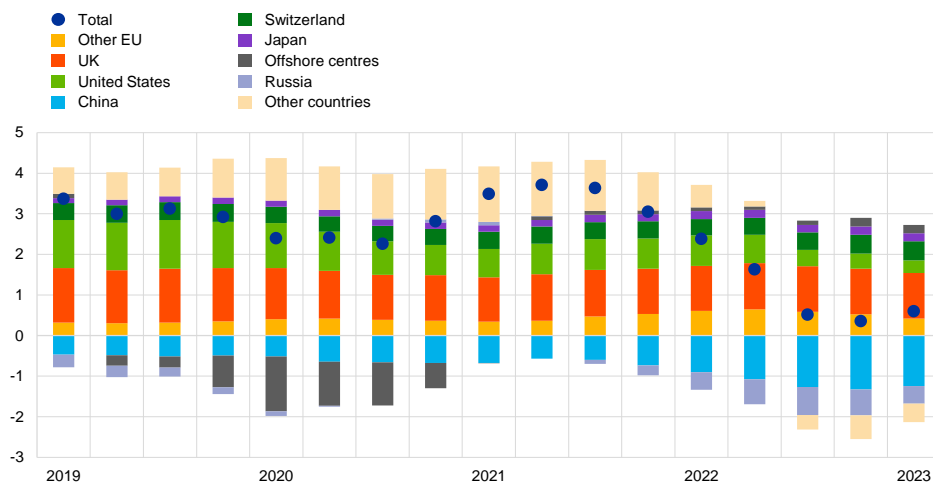
Sources: ECB and Eurostat.
Notes: "Other EU" comprises the non-euro area EU Member States and those EU institutions and bodies that are considered for statistical purposes as being outside the euro area, such as the European Commission and the European Investment Bank. "Offshore centres" comprises countries or jurisdictions outside the EU that provide financial services to non-residents on a scale that is disproportionate to the size of their domestic economy, including for example Hong Kong SAR and the Cayman Islands. "Other countries" includes all countries and country groups not shown in the chart, as well as unallocated transactions.

The primary income surplus deteriorated in 2022 due to lower net investment income, mainly because of a strong decline in the surplus on foreign direct investment (FDI), equity income and an increase in the deficit on investment fund share income.[9] In the course of 2022, the investment income balance switched to a small deficit (Chart 6) as the net income surplus on foreign direct investment (FDI) equity decreased substantially in 2022, reflecting mostly the strong volatility of income flows within the main euro area FDI hubs (Ireland, Luxembourg and the Netherlands). At the same time, euro area investment funds, domiciled predominantly in Ireland and Luxembourg, recorded higher income flows to their foreign investors in 2022. The global rise in interest rates observed since 2022 had a significant positive impact on portfolio debt income and other investment income paid to non-residents and received from abroad, while the net positive contribution of these items to the euro area investment income balance remained fairly stable.

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[9] Investment income reflects the receipts and payments generated by an economy's external assets and liabilities (such as dividends and interest) and can be further decomposed into functional categories of the balance of payments (foreign direct investment, portfolio investment, other investment and reserve assets). Primary income, in addition to investment income, also includes compensation of employees and other primary income (mainly taxes and subsidies) which traditionally contribute positively to the euro area primary income balance.

Chart 6

Developments in the euro area investment income balance by main type of income

(four-quarter cumulated flows as a percentage of GDP)

■ Portfolio, investment fund income
■ Portfolio, equity securities dividends
■ Portfolio, debt
■ Direct, equity
■ Direct, debt
■ Other
— Total investment income
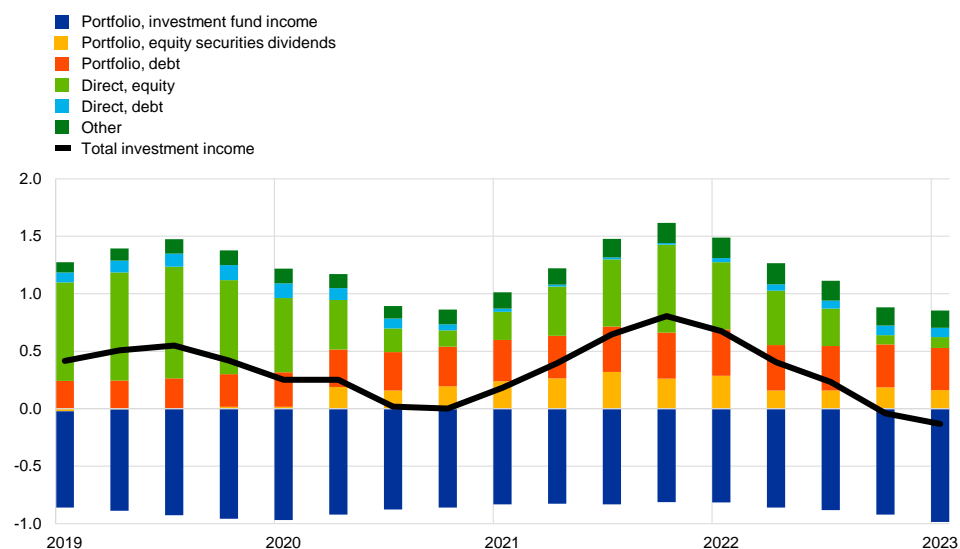
Sources: ECB and Eurostat.
Note: "Other" includes income on reserve assets and other investment income.

Despite the current account deficit, the euro area remained a net lender in 2022 as the capital account recorded an exceptionally large surplus. Among the major components of the balance of payments identity, the euro area current and financial account balances have moved very much in tandem over the past two decades (Chart 7), while the capital account balance and net errors and omissions recorded small values.[10] However, the close link between the current and financial accounts ended in the course of 2022, with the financial account continuing to record positive, albeit declining net financial outflows (0.9% of GDP in the four most recent quarters).[11] This was due to a historically large capital account surplus (1.0% of GDP) mainly with the United States and United Kingdom, mostly on account of sales of marketing assets (such as brand names and logos).[12] These, in turn, reflected relocations of intangible assets within MNEs from euro area subsidiaries to non-euro area entities. Such large corporate restructuring operations are usually non-recurrent so their impact on euro area net lending should be transitory.

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[10] According to the BoP. identity, it holds that $CA + KA + EO = FA$ where CA stands for the current account balance, KA for the capital account balance, EO for net errors and omissions (capturing any statistical discrepancy), and FA for the financial account balance. The financial account balance is defined in terms of net financial outflows, i.e. the net purchases of foreign assets by domestic residents minus the net incurrence of liabilities by domestic residents with foreign residents.

[11] For additional information on the evolution of euro area external financial flows in 2022 see the box entitled "The great retrenchment in euro area external financial flows in 2022 – insights from more granular balance of payments statistics", *Economic Bulletin*, Issue 4, ECB, 2023.

[12] The capital account mainly includes transfers of capital and transactions in non-produced non-financial assets, such as marketing assets.

Chart 7

Euro area balance of payments identity

(percentage of GDP)

- Financial account
- Current account
- Capital account
- Net errors and omissions
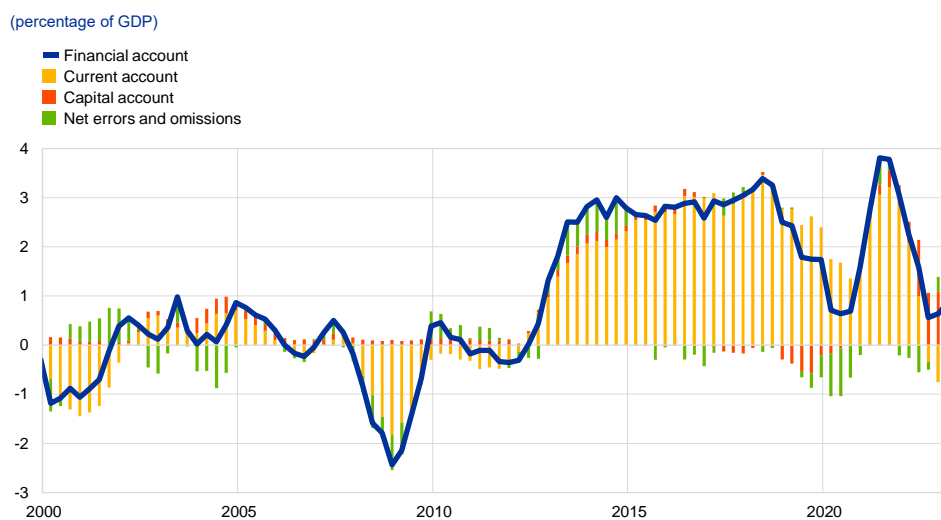
Sources: ECB and Eurostat.
Note: Data shown as four-quarter moving sums up to the first quarter of 2023.

Taken together, the deterioration in the current account balance was mostly driven by a decline in the goods trade balance on the back of sharp increases in energy import prices. Receding energy import prices contributed to a recovery of the euro area current account to 0.9% of euro area GDP in the first quarter of 2023. However, the extent of the recovery in the euro area current account over the medium term is less clear as it hinges on the degree of persistence of the increase in energy prices and how the sequence of shocks over recent years has affected the medium-term drivers of the current account. These drivers of the current account and its medium-term prospects are discussed in the following section.

Box 1

Introducing product group breakdowns and price-quantity decompositions for goods trade in the euro area balance of payments

Prepared by Jerzy Niemczyk and Mykola Ryzhenkov

Recent commodity price surges and supply chain bottlenecks highlight the importance of a granular analysis of euro area goods trade that is consistent with the overall balance of payments. This box introduces two experimental breakdowns to facilitate such analysis, namely in terms of the type of goods and the contributions of prices and volumes to trade flows.

While a detailed breakdown in terms of types of goods is not available from euro area balance of payments (BoP) data, it can be estimated by using granular data from international trade in goods statistics (ITGS).[13] However, there are important conceptual differences between BoP and ITGS data, which have resulted in growing discrepancies for the euro area in recent years (Chart A, panel

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[13] International trade in goods statistics (ITGS) published by Eurostat measure the value and quantity of goods traded among the EU Member States and with non-EU countries.

a).[14] Among the various possible approaches to decompose BoP goods exports and imports by product type, a simple proportional method, based on applying the trade structure observed in ITGS data to aggregate BoP figures, is most advantageous, also due to its computational simplicity.[15] Following this approach, BoP goods trade is broken down into five major product categories based on the Standard International Trade Classification (SITC): food, energy, chemicals, machinery and other goods.[16] The breakdown reveals that the deterioration in the trade balance since early 2021 was driven by an increasing deficit in energy products and a decreasing surplus in machinery (Chart A, panel b).

As regards the price-quantity decompositions, in the balance of payments, goods trade is measured in values without separate consideration of developments in quantities and prices, overlooking the potential for additional analytical insights. Although ITGS provide data with price-quantity breakdowns, these are based on highly aggregated deflators, which reduces both the precision and flexibility of the estimation. An experimental, more refined, bottom-up alternative for obtaining contributions of prices and volumes, offers greater analytical flexibility and ensures the additivity of the components. The calculations are based on the most granular trade in goods data available, specifically the 8-digit codes of the Combined Nomenclature (CN) classification.[17] For each product i in product group j in quarter t, quantity indices are calculated as a ratio of the physical volume of trade in a given quarter relative to the respective average quarterly volume in 2013-2015, $\gamma_{i,j}^t = q_{i,j}^t / \bar{q}_{i,j}^b$. Aggregate quantity indices for product categories are obtained as a sum of quarterly single-good indices weighted by nominal trade structure in 2013-2015, i.e., $\gamma_j^t = \sum_i \omega_{i,j} \gamma_{i,j}^t$. Finally, the obtained aggregate quantity index is multiplied by the average BoP value in the base period, $q_j^t = \gamma_j^t \bar{v}_j^{2013-2015}$, and the price component is calculated as a difference between the value and volume series, i.e. $p_j^t = v_j^t - q_j^t$. Overall, this method offers a transparent way to examine price and volume contributions at any required level of aggregation, as demonstrated by Chart 2 of the main text.

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[14] Discrepancies between the two datasets generally exist due to conceptual differences; in particular BoP statistics – and also national accounts data – are based on the concept of change in economic ownership, while ITGS record all goods crossing a country's border. Moreover, ITGS imports data require adjustments from a "cost, insurance and freight" (CIF) basis to a "free on board" (FOB) basis. In particular, the increase in transportation costs in recent years has led to an increased discrepancy between ITGS and BoP data.

[15] In practice the ratio between aggregate ITGS and BoP figures is computed for each period. Moreover, it is assumed that there is no heterogeneity in this ratio among the various product categories. Using the aggregate ratio one obtains the BoP value for each product category.

[16] The following product categories are defined: (i) Food: SITC groups 0 (Food and live animals) and 1 (Beverages and tobacco); (ii) Energy: SITC group 3 (Energy); (iii) Chemicals: SITC group 5 (Chemicals); (iv) Machinery: SITC groups 6 (Manufactured goods), 7 (Machinery and transport equipment) and 8 (Miscellaneous manufactured); (v) Other: SITC groups 2 (Crude materials), 4 (Animal/vegetable oil/fat/wax) and 9 (Other).

[17] The method makes the following assumptions: (i) only products traded in every month between 2013 and 2022 are included, (ii) physical quantity is measured in kilograms, (iii) growth rates are trimmed at 1000%.

Goods trade balance in the balance of payments: discrepancy with international trade in goods statistics and contributions of product categories

a) Discrepancy in BoP and ITGS goods trade balance

(percentage of GDP)

- Balance, BoP
- Balance, ITGS
- ITGS-BoP Discrepancy
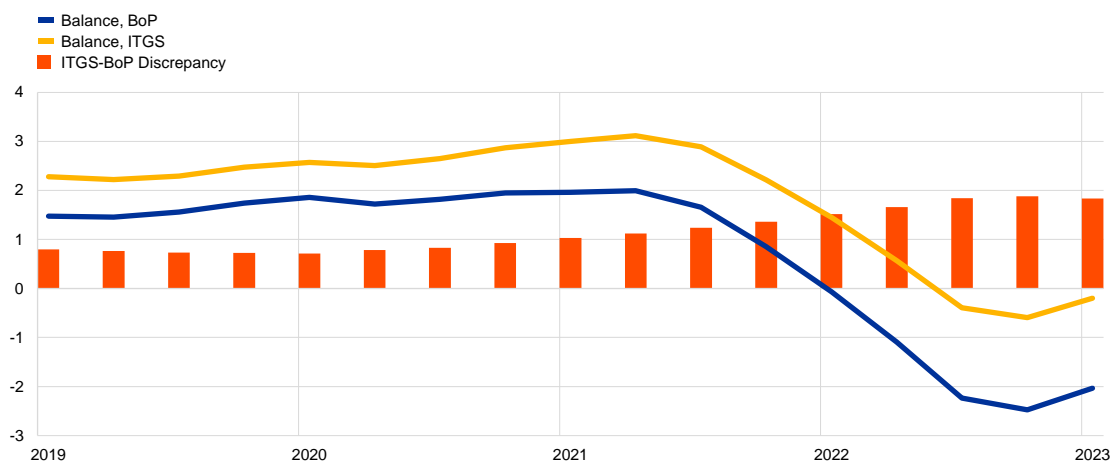
b) Goods trade balance and contributions of product categories

(percentage of GDP)

- Total
- Food
- Energy
- Chemicals
- Machinery
- Other
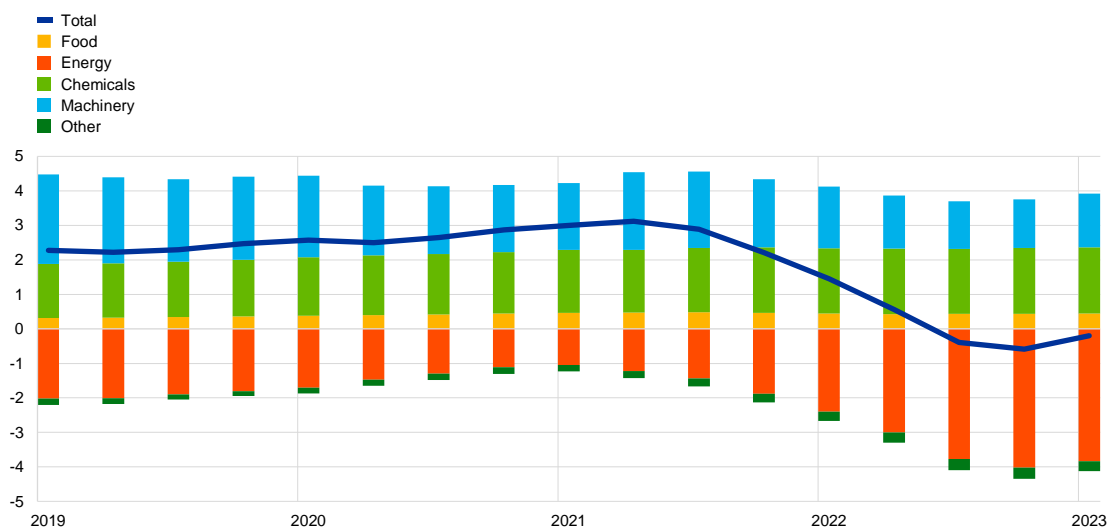
Sources: Eurostat, ECB balance of payments and ECB staff calculations.
Notes: Observations are moving sums of seasonally unadjusted data over four quarters, expressed as a percentage of euro area GDP in a respective period. The latest observations are for the first quarter of 2023.

3 Drivers of the current account and its medium-term prospects

The evolution of the current account balance over the past three years reflected large swings in net lending of households, non-financial corporations

and the government.[18] Following the outbreak of the coronavirus (COVID-19) pandemic, household net savings saw an unprecedented rise due to lockdown measures, which restricted consumption opportunities, and precautionary savings as well as government support, which protected household incomes.[19] At the same time, non-financial corporations turned from being net borrowers into net lenders, as firms received government support, cut costs, postponed new investments and hoarded cash for precautionary purposes.[20] However, this increase in private sector net savings was more than offset by an equally unprecedented fiscal expansion which led to a decrease in overall net lending, reflected by a lower current account surplus in 2020. As public sector net borrowing declined faster than private sector net lending in 2021, the current account balance increased again to close to historical highs. Escalating price pressures aggravated by the energy shock following Russia's invasion of Ukraine, however, decreased the flow of private sector net savings to such an extent that euro area net lending reached its lowest level in over a decade in 2022.[21]

Chart 8

Euro area sectoral net lending/borrowing and the current and capital account

(percentage of GDP, percentage point contributions)
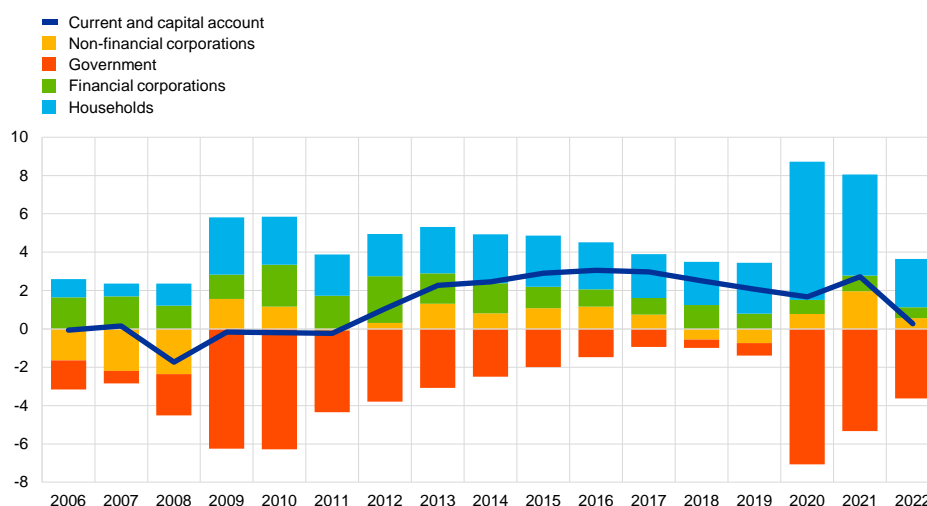
Source: ECB.

Substantial parts of the swings in the current account balance during 2022 were driven by cyclical factors, particularly the large swings in energy prices. A decomposition of the current account balance into its cyclical and fundamental

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[18] The decomposition of net lending/borrowing reflects domestic sectoral balances taken from the non-financial sectoral accounts dataset, while the current and capital accounts data show net lending/borrowing to/from the rest of the world as reported in BoP data. The two indicators of net lending/borrowing are conceptually equivalent, while minor discrepancies between the two data sources may exist for periods before 2013.

[19] See the box entitled "Household saving during the COVID-19 pandemic and implications for the recovery of consumption", *Economic Bulletin*, Issue 5, ECB, 2022.

[20] See the box entitled "Non-financial corporate health during the pandemic", *Economic Bulletin*, Issue 6, ECB, 2021.

[21] The terms of trade shock caused by the energy crisis depressed real household incomes and lowered real consumption and investment. Yet this decline in real consumption and investment levels did not translate into higher net lending as the resultant increase in price levels led to an increase in expenditure and thus triggered a reduction in net lending.

components based on a standard current account benchmark model shows that about a third of the deterioration in the euro area current account during 2022 can be attributed to factors that are typically regarded as cyclical, including the deviation of energy prices from their medium-run trend (Box 2). As energy prices indeed receded from their record levels, the current account balance turned from a deficit of -0.8% to a surplus of 0.9% of euro area GDP in the first quarter of 2023. As a result, the current account balance now stands close to its model-based current account benchmark which is an estimate of the level of the current account balance that would be consistent with fundamentals over the medium-term (Chart 9).

Chart 9

Current account balance, cyclically-adjusted current account balance and current account benchmark

(percentage of euro area GDP)

- Current account balance
- Cyclically-adjusted current account balance
- Estimated currrent account benchmark
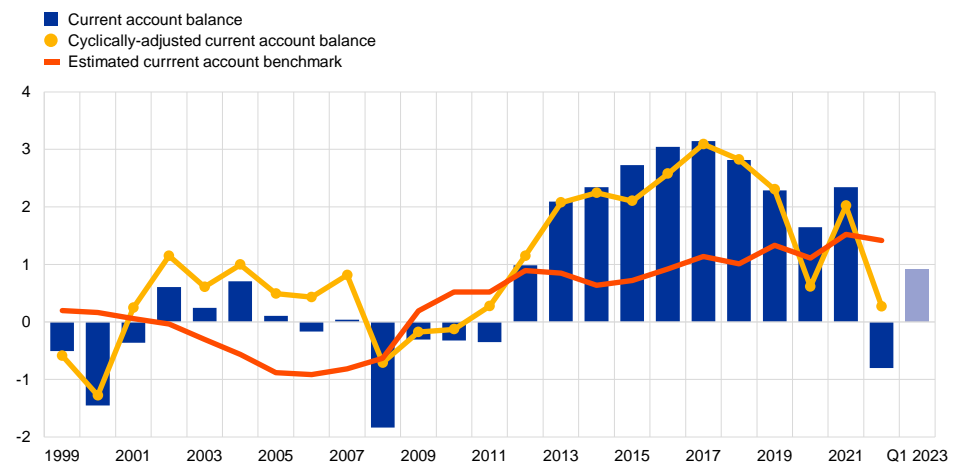
Sources: ECB.
Note: For more details see Box 2 of this article.

Looking ahead, the evolution of the current account will crucially depend on the extent to which the increase in energy prices will persist over the medium-term. Energy prices receded from their record levels but remain elevated compared to pre-2021 levels, particularly for gas. The price gap for gas, particularly vis-à-vis the United States, can be expected to remain elevated over the medium term given the role of the United States as a supplier of natural gas and the fact that pipeline gas from Russia had to be replaced by more costly liquified natural gas (see Chart 10). All else equal, this would imply a structurally lower euro area current account balance than before the energy shock. Lower energy import volumes, for example due to savings on the back of higher energy efficiency or substitution with domestic sources, could however mitigate the negative effect on the current account.

Chart 10

Gas prices

(EUR/MWh)

- EU
- Asia
- US
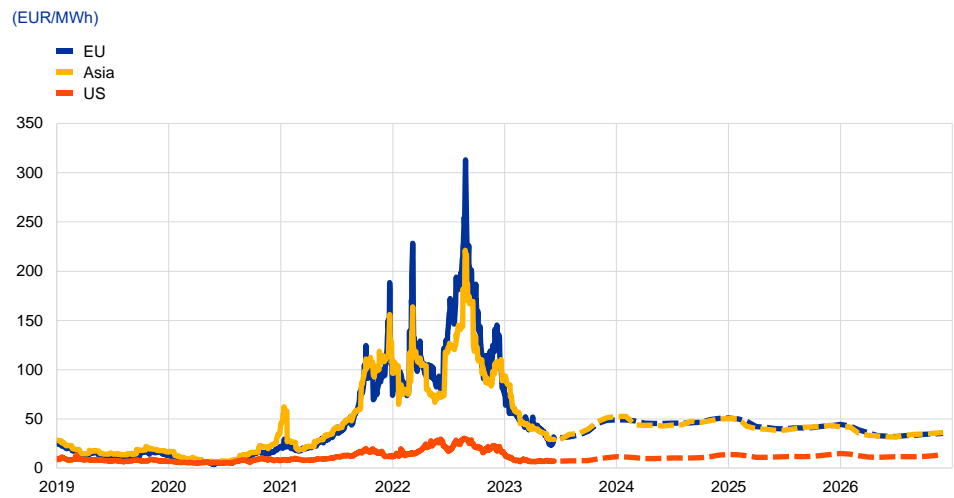
Source: Bloomberg.
Notes: EU refers to Dutch TTF, Asia refers to Nymex JMK and United States refers to Henry Hub. Solid lines refer to daily one-month ahead futures prices, dashed lines refer to monthly forward prices as of July 2023.

A worsening growth outlook relative to the rest of the world would support the euro area current account balance. To the extent that energy prices are to remain higher in the future, a worsening outlook for growth relative to the rest of the world and the associated permanent loss in income should be reflected in lower levels of consumption and investment, which would dampen the negative impact of the energy price shock on the current account balance in the medium run.

The pandemic and Russia's invasion of Ukraine also affected euro area demographics. In particular, the influx of refugees had a positive net impact on the demographic outlook for the euro area.[22] Rapidly ageing economies like the euro area tend to register a more positive current account balance while the opposite holds for countries with faster population growth and a high old-age dependency ratio due to dissaving. According to Eurostat's latest demographic projections, the old-age dependency ratio is expected to slightly improve compared to the 2019 projections in the coming decades.[23] That being said, the euro area's population is still projected to continue ageing and to shrink significantly over the coming generations, also relative to the rest of the world. Hence, demographic factors are likely to continue to support the euro area current account balance in the medium term.

The expected fiscal consolidation in the euro area over the coming years is a further factor that should support the current account surplus. According to the latest ECB staff projections government balances in the euro area are expected to

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[22] The euro area labour force increased between 0.3% and 0.5% due to the influx of Ukrainian refugees in 2022 and the impact could further increase as the war continues, according to Botelho, V. and Hägele, H.,"Integrating Ukrainian refugees into the euro area labour market", *The ECB Blog*, 1 March 2023.

[23] Relative to the 2019 projections, the old-age dependency ratio is projected to improve by 0.6 percentage points by 2025 and 1.4 percentage points (to 51%) by 2050. See the box entitled "EUROPOP2023 demographic trends and their euro area economic implications", ECB *Economic Bulletin*, Issue 3, ECB, 2023.

improve. The structural government deficit is projected to decline from 3.2% of GDP in 2022 to 2.5% of GDP by 2025, which is faster than in the rest of the world and should thus support the euro area current account balance.[24]

At the same time, public and private expenditure for greening the economy, ensuring energy security and adapting to geopolitical uncertainty could weigh on the current account. Greening the economy will require substantial investment. For example, to achieve the goals of the European Green Deal, the European Commission has pledged to mobilise at least €1 trillion in sustainable public and private investments over this decade.[25] At the same time, increased geopolitical uncertainty is not only likely to be met with higher defence spending but also likely to lead to geo-economic fragmentation.[26] To the extent that geo-economic fragmentation will trigger a reconfiguration of global supply chains away from the most price-competitive producers, this can be expected to increase the cost of imported intermediate goods. This, in turn, would weigh on euro area export competitiveness lowering the current account balance given its upstream position in global supply chains and relatively strong reliance on intermediate goods imports.

Box 2
A medium-term current account benchmark for the euro area

Prepared by Lorenz Emter and Michael Fidora

This box discusses the current account benchmark model used in the analysis of medium-term drivers of the current account. The model used in the analysis closely follows Zorell (2017) and is set up in the spirit of the IMF External Balance Assessment (EBA) model.[27] It provides a medium-term benchmark for the current account balance that is consistent with economic fundamentals and desired policies.

The current account benchmark model relates the current account balance to several macroeconomic determinants documented in the literature. These determinants are selected based on their conceptual underpinning and on whether the estimated coefficients are consistent with the theoretical priors, statistically significant and robustly associated with the current account balance. Specifically, the model relates the current account balance, expressed as a percentage of GDP, to a broad set of determinants, including cyclical variables (such as the output gap and energy price fluctuations), fundamental variables (such as demographics and future expected income growth), and policy variables (such as the structural fiscal balance). The model takes the following form, where CA corresponds to the current account balance, while Y represents cyclical variables, F exogenous fundamental variables and P the set of policy variables. Most variables are expressed

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24 An increase in government expenditure in the domestic economy, all else equal, increases domestic demand and thus leads to a lower current account balance. If, however, government expenditure abroad increases as well, all else equal, foreign demand rises, leading to a higher current account balance.

25 See European Commission, "Communication on the Sustainable Europe Investment Plan, 2020".

26 Many countries face structurally higher defence expenditures in view of the war in Ukraine and their NATO commitments to close the funding gap to the NATO target of 2% of GDP from 1.3% of GDP in 2021.

27 See Zorell, N., "Large net foreign liabilities of euro area countries", *Occasional Paper Series,* No 198, ECB, October 2017 and Allen C. et al., "2022 Update of the External Balance Assessment Methodology", *IMF Working Paper,* Issue 47, International Monetary Fund, 2023.

relative to the rest of the world since the current account is the result of developments relative to trade partners:

$$CA_{i,t} = \alpha + \beta Y_{i,t} + \gamma F_{i,t} + \delta P_{i,t} + \varepsilon_{i,t}$$

The model is estimated on a panel of 56 countries over the period 1985-2022 at annual frequency. Table A provides the regression results.

Both cyclically adjusted current account balances and current account benchmarks can be derived from this framework. The cyclically adjusted current account balance corresponds to the actual current account balance, cleaned from the effects of the business cycle. It is derived by subtracting the contribution of cyclical factors from the actual current account balance:

$$\widehat{CA}_{i,t} = CA_{i,t} - \beta Y_{i,t}$$

The cyclical factors included in the model are the output gap (relative to the rest of the world) as well as the past oil and gas import balances, both interacted with a measure of the cyclical component of their respective prices. For instance, a negative domestic output gap decreases the demand for imports. However, if the rest of the world also reports a negative output gap, demand for exports will decline in parallel. Hence, the total effect of the business cycle on the current account balance is given by the contribution of the output gap relative to the rest of the world. The estimated current account benchmark, in turn, represents the cyclically adjusted current account balance that would be justified by fundamentals and desired policies:

$$CA_{i,t}^{*} = \alpha + \gamma F_{i,t} + \delta P_{i,t}^{*} = \widehat{CA}_{i,t} + \delta(P_{i,t}^{*} - P_{i,t}) - \varepsilon_{i,t}$$

where *P** stands for the level of desired policies. As policy variables the model considers, (i) the cyclically-adjusted fiscal balance (whereby the desired level is chosen to correspond to the medium-term objective under the preventive arm of the EU's stability and growth pact), (ii) capital controls (whereby the desired level is chosen to represent full freedom of capital flows), (iii) a measure of structural rigidities (whereby the desired level is chosen to correspond to the level observed by the best-performing countries), and (iv) public social spending (whereby the desired level is chosen to correspond to the average level of countries with comparable per-capita income and age structure. The level derived under these assumptions represents the medium-term current account benchmark, as implied by the model.

Table A

Coefficients of the current account benchmark model

Dependent variable: CA/GDP		
Output gap	-0.347	***
L. Oil trade balance* Oil price (cyclical gap)	0.239	***
L. Gas trade balance* Gas price (cyclical gap)	0.889	***
L. Relative output per worker	-0.001	
L. Relative output per worker* Capital account openness	0.062	***
GDP growth, 5-year-ahead forecast	-0.436	***
Old-age dependency ratio	-0.149	***
Population growth	-0.386	*
Relative ageing speed	0.050	*
Old-age dependency ratio x Relative aging speed	0.106	***
L. NIIP/GDP	0.025	***
L. NIIP/GDP* (Dummy if NIIP/GDP < -60%)	-0.011	
Oil trade balance (5-yr mean)* Oil exporter dummy	0.258	***
Currency's share in world reserves	-0.039	***
Financial centre dummy	0.025	***
Credit risk rating* Dummy EA programme country	0.003	*
Cyclically-adjusted fiscal balance, instrumented	0.438	***
(Δ Reserves)/GDP* Capital account openness, instrumented	0.501	***
Structural rigidities	-0.136	***
Private credit/GDP, demeaned	-0.037	***
L. Public health care spending/GDP	-0.171	
L. demeaned VXO* Capital account openness	0.024	*
L. demeaned VXO* Capital account openness* Currency's share in world reserves	0.008	
Constant	-0.008	***
Observations	1704	
Number of countries	56	
R-squared	0.34	

Source: ECB staff estimates.
Notes: (*) significant at 10%, (**) significant at 5%, (***) significant at the 1% level based on heteroscedasticity-corrected z-values.
Most variables are constructed relative to the rest of the world. "L" is the first lag. Estimated using the Prais-Winsten methodology.

4   Conclusions

The sharp deterioration in the current account balance in 2022 is expected to be largely temporary. Falling energy prices have led to an improvement in the euro area terms of trade in early 2023, with modest further gains expected in the medium term. Together with the expected fiscal consolidation, this is likely to contribute to an increase in the euro area current account, which according to the latest Eurosystem

staff projections is expected to rebound to 1.1% of euro area GDP in 2023 and improve slightly further to 1.4% and 1.6% of GDP in 2024 and 2025 respectively.[28]

Nonetheless, the euro area current account is likely to stay below pre-pandemic levels. Energy prices are likely to remain elevated over the medium term until the green transition is complete. At the same time, considerable public and private expenditure for greening the economy, ensuring safe energy supplies and dealing with geopolitical uncertainty should weigh on euro area net lending and prevent the current account balance from returning to the historical highs of around 3% of GDP observed prior to the pandemic.

The fact that the sharp decline in the euro area current account was mainly related to a deterioration in the energy terms of trade has implications for monetary policy. A deterioration in the terms of trade also affects inflation dynamics through a decline in real incomes. The large – and to some degree likely persistent – terms of trade deterioration, implies a decline in wealth via the reduced present value of future real incomes, with knock-on effects for asset pricing and consumption behaviour. The energy-related terms of trade developments sharply differentiate the euro area from the United States, since the latter is broadly balanced in its energy trade due to its large-scale domestic production of energy.[29] Therefore, despite the recent improvements in euro area terms of trade and the current account, the energy deficit is likely to remain a medium-term drag on euro area real incomes with implications for domestic demand and hence for euro area inflation.

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[28]   See ECB staff macroeconomic projections for the euro area, September 2023.
[29]   See Lane, P.R., "Inflation Diagnostics", *The ECB Blog*, 25 November 2022.

2 How climate change affects potential output

Prepared by Miles Parker

1 Introduction

Climate change and the actions taken to tackle it will profoundly change economic activity in the coming decades. Eliminating carbon emissions requires changes to how people consume and how businesses produce. Without sufficient progress in reducing emissions, average temperatures will increase, sea levels will rise, and climate extremes will become more frequent and more powerful.[1]

One common approach to estimating the economic impact of climate change uses scenarios with consistent paths for carbon emissions and climatic conditions.[2] While such estimates depend on the exact scenario, the general conclusion is that unmitigated climate change is substantially worse for potential output over the long run than the impact of the transition to net-zero carbon. Yet the transition itself may also reduce potential output, particularly in the near term. Well-conceived, well-communicated and well-coordinated policies can help alleviate these negative impacts.[3]

This article takes an alternative approach by detailing the channels of impact on potential output, drawing on the existing literature and ongoing work at the ECB. Knowledge of these channels can help frame policy discussions and improve the modelling of the economic impacts of climate change. Those impacts can be broadly separated into three categories.

- **long-run climate change,** including higher average temperatures, changes to precipitation, rising sea levels and adaptation measures taken to reduce its impact;

- **extreme weather and climate events,** such as droughts, heatwaves, wildfires, windstorms and floods;

- **the transition to a net-zero carbon economy,** including notably the impact of policies enacted to accelerate the transition, such as carbon taxes and regulation.

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[1]   See Intergovernmental Panel on Climate Change, "Climate Change 2022: Impacts, Adaptation and Vulnerability, Summary for Policymakers", Cambridge University Press, Cambridge and New York, 2022.

[2]   See, for example, Network for Greening the Financial System, "NGFS Scenarios for central banks and supervisors", September 2022.

[3]   Preliminary analysis by the European System of Central Banks' Expert Group on Productivity finds that labour productivity in the euro area would be 0.5 percentage points lower in a disorderly transition scenario relative to an orderly one.

2 What is potential output?

Potential output is an important concept for monetary policy. It represents the highest level of output that an economy can sustain over the medium term.[4] Actual output can diverge from potential output, with the difference between the two called the output gap. When the output gap is positive (actual output exceeds potential), there is generally upward pressure on the cost of factors of production, resulting in higher consumer prices and necessitating tighter monetary policy. Correspondingly, a negative output gap tends to put downward pressure on inflation. So while potential output is not directly observable, estimating its value plays an important role when assessing current economic conditions and determining the monetary policy stance.

Three main components contribute to potential output.

- **Capital stock:** all assets – both physical and intangible – used as part of the production process. This includes buildings, machinery, software and patents as well as public infrastructure, such as roads.

- **Labour supply:** the total number of hours worked in the economy. This is a function of the number of people participating in the labour force, structural causes of unemployment and average hours worked per worker.

- **Total factor productivity (TFP):** how effectively capital and labour are used in the production process, reflecting both technology and managerial capabilities.

Some impacts of climate change on potential are readily visible, such as the destruction of physical capital during catastrophes; other impacts can be less obvious. Yet these other effects can be just as critical for the long-run impact of climate change. Table 1 briefly summarises the main channels of impact, which are covered in more detail below. Moreover, how climate change affects biodiversity is not always captured in traditional economic models nor in measures of economic activity such as GDP. This is discussed in Box 3.

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[4]   See the article entitled "Potential output in the post-crisis period", *Economic Bulletin,* Issue 7, ECB, 2018.

Table 1

The impact of climate change on the components of potential output

	Capital stock	Labour supply	Total factor productivity
Long-run climate change	Shifts in tourism flows. Loss of agricultural land from higher temperatures, water stress and salinification of soil due to rising sea levels. Disruption of economic activity in coastal areas from higher sea levels. Loss of biodiversity and ecosystem services.	Higher rates of mortality and sickness. Higher regional structural unemployment from changes in tourism, for example. Climate-induced migration.	Reduced labour efficiency from higher temperatures, including fewer hours worked. Capital invested in adaptation is less productive in aggregate and diverts resources away from innovation.
Extreme weather and climate events	Destruction of capital stock in disasters. Opportunity to replace old, destroyed capital with newer, more technologically advanced capital. Greater uncertainty and volatility reduce willingness to invest over long run.	Higher rates of mortality and sickness. Disaster-induced migration. Loss of education and skills.	Disaster-induced bankruptcies and localised reductions in access to finance cause reallocation between firms, for better or worse. Rebuilding process distracts management, reducing overall productivity.
Climate policies and green transition	Increase in stranded assets. Higher energy costs from carbon taxes reduce funds for investment.	Skills mismatches increasing structural unemployment.	Reallocation of output between firms within sectors may prove more or less efficient. Environmental regulation reduces productivity, perhaps (more than) offset by innovation. Reduced impact of supply shocks arising from fossil fuels.

Not every channel affects potential output at the medium-term horizon that matters most for monetary policy. Some slow-moving impacts can substantially reduce potential over the long run but may not greatly influence inflation. Short-term impacts, such as temporary dislocation following disasters or supply chain disruptions of critical minerals, may imply alternative monetary policy prescriptions than medium-term variations.[5] Regardless of the impact horizon, the combination of channels described here increases uncertainty and makes it harder for central banks to accurately estimate potential output during the macroeconomic projection process that supports monetary policy decisions.

3 The impact of long-run climate change

Long-run changes in average temperatures and precipitation patterns are likely to negatively affect certain sectors and regions across Europe. Tourism is one example. Warmer winters are expected to reduce the availability of snow for skiing. Similarly, many Mediterranean regions are currently ideal for summer tourism, but higher average temperatures and reduced availability of fresh water during the high season would substantially reduce their suitability.[6] The overall impact for southern Europe depends on whether tourists will change the timing of their holidays as more spring and autumn months may become viable. Coastal regions in the

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[5] See Panetta, F., "The complexity of monetary policy", speech, Florence, 14 November 2022.

[6] See Amelung, B. and Moreno, A., "Impacts of climate change in tourism in Europe. PESETA-Tourism study", *JRC Scientific and Technical Reports*, EUR 24114 EN, Luxembourg, 2009.

Mediterranean are also vulnerable to greater risks of flooding from rising sea levels. These changing conditions are likely to reduce the value of tourist-related capital (such as hotels) in affected regions and shrink future investment rates.

Agriculture is also expected to be affected, with southern Europe in particular facing lower crop yields. By contrast, yields may increase in some areas of northern Europe. Opportunity exists to switch crop species to adapt to higher temperatures, but water supply is expected to constrain options, notably in southern Europe.[7] Moreover, even if crops are adapted to the changes in average temperatures and precipitation, the widening of the distribution of outcomes relative to those averages may also reduce yields. That said, the value of European agricultural products may increase if other food-producing regions in the world suffer more seriously from climate-related impacts.

Higher temperatures reduce the productivity of, and hours worked by, individual workers. Workers are typically at their most productive in the comfort range of 19-22°C, with efficiency declining non-linearly beyond that range.[8] Workers in industries highly exposed to temperature, such as construction, have been shown to reduce their time worked on hot days.[9] And it is not just physical jobs that are affected: heat can also impair mathematical ability above certain thresholds.[10]

Given the non-linear impact, labour supply will be more affected by rising temperatures in countries that are on average already hotter.[11] Since low-income countries (or regions) tend to have hotter climates and specialise in climate-exposed sectors such as agriculture and tourism, rising global temperatures are likely to exacerbate income inequalities between countries and regions. Within Europe, a marginal increase in temperature could boost labour productivity growth in cooler countries, but the impact turns negative once the average historic temperature exceeds 14°C, approximately that of Italy and France.[12]

Higher temperatures may result in more deaths, although adaptation using technology may temper the impact on labour supply. The 2022 summer heatwave in Europe is estimated to have caused 60,000 heat-related deaths.[13] The

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[7] See Jacobs, C. et al., "Climate change adaptation in the agriculture sector in Europe", *European Environmental Agency Report,* No 04, 2019; Ceglar, A. et al., "Observed Northward Migration of Agro-Climate Zones in Europe Will Further Accelerate Under Climate Change", *Earth's Future*, Vol. 7, Issue 9, 2019, pp. 1088-1101.

[8] See Heal, G. and Park, J., "Temperature Stress and the Direct Impact of Climate Change: A Review of an Emerging Literature", *Review of Environmental Economics and Policy*, Vol. 10, No 2, 2016, pp. 1-17.

[9] See Graff Zivin, J., and Neidell, M., "Temperature and the Allocation of Time: Implications for Climate Change", *Journal of Labor Economics*, Vol. 32, No 1, 2014, pp. 1-26.

[10] See Graff Zivin, J., Hsiang, S. and Neidell, M., "Temperature and Human Capital in the Short and Long Run", *Journal of the Association of Environmental and Resource Economists*, Vol. 5, No 1, 2018, pp. 77-105.

[11] See Dell, M., Jones, B. and Olken, B., "Temperature Shocks and Economic Growth: Evidence from the Last Half Century", *American Economic Journal: Macroeconomics*, Vol. 4, No 3, 2012, pp. 66-95.

[12] See Deutsche Bundesbank, "Climate change and climate policy: analytical requirements and options from a central bank perspective", *Monthly Report*, January 2022, pp. 33-61.

[13] See Ballester, J. et al., "Heat-related mortality in Europe during the summer of 2022", *Nature Medicine*, Vol. 29, 10 July 2023, pp. 1857-1866.

relationship between mortality and temperature is in fact U-shaped.[14] Fewer deaths from extremely cold days that should become less frequent partly offset the increase in mortality arising from more heat-related deaths. Moreover, there is some evidence of declining mortality rates, attributed to greater use of air conditioning.[15] Yet claims that technology will mostly eliminate the negative impacts of higher temperatures should be treated with caution. The exact same constraints of access and income that currently prevent the full use of long-standing technologies (such as heating to protect from the cold) are also likely to constrain the widespread use of new technologies in the future.

Climate change could also affect labour supply through climate-induced mortality, morbidity and migration, with Europe likely seen as a highly desirable destination. Higher average temperatures are projected to result in greater rates of sickness.[16] Estimates of the potential future impact of climate on labour migration vary substantially.[17] Historically, only some of those affected by climate events relocate, and most that do are displaced internally rather than emigrating.[18] Yet historical experience of certain regions within countries becoming temporarily inhospitable may be a poor guide if entire countries become permanently so.

In the long run, adaptation can mitigate the impact of climate change on output. Measures such as sea walls, irrigation and relocating activity to less vulnerable locations increase the resilience of the economy to climate change. Yet standard productivity measures do not capture averted output losses, so the effectiveness of the capital stock may appear to decline if more capital is devoted to this task. Allocating resources to adaptation may also reduce the resources available for innovation and hence slow future TFP growth.

4 The impact of extreme weather and climate events

Extreme events typically reduce economic activity in the near term, but the long-run impact is less certain. The initial shock is followed by a period of disruption and uncertainty that gradually gives way to recovery. Factors reducing the short-term impact include higher income per head, higher literacy levels and better institutions.[19] Cash inflows to affected areas (e.g. international aid, fiscal transfers,

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14   See Barreca, A. et al., "Adapting to Climate Change: The Remarkable Decline in the US Temperature-Mortality Relationship over the Twentieth Century", *Journal of Political Economy*, Vol. 124, No 1, 2016, pp. 105-159.

15   ibid.

16   See Mora, C. et al., "Over half of known human pathogenic diseases can be aggravated by climate change", *Nature Climate Change*, Vol. 12, 2022, pp. 869-875.

17   See Missirian, A. and Schlenker, W., "Asylum applications respond to temperature fluctuations", *Science,* Vol. 358, Issue 6370, 2017, pp. 1610-1614.

18   See Burzyński, M. et al., "Climate Change, Inequality, and Human Migration", *Journal of the European Economic Association*, Vol. 20, Issue 3, 2022, pp. 1145-1197.

19   See Noy, I., "The macroeconomic consequences of disasters," *Journal of Development Economics*, Vol. 88, Issue 2, 2009, pp. 221-231.

credit and insurance) cushion the impact and support the recovery.[20] The long-run impact relative to pre-disaster trend growth is more nuanced and can differ between the regional and national levels.

Some countries have been able to build back better by seizing the opportunity to invest in new capital and technologies.[21] But this normally only occurs following mild or moderate events in relatively richer emerging market economies with close trade links to advanced economies.[22] For poorer countries, or after severe events, there is at best a return to trend, and often an incomplete recovery.[23]

The destruction of capital stock is the most visible impact of extreme events on potential output. Floods, windstorms and wildfires destroy buildings, machinery, roads and other infrastructure. Infrastructure damage amplifies the impact on potential output by spreading the effects to businesses that initially avoided damage. Output in primary industries can be durably affected by reduced land viability, such as through soil erosion. The lack of feed during droughts can lead to substantial livestock culls from which herds may take years to recover.

Insurance coverage and access to finance play an important role in underpinning the recovery and lessening the impact on long-run output. Companies with business interruption insurance show better productivity growth and profitability following disasters than those without such policies. But only if the payout is prompt: funding that arrives too late is little better than no funding at all.[24] Moreover, if access to finance is not generally correlated with productivity – if only large businesses can still obtain credit, for example – businesses that are otherwise productive and viable may go bankrupt, further reducing potential output.[25]

The long-run impact is generally more pronounced in the affected regions as workers – typically younger and more skilled – often leave and may be slow to return.[26] One year after Hurricane Katrina devastated New Orleans, there were fewer children relative to population, the average education level declined, and the median age increased by six years.[27] The impact of this emigration may persist for

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20   See McDermott, T., Barry, F. and Tol, R., "Disasters and development: natural disasters, credit constraints, and economic growth," *Oxford Economic Papers*, Vol. 66, Issue 3, 2014, pp. 750-773; Fache Rousová, L. et al., "Climate change, catastrophes and the macroeconomic benefits of insurance", *Financial Stability Review*, European Insurance and Occupational Pensions Authority, July 2021.

21   See Skidmore, M. and Toya, H., "Do Natural Disasters Promote Long-Run Growth?", *Economic Inquiry*, Vol. 40, Issue 4, 2002, pp. 664-687.

22   See Cuaresma, J., Hlouskova, J. and Obersteiner, M., "Natural disasters as creative destruction? Evidence from developing countries", *Economic Inquiry*, Vol. 46, Issue 2, 2008, pp. 214-226.

23   See Hallegatte, S. and Dumas, P., "Can natural disasters have positive consequences? Investigating the role of embodied technical change," *Ecological Economics*, Vol. 68, Issue 3, 2009, pp. 777-786.

24   See Poontirakul, P. et al., "Insurance as a Double-Edged Sword: Quantitative Evidence from the 2011 Christchurch Earthquake", *The Geneva Papers on Risk and Insurance – Issues and Practice*, Vol. 42, 2017, pp. 609-632.

25   See Basker, E. and Miranda, J., "Taken by storm: business financing and survival in the aftermath of Hurricane Katrina", *Journal of Economic Geography*, Vol. 18, Issue 6, 2018, pp. 1285-1313; Uchida, H. et al., "Financial shocks, bankruptcy, and natural selection," *Japan and the World Economy*, Vol. 36, 2015, pp. 123-135.

26   See Bier, V., "Understanding and Mitigating the Impacts of Massive Relocations Due to Disasters", *Economics of Disasters and Climate Change*, Vol. 1, Issue 2, 2017, pp. 179-202.

27   See Vigdor, J., "The Economic Aftermath of Hurricane Katrina", *Journal of Economic Perspectives*, Vol. 22, No 4, 2008, pp. 135-154.

decades. Heavily eroded counties in the Dust Bowl era of the 1930s in the United States witnessed significant outward migration. The price of farmland fell by around 30% relative to less eroded counties, reducing collateral and overall access to finance. The economic effects lasted for more than half a century, even though soil quality recovered much faster.[28]

The outflow of workers from affected regions can, conversely, boost labour supply and hence potential output in other regions, tempering the overall national impact. Searching for new positions and moving are costly, but the break caused by extreme events provides an opportunity to reassess. Indeed, workers who left following Hurricane Katrina ended up on average with higher earnings elsewhere.[29] Yet this experience is not universal. Disasters can reduce educational attainment in affected cohorts, durably lowering human capital. Since parental educational attainment also influences that of their children, the impact can transfer across generations.[30]

Extreme events can also reduce TFP growth over the long run. Even businesses in affected regions that maintain higher rates of capital investment and employment growth still have lower TFP growth over the medium term, suggesting that reconstruction distracts management and disrupts efficiency.[31] Moreover, while patents for adaptation to extreme events increase somewhat following disasters, other types of innovation slow down, resulting in lower long-term TFP in affected regions.[32]

Finally, climate change needs to be considered in the context of more frequent events, rather than taking each event in isolation. Several authors have highlighted channels through which a higher frequency of extreme events results in lower potential output over time.[33] For example, the greater uncertainty could result in households and businesses becoming more cautious and reducing capital investment. Depending on the assumptions of the frequency and magnitude of future

[28] See Hornbeck R., "The Enduring Impact of the American Dust Bowl: Short- and Long-Run Adjustments to Environmental Catastrophe", *American Economic Review*, Vol. 102, No 4, 2012, pp. 1477-1507.

[29] See Deryugina, T., Kawano, L. and Levitt, S., "The Economic Impact of Hurricane Katrina on Its Victims: Evidence from Individual Tax Returns", *American Economic Journal: Applied Economics,* Vol. 10, No 2, 2018, pp. 202-33.

[30] See Almond, D., "Is the 1918 Influenza Pandemic Over? Long-Term Effects of In Utero Influenza Exposure in the Post-1940 U.S. Population," *Journal of Political Economy*, Vol. 114, No 4, 2006, pp. 672-712; Caruso, G. and Miller, S., "Long run effects and intergenerational transmission of natural disasters: A case study on the 1970 Ancash Earthquake", *Journal of Development Economics*, Vol. 117, 2015, pp. 134-150.

[31] See Leiter, A., Oberhofer, H. and Raschky, P., "Creative Disasters? Flooding Effects on Capital, Labour and Productivity Within European Firms", *Environmental & Resource Economics*, Vol. 43, No 3, 2009, pp. 333-350.

[32] See Noy, I. and Strobl, E., "Creatively Destructive Hurricanes: Do Disasters Spark Innovation?", *Environmental and Resource Economics*, Vol. 84, 2023, pp. 1-17.

[33] See, for example, Isoré, M. and Szczerbowicz, U., "Disaster risk and preference shifts in a New Keynesian model", *Journal of Economic Dynamics and Control*, Vol. 79, Issue C, 2017, pp. 97-125; Dietrich, A., Müller, G. and Schoenle, R., "The Expectations Channel of Climate Change: Implications for Monetary Policy", *CEPR Discussion Papers*, No 15866, Centre for Economic Policy Research, 2021.

disasters, expected annual output growth could fall by between 0.25 and 1 percentage point.[34]

5 The impact of climate policies and the green transition

Swift action to cut emissions and the transition to a net-zero carbon global economy are required to reduce the impacts of long-run climate change on output. Over the long run, a global transition to net-zero carbon is projected to deliver higher output compared with a scenario of no transition.[35] Yet the transition itself may entail potential output losses, particularly if carried out in a disorderly fashion or if certain regions forge ahead while others do not follow fast enough to eliminate global emissions.[36] Climate scenarios generally incorporate a combination of taxes and regulation to increase the effective carbon price. Higher carbon prices encourage households and businesses to switch to alternatives with lower carbon content and promote the innovation, adoption and diffusion of clean technologies. ECB analysis suggests that carbon taxes have so far not had a major adverse impact on potential output in Europe (Box 1).[37]

Box 1
Empirical evidence on the impact of carbon taxes on potential output growth in Europe

Prepared by Christoph Zwick

The empirical literature on the macroeconomic effects of carbon taxes focuses on the impact on carbon emissions, with few contributions studying the broader macroeconomic implications and even fewer looking into longer-run structural implications. No studies exist on the impact on potential output.

Splitting out endogenous reactions by tax authorities is the key econometric challenge in identifying the dynamic impact of a carbon tax on macroeconomic outcomes. For example, the authorities may react to reductions in potential output by postponing carbon tax increases which, if unaddressed, would lead to biased results. To overcome this challenge, Metcalf and Stock propose splitting carbon tax changes into two components – one predicted by historical economic outcomes as well as current and past international shocks and one unpredicted by those factors, which can then be considered exogenous. The exogenous part can be used to estimate the causal impact of the tax on the economy.[38]

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[34] See Cantelmo, A., "Rare Disasters, the Natural Interest Rate and Monetary Policy", *Oxford Bulletin of Economics and Statistics*, Vol. 84, Issue 3, 2022, pp. 473-496.

[35] See Network for Greening the Financial System, op. cit.

[36] It is also important to use the correct comparison to evaluate potential output losses. The true benchmark for transition impacts is not the past, but a future with unmitigated climate change.

[37] The implications of carbon taxes extend beyond potential output. For a discussion of euro area fiscal impacts, see the article entitled "Fiscal policies to mitigate climate change in the euro area", *Economic Bulletin*, Issue 6, ECB, 2022.

[38] See Metcalf, G. and Stock, J., "Measuring the Macroeconomic Impact of Carbon Taxes", *AEA Papers and Proceedings*, Vol. 110, 2020, pp. 101-106.

Preliminary research under way at the ECB uses this approach to study the impact of carbon taxes on potential output for 29 European countries over the period from 1985 to 2021.[39] Around half of those countries have enacted carbon taxes, with the highest set by Sweden in 2014 at USD 140/tCO2 (in real terms, based on 2018 purchasing power parity). Chart A shows the impact of a USD 40 carbon tax shock, which is close to the average sample tax rate for those countries that have enacted carbon taxes. Importantly, the lower boundary of the 95% confidence interval is around -0.1 percentage point, implying that the impact is statistically significant above that value. This compares with the average annual growth rate of potential output in the sample of 2.1%. Given the highest tax level in the sample and the fact that carbon taxes have typically risen gradually over time, the results suggest that carbon taxes have not had a major adverse impact on potential output growth in Europe in the past.

Chart A

Impact of a USD 40/tCO2 carbon tax shock on potential output growth

(percentage points)

- 1 standard deviation
- 2 standard deviation
- Mean
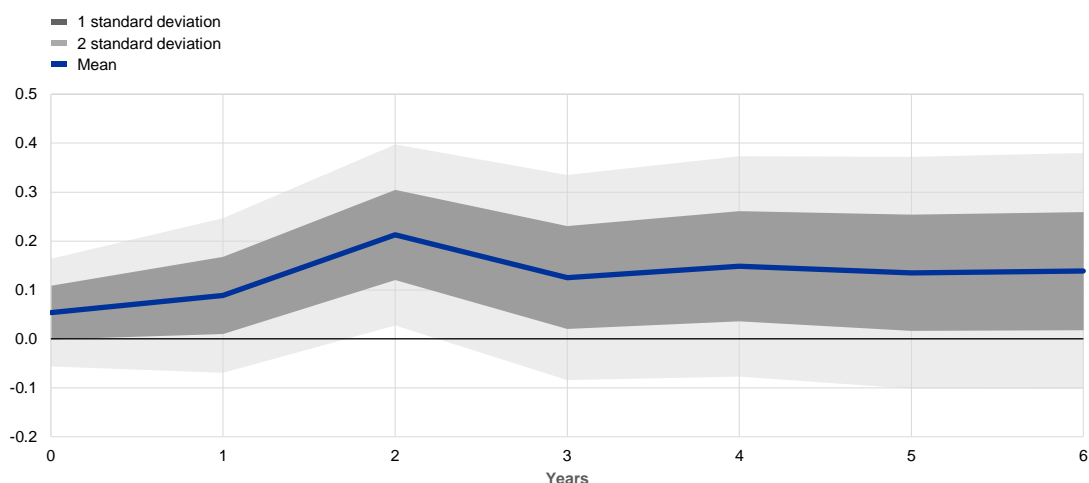
Sources: AMECO, World Bank and ECB calculations.
Note: The graph shows impact on potential output in the years following the tax shock, with year 0 being the year of implementation.

The green transition is a structural transformation of the economy, shifting capital and workers between sectors, between companies within the same sector and within individual companies. The overall impact therefore depends on a range of structural and technological factors, including barriers that prevent new, innovative firms from entering markets and growing (and inefficient, carbon-intensive ones from leaving), impediments to workers changing positions and the rate of green innovation. If the transition is orderly, with ample technological progress and well-communicated, and hence predictable, carbon price increases and other government policies, carbon-intensive capital can be replaced once depreciated with new, green capital at relatively small extra cost. But if the transition is abrupt, or happens before equivalent green technology exists, carbon-intensive capital becomes obsolete before the end of its usable life, reducing the overall capital stock.

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39   The results presented follow this empirical approach. They are based on the full sample and are shown for two-year lag local projections. The sample comprises only countries that are covered by the EU Emissions Trading System, and hence controls for its impact.

Workers shifting from carbon-intensive jobs to green ones may impair labour supply if there exist substantial skills mismatches, although the balance of evidence suggests few constraints that are unique to the green transition. In around 5% of EU regions, carbon-intensive jobs account for more than 20% of employment.[40] Such regions could suffer from protracted unemployment and skill atrophy, the human equivalent of stranded assets. Yet most "green" jobs are only partly so and share many skills with "dirty" jobs, while most of the unique skills are obtainable through on-the-job training.[41] The International Energy Agency estimates that most carbon-intensive jobs in the energy sector share skills with green energy positions and that more than half of workers in the sector in Europe have already transferred.[42] That said, scarcity of available workers caused by population decline in Europe in the coming decades may slow the green transition.[43] Structural policies that support labour mobility as part of standard economic transformation should therefore also help smooth the impact of the transition on labour supply.

The overall impact of the transition on economy-wide TFP depends on the relative productivity of growing versus shrinking businesses. If shrinking carbon-intensive sectors have greater productivity than growing green sectors, sectoral reallocation during the transition will lead to lower aggregate productivity (and vice versa). The impact may then vary across economies, depending on their industrial structure. But the overall impact is far from certain, since even within sectors there are substantial differences in carbon intensity. The 20% most carbon-intensive EU businesses in the metals and chemicals sectors account for around three-quarters of total sector carbon emissions, but only 20-30% of employment. In the cement and lime sector, where businesses use similar technology, the 20% most emissions-intensive firms account for 30% of emissions, but only 10% of employment.[44] The most emissions-intensive businesses generally have lower TFP than other firms in the same sector, so reallocating their output and labour could both boost sectoral TFP and reduce emissions.[45]

The overall long-run impact on productivity ultimately depends on successful innovation in green technologies that can match carbon-intensive ones for efficiency. Care needs to be taken when comparing these technologies – the inefficiency of long-run environmental degradation of current carbon-intensive technologies is not currently well-measured. Green technologies that avoid this damage, including capital put in place to abate emissions, may not have their full contribution measured in GDP, and so may falsely appear less efficient than existing technology.

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[40]   See Vandeplas, A. et al., "The Possible Implications of the Green Transition for the EU Labour Market", *European Economy Discussion Papers*, No 176, European Commission, 2022. Based on NUTS 2 basic regions.

[41]   See Bowen, A., Kuralbayeva, K. and Tipoe, E., "Characterising green employment: The impacts of 'greening' on workforce composition", *Energy Economics*, Vol. 72, 2018, pp. 263-275.

[42]   See International Energy Agency, *World Energy Employment*, 2022.

[43]   See the box entitled "EUROPOP2023 demographic trends and their euro area economic implications", *Economic Bulletin*, Issue 3, ECB, 2023.

[44]   See Bijnens, G. and Swartenbroekx, C., "Carbon emissions and the untapped potential of reallocation – Lessons from the EU ETS", *NBB Economic Review*, No 06, 2022.

[45]   ibid.

Environmental regulation may encourage innovation that enhances productivity sufficiently over the long run to offset the short-run costs (the Porter hypothesis).[46] Evidence for the hypothesis is mixed overall, but one key sector where green innovation has resulted in competitive technology is electricity generation. Technological improvements and economies of scale have caused the price of electricity generated from wind and solar to plummet over the past decade. Both sources are now markedly cheaper than fossil fuel sources of electricity on a levelised cost basis.[47] While challenges remain to handle intermittency, particularly at high penetration rates, a substantial switch from fossil fuel electricity generation to renewables would at present likely result in both lower carbon intensity and lower costs. Since the euro area is a net importer of fossil fuels, reduced reliance would also reduce the impact of supply shocks arising from this energy source.

The impact of regulation varies across businesses, with those at the technological frontier better able to reap benefits.[48] ECB research has highlighted how different policies used to incentivise decarbonisation vary in their impact on firm-level productivity. Market-based policies (such as carbon taxes) and subsidies for research and development have the lowest negative overall impact, whereas regulation has a more marked negative impact (Box 2). Larger firms are less affected by transition policies, reflecting both better access to capital and a greater innovative capacity.

Box 2
Testing the Porter hypothesis: environmental regulation and productivity growth in the euro area

Prepared by Paloma Lopez-Garcia

The Porter hypothesis states that environmental regulation might trigger innovation and productivity gains over the long run that compensate possible short-term costs. Empirical testing of the hypothesis is inconclusive. Moreover, using country-level data and aggregate policy measures hides the heterogenous effects of various policies on different types of firms.

Recent ECB research uses data for more than three million individual firms from six euro area countries from 2003 to 2019 along with the OECD's Environmental Stringency Policy (EPS) indicator to test the Porter hypothesis.[49] The research uses estimates of firm-level carbon emissions to identify the causality of the impacts, given that environmental policy is likely to affect firms differently depending on their exposure to the regulation. The research aims to determine how firm-level innovation and TFP growth are affected over time by tighter environmental regulation. It also differentiates between types of environmental policy, splitting them up into market-based measures (such as carbon taxes and emissions trading schemes), non-market-based measures (such as

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46 See Porter, M. and van der Linde, C., "Toward a new conception of the environment-competitiveness relationship", *Journal of Economic Perspectives*, Vol. 9, No 4, 1995, pp. 97-118.

47 The net present cost per kWh of electricity generated over the lifetime of a plant, including financing, building and operating.

48 See OECD, "Productivity growth, environmental policies and the Porter hypothesis", *Assessing the economic impacts of environmental policies: Evidence from a decade of OECD research*, Organisation of Economic Co-operation and Development, Paris, 2021.

49 See Benatti, N., Groiss, M., Kelly, P. and Lopez-Garcia, P., "Environmental regulation and productivity growth in the euro area: testing the Porter hypothesis", *Working Paper Series*, No 2820, ECB, 2023.

bans or limits on certain products or processes) and technology support for green research and development (R&D).

More stringent environmental policy affects emission-intensive firms more than their low-emission peers. It is, however, important to distinguish between the different policy types. For high-emission firms, R&D support policies only have temporary negative effects before eventually boosting TFP growth. By contrast, market policies have persistent negative, albeit small effects, and non-market tools reduce TFP growth the strongest in the five years following the policy change (Chart A). But high-emission firms are not all affected in the same way. The TFP growth of large emission-intensive firms increases after a policy change, while that of small emission-intensive firms falls significantly, which could reflect better access to capital and higher innovative capacity.

Chart A

Firm-level impulse response functions of a tightening of environmental policy on TFP growth of high-emission firms
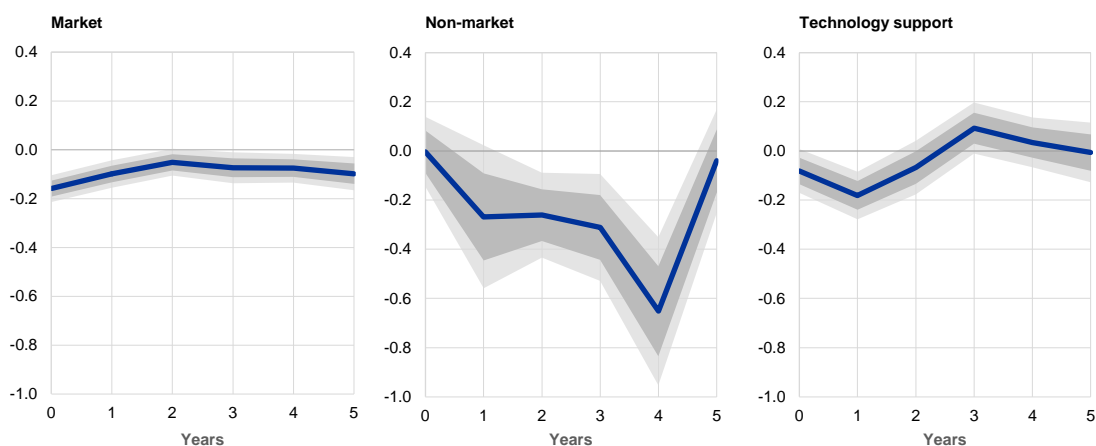
(percentage points)

Source: ECB calculations.
Notes: Impulse response function of a 1 percentage point EPS change on a firm's TFP growth over five years for market (taxes), non-market (emission limits) and technology support (R&D subsidies) policies. High-emission firms are identified as those in the top half of the carbon emission distribution. Shaded areas show the 68% and 90% confidence intervals.

We also study the impact on patent applications to check whether more stringent policies may increase long-run TFP growth by spurring innovation and investment in green technology and whether green innovation crowds out other innovation.[50] Green patent applications by high-emission firms increase significantly after the tightening of environmental policies, without crowding out other types of innovation (Chart B). The positive impact is driven by non-market and, above all, R&D support policies. Market-based policies barely affect patenting by firms. However, looking at just the largest 25% of policy changes, market-based policies do have a significant and positive impact on green innovation. There is no evidence of crowding out, as other patent applications either do not change or even increase slightly. This increase could be due to complementarities across technology types if, for example, a new green technology also requires new software.

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[50] Benatti, N., Groiss, M., Kelly, P. and Lopez-Garcia, P., "Environmental regulation and innovation in the euro area: Testing the Porter hypothesis", *Working Paper Series*, ECB, forthcoming.

Chart B

Firm-level impulse response functions of a tightening of environmental policy on green patent applications by high-emission firms
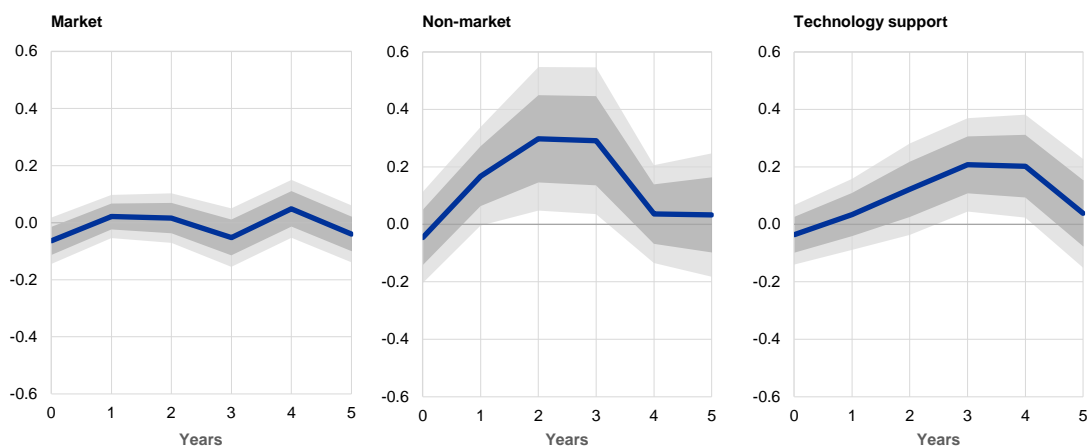
(percentage points)

Source: ECB calculations.
Notes: Impulse response function of a 1 percentage point EPS change on an increase in a firm's green patent applications over five years for market (taxes), non-market (emission limits) and technology support (R&D subsidies) policies. High-emission firms are identified as those in the top half of the carbon emission distribution.

The overall combined results provide some support for the Porter hypothesis – while firm-level TFP growth declines following a tightening of environmental policy, it can increase over the long term as patent applications increase.

6   Other climate-related factors influencing potential output

Potential output may also be affected in the short or long run by other climate-related factors, most notably intermediate inputs to production. Many green technologies rely on certain critical metals and minerals, such as lithium, cobalt and silicon, which will need to be mined in much greater quantities than at present. Future supply chain disruptions affecting these raw materials may temporarily restrict the production of solar panels, wind turbines, electric vehicles and other key transition products.[51]

A large share of economic activity relies on the – unpriced and unvalued – contribution of natural capital, biodiversity and ecosystem services. Clean air, clean water and wild pollination are just some of these services that do not appear in GDP. Yet the environmental degradation witnessed over recent decades could threaten their contribution to potential output in the future. Box 3 explores the reliance of European businesses on these ecosystem services.

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[51]   For an analysis of the impact of supply chain disruptions on euro area potential output, see the box entitled "How persistent supply chain disruptions could affect euro area potential output", *Economic Bulletin*, Issue 1, ECB, 2022.

Box 3

Economic activity's reliance on nature

Prepared by Andrej Ceglar

Human wellbeing relies on nature and biodiversity – the variety and variability of life on Earth. We all require the food, clean air and water, energy and raw materials provided by nature. The economy is no different, with over half of global economic production dependent on nature and the ecosystem services it provides.[52] Pollination, for example, is required by about 75% of our food crops,[53] with an estimated annual global economic value of between €248 billion and €293 billion.[54]

Despite mounting scientific evidence of nature's high socio-economic benefit, natural ecosystems are deteriorating at an unprecedented rate. An estimated 1-in-8 animal and plant species on Earth are threatened by extinction, with the number as high as 1-in-4 in Europe.[55] The main drivers of biodiversity loss include land use, climate change, overexploitation of natural resources, pollution and invasive species. The estimated annual global cost is already immense: around €3.5-18.5 trillion in reduced ecosystem services and €5.5-10.5 trillion from land degradation.[56]

Nature loss affects the economy through three main channels, similar to the climate change channels discussed above: increased impact of extreme weather and climate events, long-run dwindling of ecosystems and the impact of policies put in place to avert these losses. For example, wetland loss increases vulnerability to storm surges,[57] fewer pollinators reduce agricultural output, and regulation could limit the exploitation of natural resources or ban certain products. Some business models may disappear, while others might become too expensive and lose market share. Shaping effective policy measures requires an understanding of double materiality: how the economy affects nature and how nature affects the economy.

Our analysis shows that around three-quarters of non-financial corporations in the euro area are highly dependent on natural benefits such as protection from floods and storms, freshwater provision and climate regulation (including carbon removal).[58] Severe impairment of the relevant ecosystem would create critical economic problems for those companies. Similarly, around three-quarters of euro area corporate bank loans are granted to companies highly dependent on at least one ecosystem service, which could lead to substantial bank losses in the event of critical ecosystem failure, amplifying the overall economic impact.

Climate change and nature loss are closely interconnected. Identifying the interdependencies and reinforcing mechanisms between climate, environmental pressures and biodiversity is crucial to fully capture nature-related risks. Timely recognition, assessment and action to address these challenges are essential to mitigate future economic losses. While further development of risk

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[52] See World Economic Forum, "Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy", 2020.

[53] See Klein, A.-M. et al., "Importance of pollinators in changing landscapes for world crops", *Proceedings of the Royal Society B*, Vol. 274, Issue 1608, 2007.

[54] See Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, "Assessment report on pollinators, pollination and food production", Bonn, 2016.

[55] See Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, "Summary for policymakers of the global assessment report on biodiversity and ecosystem services", Bonn, 2019.

[56] See Costanza, R. et al., "Changes in the global value of ecosystem services", *Global Environmental Change*, Vol. 26, 2014, pp. 152-158.

[57] See Narayan, S. et al., "The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA", *Scientific Reports*, Vol. 7, No 9463, 2017.

[58] See Elderson, F., "The economy and banks need nature to survive", The ECB Blog, 8 June 2023.

modelling frameworks is needed to identify and quantify the key transmission channels, we already have enough data and knowledge available to enable nature-friendly policymaking while there is still time.

Chart A

Direct and indirect dependency of euro area non-financial corporations on ecosystem services

(dependency scores)
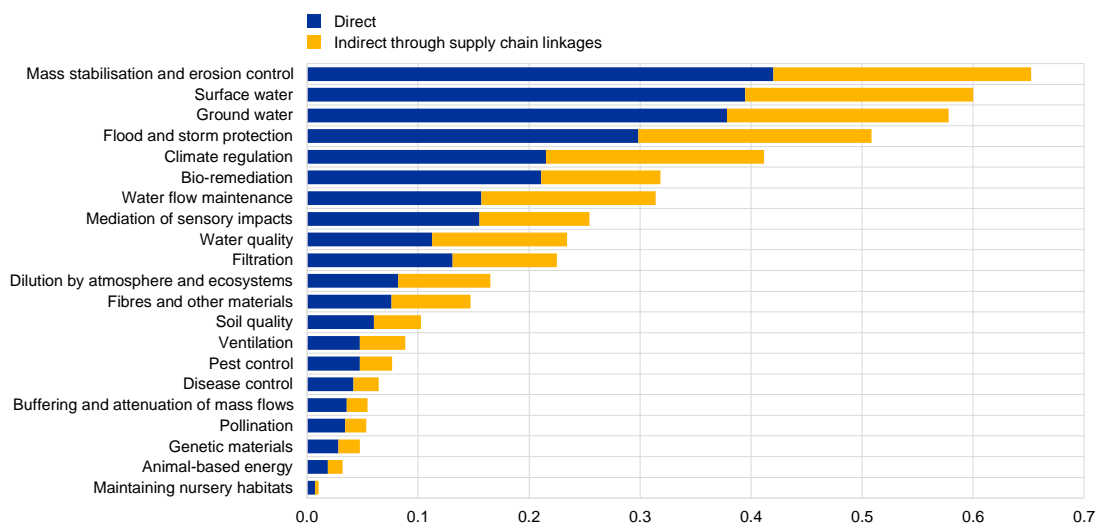
Sources: ENCORE, EXIOBASE, AnaCredit and ECB calculations.
Notes: Euro area dependency score is computed as the average of the dependency scores of euro area non-financial corporations. A distinction is made between direct dependency (Scope 1) and indirect dependency (upstream) associated with the supply chain.

7 Conclusions

Climate change and actions taken to tackle it are likely to affect potential output in the euro area in the coming decades. The impacts extend beyond the destruction of physical capital during extreme events and include the impacts on labour supply and technological progress. For many of the channels described here, our knowledge remains imperfect and would benefit greatly from future research. The effects of biodiversity loss in particular have received little attention so far.

One major challenge for monetary policy is the substantial localised impact of climate change on regions or on certain sectors, in contrast to standard macroeconomic shocks. Divergent country-level impacts in particular can pose challenges for the operation of monetary policy in the euro area. Recent research has highlighted how production linkages between firms can amplify shocks.[59] Climate change impacts concentrated on certain sectors or regions may therefore affect aggregate activity and prices by much more than their share in output would suggest and hence have repercussions for monetary policy.

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[59] See, for example, Baqaee, D. and Farhi, E., "The Macroeconomic Impact of Microeconomic Shocks: Beyond Hulten's Theorem", *Econometrica*, Vol. 87, Issue 4, 2019, pp. 1155-1203; Guerrieri, V. et al., "Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?", *American Economic Review*, Vol. 112, No 5, 2022, pp. 1437-1474.

Finally, the range of the channels of impact and the number of obstacles to a successful green transition highlight the need for a broad range of policies to complement carbon pricing. The transition is a structural transformation of the economy. Structural policies that support effective movements of capital and labour across activities are vital, as are those that support innovation and the widespread uptake of new technologies. At the same time, even with a swift and smooth transition, the impacts of climate change and extreme events are likely to increase, requiring adaptation measures including irrigation, air conditioning and insurance.

3 SESFOD@10 – credit terms and conditions in euro-denominated securities financing and over-the-counter derivatives markets since 2013

Prepared by Simon Kördel and Philippe Molitor

Credit terms and conditions are an essential component of financing conditions and central to determining market participants' risk appetite. Financing conditions affect market participants' investment decisions. Looser credit terms and conditions may favour the build-up of leverage and increased risk-taking in the financial system. Building on the lessons from the global financial crisis, the ECB has been running the three-monthly survey on credit terms and conditions in euro-denominated securities financing and over-the-counter derivatives markets (SESFOD) since March 2013.[1]

Securities financing transactions (SFTs) are secured transactions in which assets are exchanged for cash. In economic terms, SFTs represent a loan which is collateralised by assets (e.g. bonds or shares). SFTs encompass four different transaction types: repurchase agreements (repos), securities lending, buy/sell back transactions and margin lending.[2] Euro-denominated repo transactions currently represent the largest segment of the euro money market with an outstanding amount of around €2 trillion at the end of 2022. Secured trades have become more popular since the financial crisis owing to a greater preference for mitigating counterparty risk through collateralisation. In addition to providing secured funding, repo transactions also enable market participants to source specific securities. Lastly, the secured money market segment plays a central role in monetary policy implementation and transmission, as does the unsecured money market segment.[3]

Over-the-counter (OTC) derivatives are financial instruments whose price depends on an underlying asset and which are traded outside of regulated exchanges. Derivatives are financial contracts linked to the fluctuation in the price of an underlying asset or a basket of assets (e.g. interest rates instruments, equities or commodities). OTC derivatives − which are privately negotiated and not traded on an exchange − accounted for almost 32% of the euro-denominated derivatives markets with a total gross notional outstanding amount of €41 trillion at the end of 2022. Financial derivatives are used, among other things, for risk management, hedging, arbitrage between markets and speculation.[4] Derivatives have a significant impact on the real economy, from mortgages to food prices.

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1   See the special feature entitled "New ECB Survey on Credit Terms and Conditions in Euro-denominated Securities Financing and Over-the-Counter Derivatives Markets (SESFOD)", *Financial Stability Review*, ECB, May 2013.

2   For definitions, see Article 3 of the Regulation (EU) 2015/2365 of the European Parliament and of the Council of 25 November 2015 on transparency of securities financing transactions and of reuse and amending Regulation (EU) No 648/2012 (OJ L 337, 23.12.2015, p. 1).

3   See Euro money market study 2022, ECB, April 2023.

4   See Derivatives / EMIR, European Commission.

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SESFOD is part of an international initiative to collect information on the credit terms and conditions offered by firms operating in the wholesale markets. These markets are also important conduits for leverage in the financial system. SESFOD sheds light on potential risks associated with securities financing and derivatives markets, while also serving as a valuable monitoring and potential early warning tool by identifying significant changes in credit terms and conditions. Lastly, information on changes in the cost and availability of funding in wholesale markets, and in repo markets in particular, may support the analysis of monetary policy transmission and interbank funding conditions.[5]

SESFOD can be seen as the market-based counterpart to the euro area bank lending survey (BLS).[6] The ECB conducts several surveys[7], among which both SESFOD and the BLS focus, in part, on credit conditions. SESFOD studies credit terms for SFTs and OTC derivatives, whereas the BLS provides information on bank lending conditions for firms and households in the euro area.

On the tenth anniversary of SESFOD, this article illustrates the developments and drivers of counterparty credit terms and conditions based on participants' responses over time.

1   Background to the survey

SESFOD, which was developed as part of an international initiative[8], is a predominantly qualitative survey of the activities of a sample of large banks and dealers in securities financing and over-the-counter (OTC) derivative markets. SESFOD participants are large banks and dealers headquartered in both euro area and non-euro area countries. The SESFOD panel currently consists of 27 banks. Box 1 looks at the representativeness of the survey participants in terms of their footprint in the relevant euro-denominated markets. In the aftermath of the 2008 global financial crisis, a study group of the Committee on the Global Financial System (CGFS) recommended conducting a qualitative survey on credit terms and conditions.[9] This resulted in major global central banks using equivalent survey structures. The results from such surveys provide the basis for international comparisons. Box 2 compares responses on hedge funds from SESFOD with those from the Federal Reserve's Senior Credit Officer Opinion Survey on dealer financing terms (SCOOS).

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[5]   Analyses that drew on SESFOD information include Section 2.1 in the Financial Stability Review, ECB, November 2019 and the boxes entitled "Recent trends in credit terms and conditions in euro-denominated securities financing and over-the-counter derivatives markets based on information from the SESFOD survey", *Financial Stability Review,* ECB, November 2018 and "Interconnectedness of derivatives markets and money market funds through insurance corporations and pension funds", *Financial Stability Review,* ECB, November 2020.

[6]   See Euro area bank lending survey, ECB.

[7]   See ECB surveys, ECB.

[8]   The Bank of Canada, the Bank of England and the Federal Reserve System conduct similar surveys but only the Federal Reserve publishes aggregated results. See Senior Credit Officer Opinion Survey on Dealer Financing Terms.

[9]   See Committee on the Global Financial System, "The role of margin requirements and haircuts in procyclicality", *CGFS Papers*, No 36, BIS, March 2010.

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SESFOD covers the markets that facilitated higher leverage and risk-taking in the lead-up to the global financial crisis. Prior to 2007, the non-bank financial system (sometimes referred to as the shadow banking system) enabled the build-up of leverage and allowed increasing interconnectedness within the financial system. SFT and OTC derivative markets played a key role in these developments. SESFOD was designed to monitor risks arising from increased interconnectedness, excessive financial leverage, vulnerability to procyclicality, "repo runs" and financial conditions.

SESFOD qualitative results enrich and complement the more recently available granular data on the covered markets. Since the survey was launched, new datasets have become available which provide granular insights into the markets covered by SESFOD. These datasets include data collected under the European Market Infrastructure Regulation (EMIR), the Securities Financing Transactions Regulation (SFTR) and Money Market Statistical Reporting (MMSR).[10] However, while price terms could be monitored through these datasets to some extent, SESFOD offers insights on non-price terms. The monitoring of non-price terms (e.g. credit limits or covenants and triggers) through quantitative datasets is much more challenging and costly. At the same time, as experienced during the global financial crisis[11], changes in non-price terms may have a much more adverse impact than changes in price terms (e.g. haircuts or initial margin requirements).

SESFOD also provides a forward-looking perspective that cannot be offered by regulatory data. SESFOD includes questions seeking qualitative information on the future direction of credit terms for different counterparty types or on the availability of (unutilised) leverage at hedge funds. Surveyed banks are asked about their outlook, which is later compared with actual market developments. The reliability of forward-looking information is one of the focus points in Section 4

2 Survey structure

SESFOD is structured in three parts spanning different counterparty types and market segments.[12] The first part covers credit terms across counterparty types in both SFT and OTC derivatives markets, while the second focuses on financing conditions against different types of collateral in SFT markets. The third part deals with financing conditions based on the type of underlying asset classes in OTC derivatives transactions.[13]

Credit terms are reported from the perspective of the dealer banks participating in the survey as suppliers of credit; they are differentiated between price and non-price terms and by counterparty types. Banks

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[10] Data collection under EMIR started in 2012, MMSR in 2016 and SFTR in 2020.

[11] See *Financial Stability Review*, ECB, May 2013, op. cit.

[12] The standard survey template includes 342 questions which are broadly similar to those asked in surveys by other central banks, enabling a comparison among jurisdictions (see Box 2).

[13] Additionally, the first and last survey round of the year includes "special questions" regarding long-term trends and market making. The survey may also include ad hoc special questions such as those asked in June 2020 regarding financing conditions at the outset of the pandemic or in March 2022 regarding energy derivatives.

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participating in SESFOD report changes in the credit terms they apply to SFT and OTC derivatives transactions with counterparties belonging to one of six counterparty types: (i) banks and dealers, which are the main financial intermediaries in wholesale markets; (ii) hedge funds; (iii) insurance companies; (iv) investment funds (including exchange-traded funds), pension plans and other institutional investment pools; (v) non-financial corporations; and (vi) sovereigns. In addition to the counterparty breakdown, credit terms are also differentiated into price and non-price terms. Price terms refer to the compensation demanded for bearing risk, e.g. financing rates or spreads; non-price terms refer to contractual provisions used to mitigate risk exposures, e.g. haircuts, provisions on the maximum maturity of funding, covenants and triggers. To the extent that credit terms have tightened or eased, respondents are asked to provide up to three of the most important reasons why their price and non-price credit terms have changed across the entire spectrum of securities financing and OTC derivatives transaction types, selecting from a given list of eight reasons.[14]

Aggregate survey results are expressed in net percentages of respondents. For each question, survey respondents choose from five options, for example: (i) tightened considerably; (ii) tightened somewhat; (iii) remained basically unchanged; (iv) eased somewhat; and (v) eased considerably. Net percentages are calculated as the difference between the percentage of respondents reporting "tightened considerably" or "tightened somewhat" and those reporting "eased somewhat" and "eased considerably".

The time series of aggregate survey results since the survey launch in March 2013 enables a comparison of SESFOD results with relevant market indicators. Comparing SESFOD for the main financial intermediary counterparty types with the Euro Stoxx 50 Volatility Index (VSTOXX) illustrates that SESFOD results for financial counterparties tracked the VSTOXX index rather closely. Moreover, after some dispersion in credit terms across financial counterparties in the earlier part of the survey period, credit terms have moved in line in recent years (Chart 1, panel a).

Comparisons are also possible with the results of other surveys such as the BLS. Since the information covered by both ECB surveys also includes credit conditions for non-financial entities, it is possible to compare results from the SESFOD survey with those of the BLS. Overall credit terms for non-financial counterparties in SESFOD are not always aligned with BLS credit standards for euro area firms. Credit conditions from SESFOD are more volatile when compared with the credit standards reported in the BLS. Moreover, SESFOD results have pointed to a tightening in most quarters since 2015, whereas BLS results moved to a consistent tightening only as of 2022 and have been signalling mostly easing credit standards between 2014 and 2019 (Chart 1, panel b).

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[14]   See also the SESFOD guidelines, ECB, 2016, or *Financial Stability Review*, ECB, May 2013, op. cit.

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Chart 1

SESFOD and BLS aggregate survey results and VSTOXX index

a) Financial SESFOD counterparties and VSTOXX index

(left-hand scale: net percentages of responses; right-hand scale: index)

- ■ SESFOD, banks and dealers
- ■ SESFOD, hedge funds
- ■ SESFOD, insurance companies
- ■ SESFOD, investment funds (incl. ETFs), pension plans and other institutional investment pools
- ■ VSTOXX index (right-hand scale)
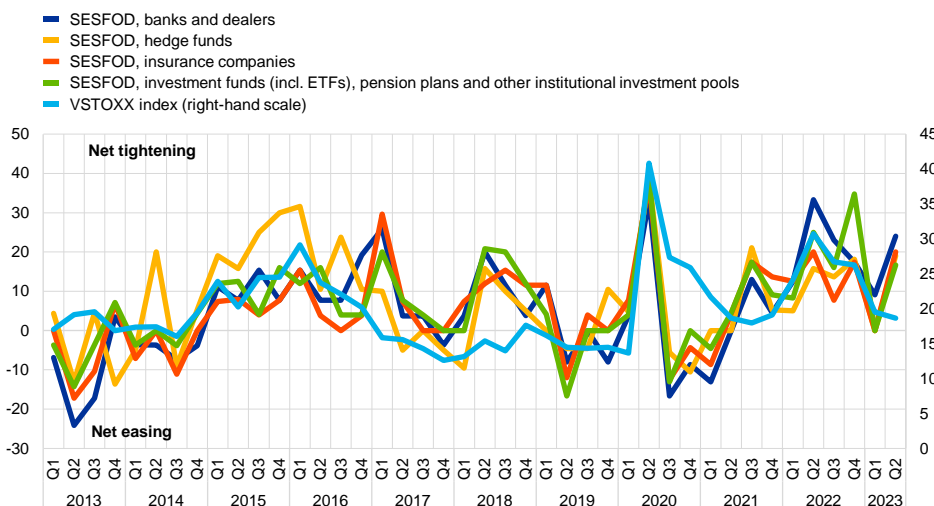
b) Non-financial SESFOD counterparties and BLS

(left-hand scale: net percentages of responses; right-hand scale: index)

- ■ SESFOD, non-financial corporations
- ■ SESFOD, sovereigns
- ■ BLS, credit standards for euro area firms
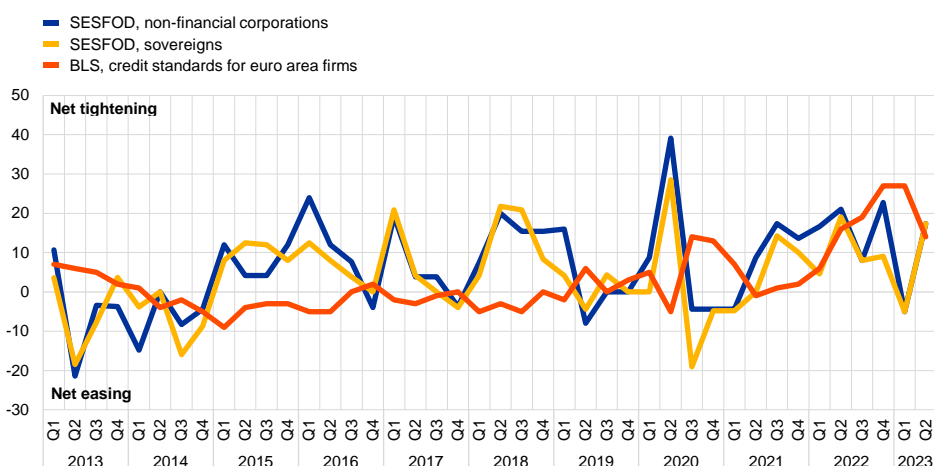
Sources: SESFOD, Eurex, and ECB calculations.
Note: For the VSTOXX index the median value over the SESFOD reporting periods is shown.

The time series of responses since the survey launch in March 2013 provide a rich basis for assessing the range of opinions among participating banks. The mapping of qualitative answers into numerical scores allows us to compute several statistics and to gauge the aggregate information collected by SESFOD.[15] In a nutshell, dispersion across responding banks on single questions can be aggregated at the survey round level or by question theme. This approach can also be applied to subgroups of respondents, typically broken down by their jurisdiction or the national location of the headquarter. This analysis is presented in Section 3.

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[15] Using the example above, tightened considerably is assigned a numerical score of +2, tightened somewhat +1, remained basically unchanged 0, eased somewhat -1, and eased considerably -2.

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As the predominant response has been "remained basically unchanged", the net percentages – as aggregate indicators of survey results – have often been based on a small number of responses either side of the response spectrum. For each survey since 2013, an average 88% of responses indicated that conditions were basically unchanged. This average is lower for questions on counterparty credit terms and highest for those on uncleared OTC derivatives (Chart 2). Given the predominance of these responses among a relatively small set of participants, we need to ensure that survey findings are not consistently driven by a subset of (individual) respondents or by the geographic domicile of the respondents.

Chart 2
SESFOD responses indicating basically no change

(percentages)
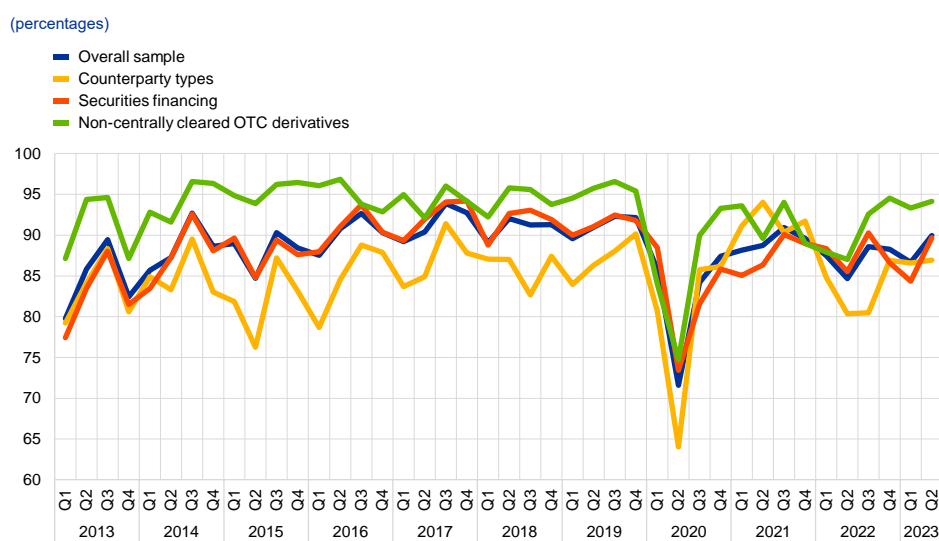
Sources: SESFOD and ECB calculations.
Note: For each survey round, the average of the share of "remained basically unchanged" responses received for the 342 SESFOD questions (or for the questions in a subsection of the questionnaire) is calculated and displayed over time.

3   Drivers of changes in bank responses

Participant opinions differ more on questions about price terms than on ones about non-price terms (Chart 3, panel a). Bank responses vary based on the questions and the geographic area of the survey participants. The standard deviation for responses to questions on price terms is higher than for those on non-price terms. Credit terms and conditions not only reflect considerations about counterparty credit risk management, but also considerations about balance sheet availability, market liquidity and competitive pressures, etc. These are further documented in Section 5. Moreover, the non-price terms and conditions agreed with established counterparties in relation to transactions or financial instruments guided by e.g. International Swaps and Derivatives Association (ISDA) agreements are adjusted very infrequently.

Views have diverged more among participants headquartered in the euro area than among participants headquartered elsewhere (Chart 3, panel b). The jurisdiction breakdown reveals a persistent difference in dispersion within groups.

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The most likely factors driving this wedge are differences in customer bases and in full access to the Eurosystem liquidity facilities. For the former, euro area banks compete for many small and medium-sized enterprises (SMEs), while non-euro area groups focus on larger, global clients in the "blue chips" echelon.

Chart 3

Opinion dispersion indicator by theme

a) Price and non-price terms

(standard deviation)
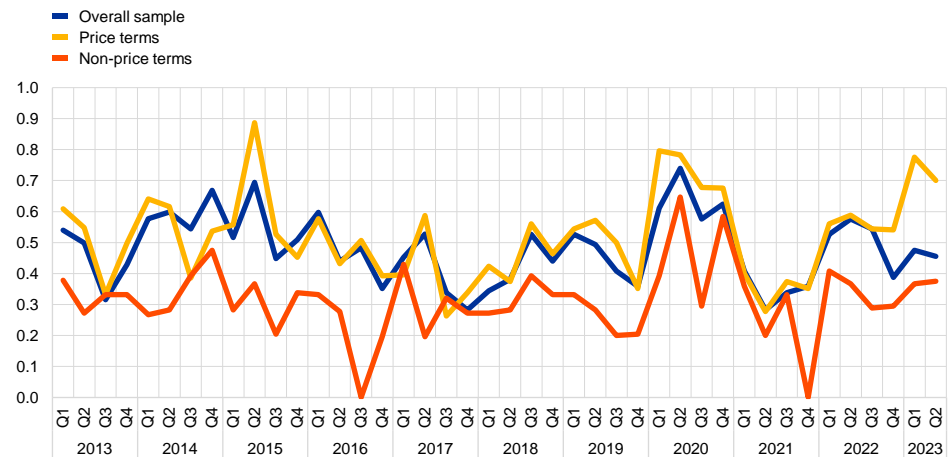
b) Domicile

(standard deviation)
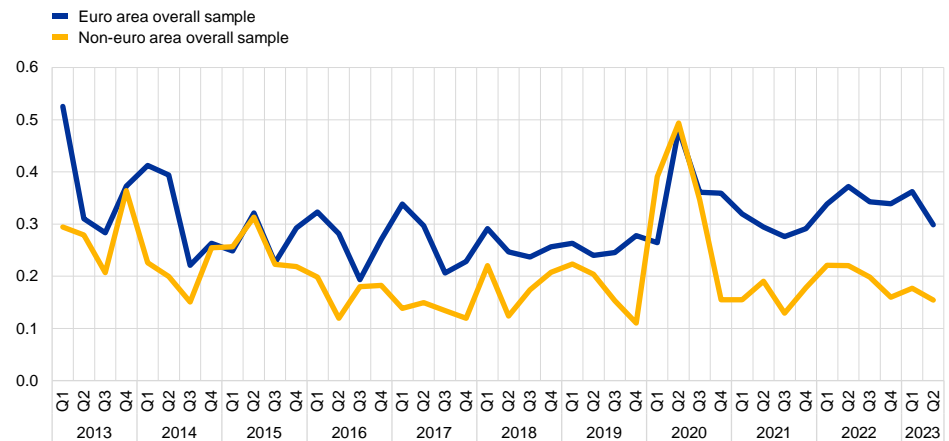
Sources: SESFOD and ECB calculations.
Note: Surveyed banks' individual responses to a question are translated into numerical scores ranging from -2 to +2. The standard deviation is then computed using the numerical scores across all surveyed banks' responses. The standard deviations for a subgroup of questions is then aggregated for a point of time taking the average.

4   Bank expectations versus outcomes

SESFOD assesses counterparty credit terms from both a backward-looking and a forward-looking perspective. For predetermined counterparty types and for all counterparties, SESFOD asks respondents to assess overall, price and non-price credit terms over the preceding three months and to share their expectations for these terms over the forthcoming three months. This section assesses the degree to

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which expectations expressed by participants at the individual (micro) and at the aggregate (macro) levels have leading indicator properties.

Individual participants predominantly and correctly anticipate unchanged counterparty credit terms, while only rarely correctly anticipating directional changes. Incorrect anticipations were more common for price than for non-price terms: on average, respondents correctly anticipated unchanged price and non-price terms in 67.7% and 83.7% of the cases respectively. Moreover, respondents' expectations were on average directionally wrong in 28.5% of the cases for price terms and in 14.2% of the cases for non-price terms. Correctly anticipated directional changes were more often correct on the tightening side (5.1% of the cases for price and 2.1% for non-price terms) than on the easing side (2.4% and 0.9%) (Chart 4).

Chart 4

Expectations of individual respondents and realised outcomes

a) Price terms

(number of responses by direction and accuracy)
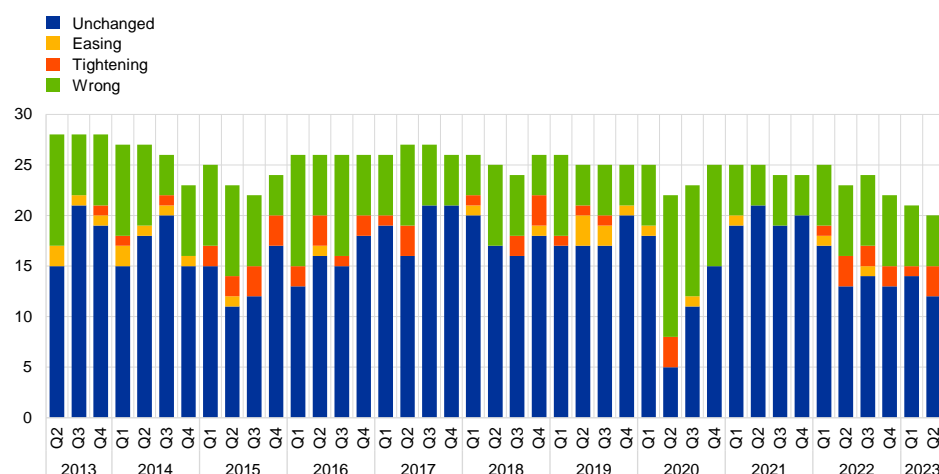
b) Non-price terms

(number of responses by direction and accuracy)
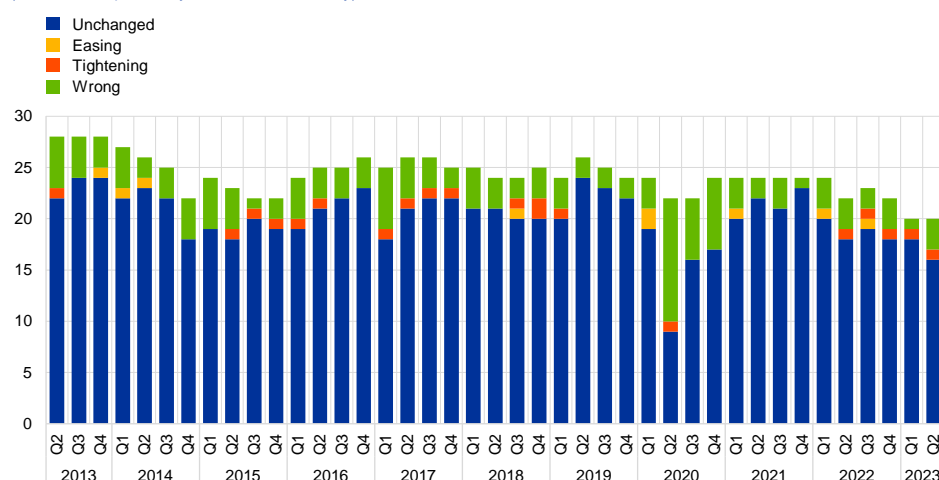
Sources: SESFOD, and ECB calculations.
Note: Respondents' expectations from the previous review period are evaluated against the direction that was actually realised over the review period.

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Aggregate expectations have consistently displayed leading indicator properties (Chart 5). Aggregate opinions, often described as the "wisdom of the crowd", could balance out individual underperformances and deliver higher accuracy. On average, respondents have rightly anticipated the overall credit terms across counterparty types in 76% of the cases. In 24% of the cases, respondents' anticipations did not materialise without erring either on the easing or on the tightening side. In 13% of the cases, the observed credit terms tightened less than expected, whereas in 11% of the cases they eased less than expected. This good aggregate anticipation might be driven by poor individual expectations balancing each other out, or also by self-fulfilling expectations and endogeneity, as SESFOD participants are large market participants.

Chart 5

Aggregate expectations versus realisations – SESFOD leading indicator properties

a) Time series of actual and expected changes

(aggregate net percentage of survey respondents, shifted to following survey period for expected changes)
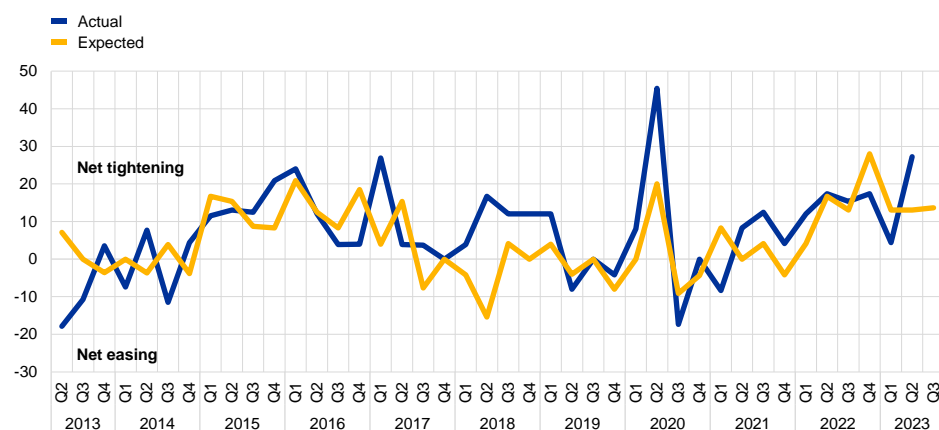
b) Accuracy of expectations

(percentages)
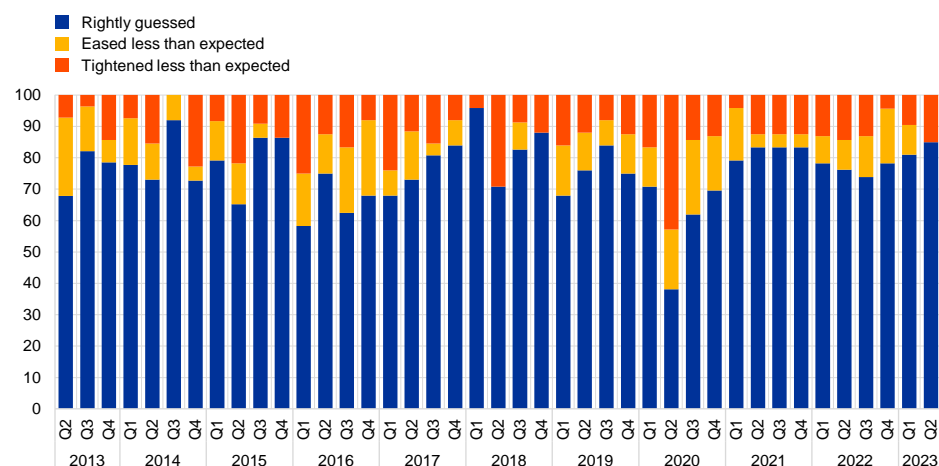
Sources: SESFOD, and ECB calculations.
Notes: Actual variation comes from questions in which market participants are asked to assess the change in overall conditions over the past three months, while expectations are derived by asking them to guess what conditions will be like in the following three months.

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5 Drivers behind changes in counterparty credit terms and conditions

Survey responses may reveal cyclicality in the relative importance of drivers of credit terms and conditions or may be indicative of underlying structural market developments. Respondents are asked to provide the three most relevant drivers behind an easing or tightening in credit terms as appropriate by selecting from a list of eight options. Analysing these responses over time reveals that some of these drivers are cyclical (e.g. the role of general market liquidity and functioning) (Chart 6, panel a). Beyond this cyclicality, the recurring mention of individual drivers as the most relevant reasons for tightening or easing can help identify structural trends in markets.

General market liquidity and functioning as well as competition from other institutions have been identified as the main drivers influencing price and non-price terms over the life of SESFOD. Since the start of SESFOD, survey participants have named general market liquidity and functioning as the main driver for an easing or tightening of price and non-price terms. Additionally, competition from other institutions and availability of balance sheet space were consistently mentioned by the surveyed banks (Chart 6, panel a). For price terms applied to transactions with bank and dealer counterparties, responses show that balance sheet availability and the adoption of new market conventions, in particular during the early implementation phases of Basel III, were important drivers in the early years of SESFOD. In line with the results for all counterparties, general market liquidity and functioning has had the main impact on price terms in recent years (Chart 6, panel b).

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Chart 6

Drivers of survey price credit terms for all counterparties and for banks and dealers

a) All counterparties – reasons for tightening and easing

(left-hand scale: number of responses by driver; right-hand scale: percentages)

- Current or expected financial strength of counterparties
- Willingness of your institution to take on risk
- Adoption of new market conventions (e.g. ISDA protocols)
- Internal treasury charges for funding
- Availability of balance sheet or capital at your institution
- General market liquidity and functioning
- Competition from other institutions
- Other
- Net percentage of respondents (right-hand scale)

b) Banks and dealers – reasons for tightening

(percentages)

- Current or expected financial strength of counterparties
- Willingness of your institution to take on risk
- Adoption of new market conventions (e.g. ISDA protocols)
- Internal treasury charges for funding
- Availability of balance sheet or capital at your institution
- General market liquidity and functioning
- Competition from other institutions
- Other
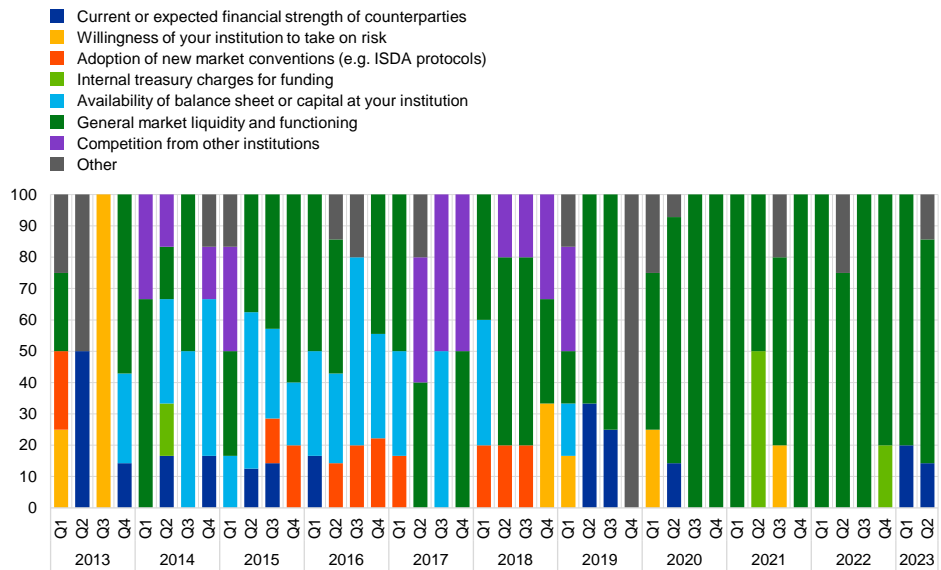
Sources: SESFOD and ECB calculations.

6   Concluding remarks

SESFOD surveys a small but representative sample of market participants. The analysis of responses since the launch of the survey in 2013 validates the conduct and use of the survey for financial stability (as it shows increases in risk-taking and

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build-up of leverage), for market functioning and for monetary policy (as it shows changes to financing conditions).

- The infrequent changes, along with the "wisdom of the crowd" phenomenon observed for developments in price and non-price credit terms, emphasise the value of the qualitative SESFOD information as a warning light for future unfavourable developments.

- Coupling the qualitative survey with quantitative regulatory reporting data will further enrich the assessment of credit terms in euro-denominated SFT and uncleared OTC derivatives markets and enable a better understanding of the financing conditions prevailing in financial markets.

Box 1
Market structure and sample representativeness

Prepared by Emanuele Franceschi, Piotr Kotlarz, Valentina Macchiati and Philippe Molitor

The value of SESFOD for policymaking relies on the representativeness of SESFOD participants for the underlying market segments. On launching SESFOD, the ECB selected participants on the basis of balance sheet and market information and feedback from EU national authorities. The participant sample has remained broadly stable since the launch of SESFOD and currently consists of 27 major banking groups located inside and outside the euro area. This box provides quantitative evidence using regulatory reporting information under the Securities Financing Transactions Regulation (SFTR) and European Market Infrastructure Regulation (EMIR) to validate this selection and its representativeness in terms of activities in euro-denominated securities financing and over-the-counter (OTC) derivatives markets. The information and data are also used to illustrate the relative importance of different collateral types in securities financing transactions (SFT) markets and of instrument types in derivatives markets.

SFT markets

The transaction-level dataset under the Securities Financing Transaction Regulation (SFTR) requires any EU-based entity engaging in securities financing transactions to report such transactions to trade repositories. The SFTR separately covers repurchase agreements (repos) and buy/sell-backs, securities lending and borrowing, as well as margin lending. It thus provides almost universal coverage of European market participants' financial activities in the covered market segments.

SESFOD banking groups lend about €1.3 trillion via repo and represent approximately 60% of the entire euro-denominated repo funding market (Chart A). This share has been remarkably stable over recent SESFOD reference periods and supports the representativeness of the SESFOD sample in securities financing transactions markets. SESFOD participants headquartered in the euro area represent around 70% of the survey participants' market footprint and their share is slowly increasing.

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Chart A

SESFOD footprint in the European repo market is sizeable and stable

(left-hand scale: EUR trillions; right-hand scale: percentages)

- SESFOD, euro area
- SESFOD, non-euro area
- Other
- SESFOD share (right-hand scale)
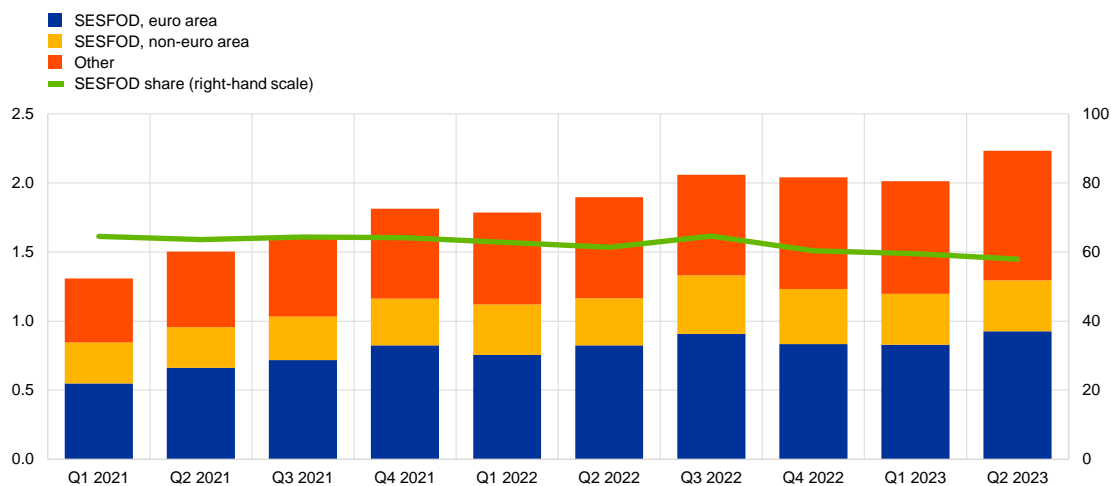
Sources: Securities Financing Transactions Data Store (SFTDS), Global Legal Entity Identifier Foundation (GLEIF), ESCB's Register of Institutions and Affiliates Data (RIAD), and ECB calculations.
Notes: Values are computed as medians over daily values within each three-month reference period. SESFOD participants' values represent those of their whole banking group. Geographical location is assigned by the headquarter of each banking group. The sample is restricted to euro-denominated repo and buy/sell-back lending from SESFOD participants and overall euro repo lending reported under the SFTR.

In most cases, SESFOD participants supply funds against government debt. In secured financing transactions, counterparties exchange liquid funds against collateral. The entities or banks supplying funds receive a security in exchange and agree to sell it back when the repo contract matures. Under the SFTR, detailed information is collected about the collateral backing repo transactions. For SESFOD participants, public debt – issued either by central governments or supranational entities – is by far the most common type of collateral and it is used to back about 90% of total repo transactions by volume (Chart B). Collateral in the form of debt securities issued by financial or non-financial corporations is of relatively minor importance in securing securities financing transactions.

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Chart B

SESFOD participants receive mostly public debt as collateral

(percentages)

- Government debt
- Financial corporation debt
- Non-financial corporation debt
- Other collateral types
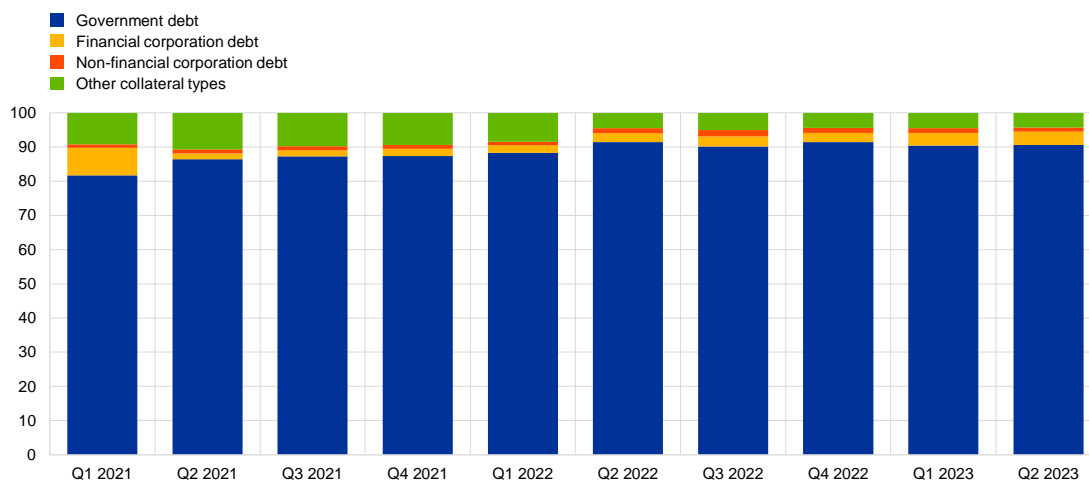
Sources: SFTDS, Centralised Securities Database (CSDB) and ECB calculations.
Notes: Government debt includes national and supranational government debt securities, financial corporation debt includes banks and NBFI entities, non-financial corporation debt includes bonds issued by any other corporation. Other collateral types include securities related to equities, indexes and all residual assets. Values exclusively represent transactions where SESFOD participants supply liquidity against collateral. Shares are computed on the repo spot value, i.e. the liquidity provided. Values are three-month medians over daily values. The sample is restricted to euro-denominated repo and buy/sell-back lending from SESFOD participants and overall euro repo lending reported under the SFTR.

Derivative markets

The European Market Infrastructure Regulation (EMIR) requires European entities to report on derivatives transactions, both when they take place bilaterally (OTC) or are cleared by a central counterparty (CCP). For example, banks use derivatives to hedge against various risks, hence the considerable variety of derivative types, such as currency and interest rates fluctuations, commodities and equities volatility, or credit risk. Also, some large banks provide derivatives market access to non-bank financial institutions and act as gateways for them.[16]

The derivatives market is one of the largest financial markets and is key to assessing risk appetite. Totalling a gross notional amount of more than €120 trillion for the European market, it is mainly made up of interest rate and foreign exchange derivatives, by far the most of which are traded by banks. The EMIR thus sheds light on the risk behaviour and potential build-up of synthetic leverage in financial markets.

SESFOD surveys inform on shifts and trends in OTC markets and risk attitudes. The qualitative and directional information from SESFOD rounds provides useful insights into risk build-up and favoured clearing behaviour. The combination of information on actual behaviour from EMIR and qualitative information from SESFOD allows a comprehensive assessment of the European derivative market.

SESFOD representativeness of derivatives is good, with some heterogeneity. Transactions carried out by SESFOD participants average at about 40% of the whole European market in the first quarter of 2023 (Chart C, panel a). As is the case for data on securities financing transactions, this footprint takes into account the full ownership structure of the banking groups, as ultimate holdings

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[16] See the feature entitled "Key linkages between banks and the non-bank financial sector", *Financial Stability Review,* ECB, May 2023.

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only occasionally enter into derivatives transactions, while branches and subsidiaries located in specialised markets are more active.

SESFOD participants based in the euro area cover relatively more of the cleared market. This is possibly because they make up the largest share of European banks in the survey, but it also reflects the regulatory measures taken since 2008. Indeed, the SESFOD footprint in centrally cleared transactions stands at about 8% for non-European banks, while it triples above 24% for European banking groups, totalling more than 33%. On the other hand, SESFOD covers more than two-thirds of the OTC market, split in 24% for euro area banks and 43% for non-euro area groups.

The SESFOD survey represents 45% of the interest rate derivative market, the largest segment. With a notional gross amount of just below €119 trillion (Chart C, panel b), interest rate derivatives are by far the largest segment in the market, and banks are often relevant players due to their natural exposure to rate fluctuations. While the coverage is larger for OTC transactions, the overall coverage points to a good representativeness of SESFOD. Indeed, the worst performing segment in terms of footprint is the residual "Other" in OTC transactions, which gathers less frequently traded contracts. In this space, SESFOD participants represent about 8% of roughly €250 billion in notional terms.

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Chart C

SESFOD participants trade relatively few derivatives

a) Relative market shares by derivative type and participant group

(percentages)
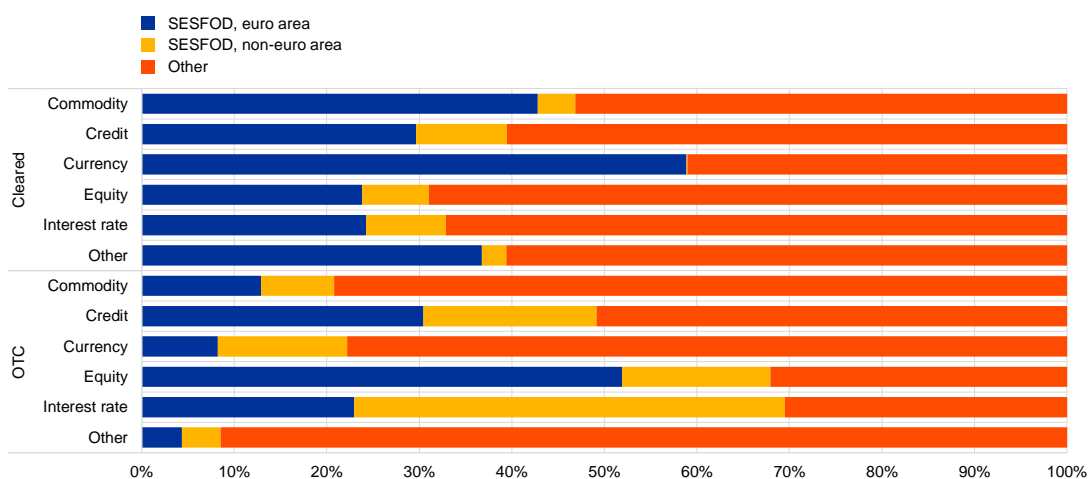
b) Absolute market shares by derivative type and participant group

(EUR trillions)
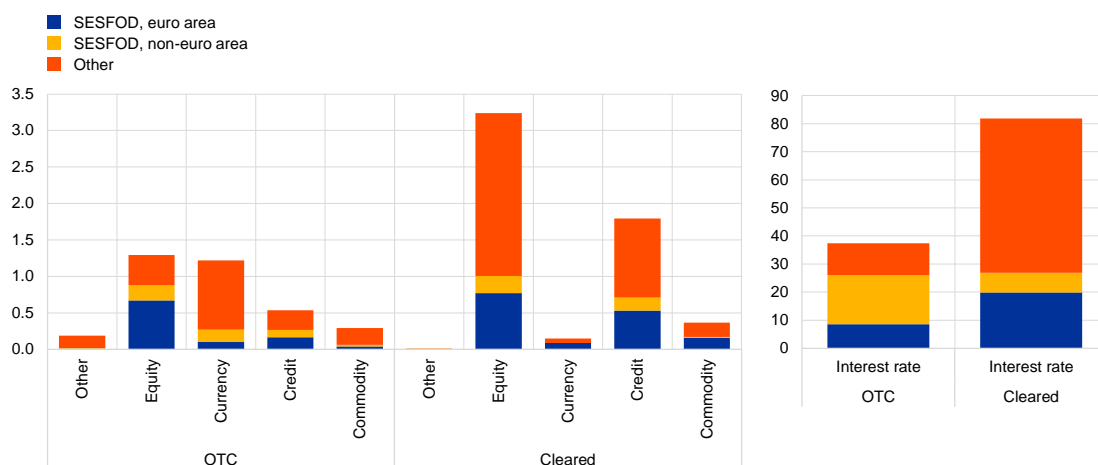
Sources: EMIR and ECB calculations.
Notes: Values represent gross notional seller amounts for SESFOD participants over the period from 1 December 2022 to 28 February 2023. They are three-month median values computed on daily aggregated data for each subcategory. The sample is restricted to euro-denominated derivatives sold by SESFOD participants and overall euro-denominated derivatives reported in EMIR over the same period.

Concluding remarks

Regulatory reports corroborate the representativeness of SESFOD surveys. SFTR and EMIR data enable close benchmarking and monitoring of the footprint of SESFOD participants, in almost real time. The results of this exercise are valuable and corroborate the policy value of SESFOD, particularly in respect of the qualitative, non-price information. Comparing the surveys' answers with actual data can indeed provide useful insights on the transmission from risk appetite and expectations to realised price conditions and inform policy decisions.

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Box 2
Comparison between SESFOD and SCOOS responses on hedge funds

Prepared by Simon Kördel and Philippe Molitor

The SESFOD questions largely mirror questions in the Federal Reserve's Senior Credit Officer Opinion Survey (SCOOS) on dealer financing terms for US dollar-denominated transactions, while being tailored in some aspects to the situation and needs in the euro area. The setups of SESFOD and SCOOS are aligned with each other and with the recommendation of the Committee on the Global Financial System (CGFS). However, some aspects consider the regional situations. For example, the selection of counterparty types accounts for the role and size of specific financial subsectors active in the markets falling under the scope of SESFOD and SCOOS respectively. This box compares results of the SESFOD with its US counterpart, focusing on credit terms as well as leverage in the hedge funds sector.

Hedge funds drove leverage developments and risk-taking in the financial system in the run-up to the global financial crisis. The CGFS identified a lack of information on financing conditions in secured lending and OTC derivatives, including on leverage developments in the hedge funds sector, as a blind spot for policymakers and analysts.[17] The qualitative information from SESFOD and SCOOS is essential in identifying early warnings of developing vulnerabilities.

Hedge funds play a more prominent role in the United States than in the euro area financial system. Even though the total assets under management by euro area-based hedge funds have nearly tripled to around €520 billion since the launch of SESFOD, the hedge fund sector in the euro area is still relatively small when compared with that in the United States which has assets under management of €2.5 trillion (Chart A).[18]

Chart A
Hedge funds total assets in the United States and in the euro area

(EUR trillions)
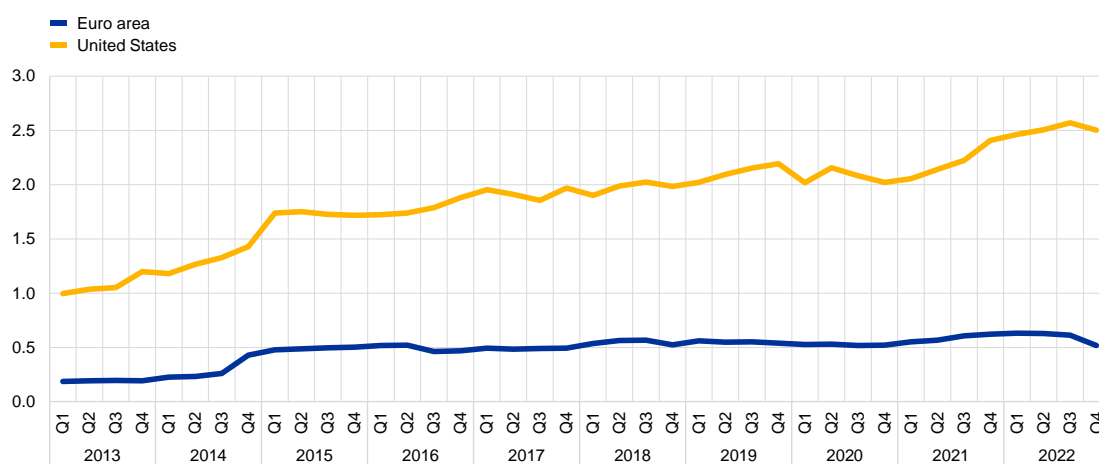
Sources: Board of Governors of the Federal Reserve System, ECB and ECB calculations.

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[17] See Committee on the Global Financial System, "The role of margin requirements and haircuts in procyclicality", *CGFS Papers*, No 36, BIS, March 2010.

[18] The fact that European hedge funds assets only represent a fraction of US hedge funds does not change when accounting for total assets of the UK hedge fund sector. Hedge funds based in the United Kingdom also engage in financial transactions or in markets falling within the scope of SESFOD. In particular non-euro area SESFOD participants reflect developments in these transactions in their responses.

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Price and non-price terms offered to hedge funds

Price and non-price terms offered to hedge funds as reported by SESFOD and SCOOS participants showed overall similar developments with a tendency towards easier credit terms in the United States in the period from 2016 to 2019 (Chart A). Both price and non-price terms of hedge fund counterparties as reported in SESFOD and SCOOS have generally moved in line with each other since the launch of SESFOD in 2013. In the years between 2016 and 2019 SCOOS participants reported easier price and non-price terms compared to their SESFOD counterparts. This must be seen against the background of overall looser financial conditions in the United States during that period.

Chart B

Price and non-price terms for hedge fund counterparties in the euro area and in the United States

a) Price terms

(net percentage of survey respondents)
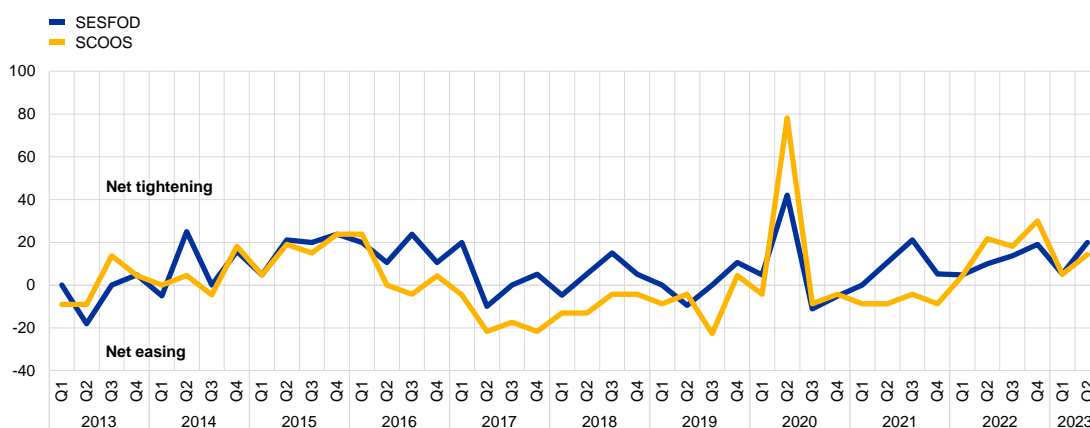
b) Non-price terms

(EUR trillions)
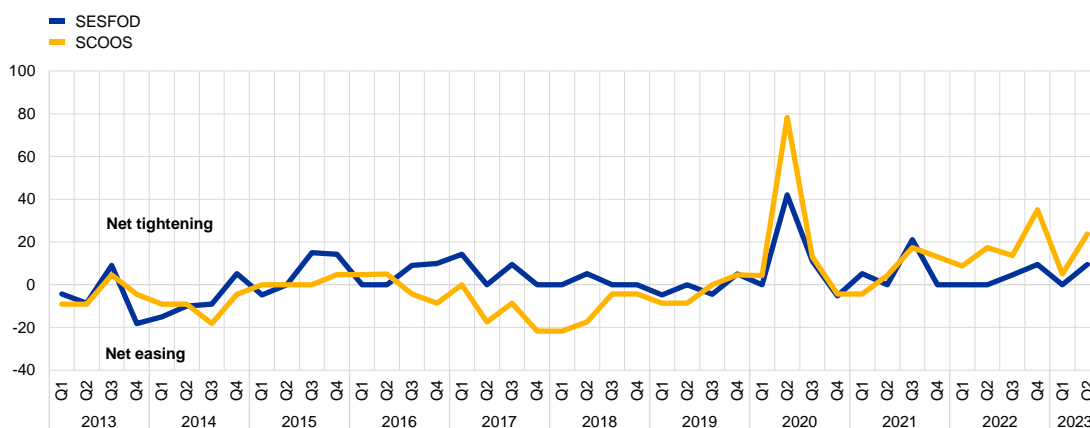
Source: Board of Governors of the Federal Reserve System, ECB and ECB calculations.

Use and availability of leverage

The two surveys also include questions on the availability and the use of financial leverage by hedge funds. Aside from questions regarding the credit terms in SFT and OTC derivative markets, SESFOD and SCOOS also include questions regarding the use of financial leverage by some counterparties, especially hedge funds, as well as the availability of financial leverage at hedge

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funds. This information can be used to identify early warnings of developing vulnerabilities and the build-up of leverage.

The available (and unutilised) leverage of hedge funds displays some leading indicator properties on the future use of leverage (Chart C). The availability of unutilised leverage reported by survey participants can be interpreted as an expectation that this leverage will be used in the future. This can be used as a leading indicator. Since the launch of SESFOD, the availability and the use of financial leverage reported by respondents in both surveys has developed in a broadly similar way, with the exception of the years after the start of the COVID-19 pandemic, during which SCOOS participants reported decreases in the use of leverage up until early 2023, whereas SESFOD participants already reported an increased use of leverage in the third quarter of 2020.

Chart C
Availability of (unutilised) leverage at hedge funds as expectation for actual use of leverage

(percentages)
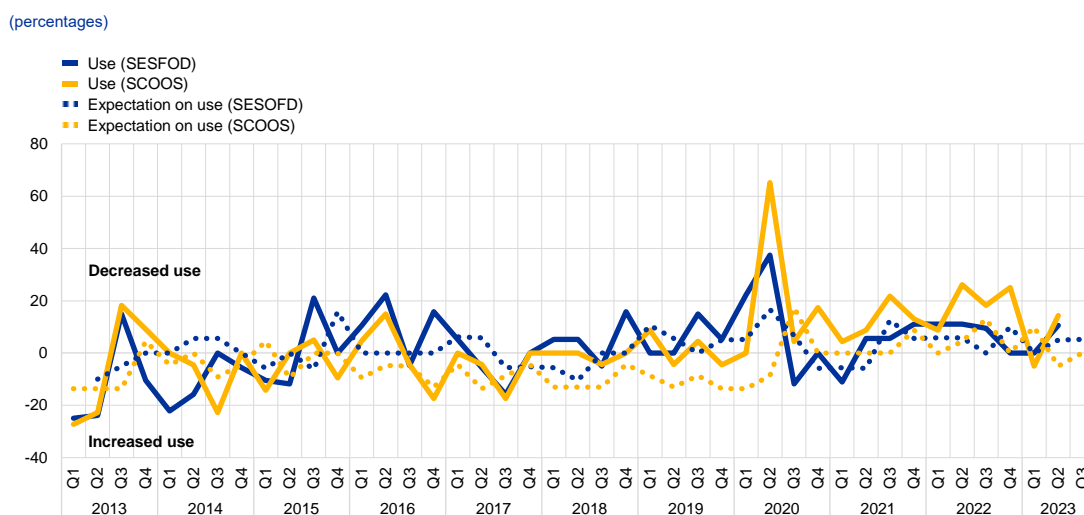
Sources: SESFOD, SCOOS and ECB calculations.
Notes: Availability of (unutilised) leverage at hedge funds is displayed as an expectation for the use of leverage by hedge funds in the subsequent reference period (e.g. expectations on use values in the second quarter are the values for the availability of (unutilised) leverage in the first quarter). The net percentage is defined as the difference between the percentage of respondents reporting "decreased considerably" or "decreased somewhat" and those reporting "increased somewhat" and "increased considerably")

Concluding remarks

The comparison of SESFOD and SCOOS results for hedge funds illustrates the existence of similar developments across the United States and the euro area. The findings validate the use of the qualitative survey information for analyses of potential spillover channels for market developments and systemic risks.

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Statistics

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Further information

Data published by the ECB can be accessed from the ECB Data Portal:	https://data.ecb.europa.eu/
Detailed tables are available in the "Publications" section of the ECB Data Portal:	https://data.ecb.europa.eu/publications
Methodological definitions can be found in the "Methodology" section of the ECB Data Portal:	https://data.ecb.europa.eu/methodology
Explanations of terms and abbreviations can be found in the ECB's statistics glossary:	http://www.ecb.europa.eu/home/glossary/html/glossa.en.html

Conventions used in the tables

-	data do not exist/data are not applicable
.	data are not yet available
...	nil or negligible
(p)	provisional
s.a.	seasonally adjusted
n.s.a.	non-seasonally adjusted

1 External environment

1.1 Main trading partners, GDP and CPI

	GDP [1] (period-on-period percentage changes)						CPI (annual percentage changes)					
	G20	United States	United Kingdom	Japan	China	Memo item: euro area	OECD countries		United States	United Kingdom (HICP)	Japan	China	Memo item: euro area [2] (HICP)
							Total	excluding food and energy					
	1	2	3	4	5	6	7	8	9	10	11	12	13
2020	-3.0	-2.8	-11.0	-4.2	2.2	-6.1	1.3	1.7	1.2	0.9	0.0	2.6	0.3
2021	6.3	5.9	7.6	2.2	8.1	5.6	4.0	3.0	4.7	2.6	-0.3	0.9	2.6
2022	3.2	2.1	4.1	1.0	3.0	3.3	9.6	6.8	8.0	9.1	2.5	1.9	8.4
2022 Q3	1.4	0.8	-0.1	-0.3	3.2	0.3	10.4	7.3	8.3	10.0	2.9	2.7	9.3
Q4	0.4	0.6	0.1	0.1	0.5	-0.1	10.1	7.6	7.1	10.8	3.8	1.8	10.0
2023 Q1	0.9	0.5	0.1	0.8	2.2	0.1	8.6	7.2	5.8	10.2	3.6	1.3	8.0
Q2	.	0.5	0.2	1.2	0.8	0.1	.	.	4.0	8.4	3.3	1.1	6.2
2023 Mar.	-	-	-	-	-	-	7.7	7.2	5.0	10.1	3.2	0.7	6.9
Apr.	-	-	-	-	-	-	7.4	7.1	4.9	8.7	3.5	0.1	7.0
May	-	-	-	-	-	-	6.5	6.9	4.0	8.7	3.2	0.2	6.1
June	-	-	-	-	-	-	.	.	3.0	7.9	3.3	2.9	5.5
July	-	-	-	-	-	-	.	.	3.2	6.8	3.3	2.6	5.3
Aug. [3]	-	-	-	-	-	-	.	.	.	.	.	.	5.3

Sources: Eurostat (col. 6, 13); BIS (col. 9, 10, 11, 12); OECD (col. 1, 2, 3, 4, 5, 7, 8).
1) Quarterly data seasonally adjusted; annual data unadjusted.
2) Data refer to the changing composition of the euro area.
3) The figure for the euro area is an estimate based on provisional national data, as well as on early information on energy prices.

1.2 Main trading partners, Purchasing Managers' Index and world trade

	Purchasing Managers' Surveys (diffusion indices; s.a.)									Merchandise imports [1]		
	Composite Purchasing Managers' Index						Global Purchasing Managers' Index [2]					
	Global [2]	United States	United Kingdom	Japan	China	Memo item: euro area	Manufacturing	Services	New export orders	Global	Advanced economies	Emerging market economies
	1	2	3	4	5	6	7	8	9	10	11	12
2020	47.5	48.8	46.5	42.4	51.4	44.0	48.5	46.3	45.3	-4.0	-4.0	-4.0
2021	54.9	59.6	55.9	49.4	52.0	54.9	53.7	55.2	52.1	11.3	9.9	12.8
2022	50.6	50.7	53.0	50.3	48.2	51.4	49.9	51.0	47.8	2.6	4.4	0.8
2022 Q1	52.2	54.9	58.3	48.7	48.0	54.2	51.0	52.6	49.1	0.8	2.8	-1.4
Q2	51.6	54.0	55.0	52.1	44.9	54.2	50.2	52.1	48.8	-0.2	-0.2	-0.1
Q3	50.0	47.2	50.3	50.2	51.8	49.0	49.9	50.1	47.6	0.5	-0.4	1.6
Q4	48.4	46.5	48.5	50.1	47.9	48.2	48.7	48.3	47.0	-1.8	-1.8	-1.8
2022 July	51.0	47.7	52.1	50.2	54.0	49.9	50.7	51.0	48.6	1.2	0.6	1.8
Aug.	49.3	44.6	49.6	49.4	53.0	49.0	49.8	49.1	47.5	1.0	-0.4	2.5
Sep.	49.9	49.5	49.1	51.0	48.5	48.1	49.1	50.1	46.5	0.5	-0.4	1.6
Oct.	49.3	48.3	48.2	51.8	48.3	47.3	49.5	49.2	47.3	-0.1	-0.8	0.7
Nov.	48.0	46.4	48.2	48.9	47.0	47.8	48.1	47.9	47.0	-0.9	-1.3	-0.4
Dec.	47.9	45.0	49.0	49.7	48.3	49.3	48.6	47.7	46.7	-1.8	-1.8	-1.8

Sources: Markit (col. 1-9); CPB Netherlands Bureau for Economic Policy Analysis and ECB calculations (col. 10-12).
1) Global and advanced economies exclude the euro area. Annual and quarterly data are period-on-period percentages; monthly data are 3-month-on-3-month percentages. All data are seasonally adjusted.
2) Excluding the euro area.

2 Economic activity

2.1 GDP and expenditure components
(quarterly data seasonally adjusted; annual data unadjusted)

	GDP									External balance [1]		
Total	Domestic demand											
	Total	Private consumption	Government consumption	Gross fixed capital formation				Changes in inventories [2]	Total	Exports [1]	Imports [1]
				Total	Total construction	Total machinery	Intellectual property products				
1	2	3	4	5	6	7	8	9	10	11	12
Current prices (EUR billions)											
2020	11,515.7	11,103.4	5,951.3	2,579.5	2,524.0	1,227.9	687.0	602.3	48.6	412.3	5,224.9	4,812.6
2021	12,418.2	11,921.6	6,336.6	2,730.5	2,707.6	1,374.7	760.0	566.0	147.0	496.6	6,148.5	5,651.9
2022	13,427.3	13,188.5	7,053.6	2,886.7	2,997.5	1,547.3	843.2	599.4	250.6	238.8	7,404.8	7,166.0
2022 Q3	3,375.9	3,349.0	1,794.0	723.9	760.9	390.2	215.7	153.1	70.2	26.8	1,912.5	1,885.6
Q4	3,440.8	3,369.4	1,823.9	741.3	768.4	393.8	218.1	154.5	35.8	71.4	1,901.5	1,830.1
2023 Q1	3,506.9	3,372.0	1,849.6	737.2	778.3	402.1	221.8	152.4	7.0	134.9	1,893.0	1,758.2
Q2	3,553.9	3,406.4	1,866.8	749.9	784.4	402.9	224.1	155.4	5.2	147.5	1,869.0	1,721.5
as a percentage of GDP											
2022	100.0	98.2	52.5	21.5	22.3	11.5	6.3	4.5	1.9	1.8	-	-
Chain-linked volumes (prices for the previous year)											
quarter-on-quarter percentage changes											
2022 Q3	0.3	0.9	0.9	0.0	0.9	-1.0	2.7	3.0	-	-	1.2	2.5
Q4	-0.1	-0.6	-0.7	0.5	-0.2	-0.6	-0.3	0.8	-	-	-0.3	-1.4
2023 Q1	0.1	-0.7	0.0	-0.6	0.3	1.0	1.3	-2.4	-	-	0.0	-1.3
Q2	0.1	0.6	0.0	0.2	0.3	-0.2	0.2	1.6	-	-	-0.7	0.1
annual percentage changes											
2020	-6.1	-5.7	-7.7	1.1	-6.3	-4.0	-11.9	-3.8	-	-	-9.0	-8.4
2021	5.6	4.4	4.1	4.1	3.4	5.8	8.5	-7.3	-	-	11.1	8.7
2022	3.3	3.6	4.3	1.3	2.8	1.8	4.6	2.8	-	-	7.0	7.9
2022 Q3	2.3	3.4	2.3	0.4	4.6	1.3	8.4	7.4	-	-	7.6	10.4
Q4	1.7	1.2	1.3	0.6	0.9	0.2	6.5	-3.9	-	-	4.2	3.1
2023 Q1	1.1	0.6	1.4	-0.4	1.9	-0.7	5.0	4.0	-	-	2.6	1.7
Q2	0.5	0.2	0.2	0.1	1.3	-0.9	4.0	2.9	-	-	0.2	-0.2
contributions to quarter-on-quarter percentage changes in GDP; percentage points											
2022 Q3	0.3	0.9	0.5	0.0	0.2	-0.1	0.2	0.1	0.2	-0.6	-	-
Q4	-0.1	-0.6	-0.4	0.1	0.0	-0.1	0.0	0.0	-0.3	0.5	-	-
2023 Q1	0.1	-0.6	0.0	-0.1	0.1	0.1	0.1	-0.1	-0.6	0.7	-	-
Q2	0.1	0.6	0.0	0.1	0.1	0.0	0.0	0.1	0.4	-0.4	-	-
contributions to annual percentage changes in GDP; percentage points											
2020	-6.1	-5.5	-4.1	0.2	-1.4	-0.4	-0.8	-0.2	-0.2	-0.6	-	-
2021	5.6	4.4	2.2	1.0	0.8	0.7	0.5	-0.4	0.4	1.4	-	-
2022	3.3	3.5	2.2	0.3	0.6	0.2	0.3	0.1	0.4	-0.2	-	-
2022 Q3	2.3	3.2	1.2	0.1	1.0	0.1	0.5	0.3	1.0	-0.9	-	-
Q4	1.7	1.1	0.7	0.1	0.2	0.0	0.4	-0.2	0.1	0.6	-	-
2023 Q1	1.1	0.6	0.7	-0.1	0.4	-0.1	0.3	0.2	-0.4	0.5	-	-
Q2	0.5	0.3	0.1	0.0	0.3	-0.1	0.2	0.1	-0.2	0.2	-	-

Sources: Eurostat and ECB calculations.
1) Exports and imports cover goods and services and include cross-border intra-euro area trade.
2) Including acquisitions less disposals of valuables.

2 Economic activity

2.2 Value added by economic activity
(quarterly data seasonally adjusted; annual data unadjusted)

	Gross value added (basic prices)											Taxes less subsidies on products
	Total	Agriculture, forestry and fishing	Manufacturing energy and utilities	Const-ruction	Trade, transport, accom-modation and food services	Infor-mation and com-munica-tion	Finance and insurance	Real estate	Professional, business and support services	Public ad-ministration, education, health and social work	Arts, enter-tainment and other services	
	1	2	3	4	5	6	7	8	9	10	11	12
	Current prices (EUR billions)											
2020	10,377.2	176.6	2,010.0	550.4	1,804.6	546.4	486.2	1,210.8	1,202.5	2,066.9	322.9	1,138.4
2021	11,135.6	184.9	2,207.8	588.6	2,006.4	594.8	516.7	1,245.7	1,290.8	2,163.9	335.9	1,282.6
2022	12,088.5	215.4	2,439.5	649.2	2,315.7	630.2	528.3	1,297.0	1,389.3	2,254.8	369.2	1,338.7
2022 Q3	3,040.5	56.0	609.8	163.2	590.0	159.3	131.9	323.7	349.0	564.6	93.1	335.4
Q4	3,117.5	56.4	634.3	167.6	597.3	160.7	139.0	333.4	358.2	576.8	93.8	323.3
2023 Q1	3,180.0	56.0	659.7	176.4	602.0	163.6	144.1	341.1	363.7	577.1	96.3	326.9
Q2	3,215.7	54.0	661.5	179.4	607.7	167.2	146.9	346.1	369.0	586.0	97.9	338.2
	as a percentage of value added											
2022	100.0	1.8	20.2	5.4	19.2	5.2	4.4	10.7	11.5	18.7	3.1	-
	Chain-linked volumes (prices for the previous year)											
	quarter-on-quarter percentage changes											
2022 Q3	0.4	0.7	0.5	-1.2	0.7	1.7	0.3	-0.2	0.5	0.5	1.3	-0.7
Q4	-0.1	0.1	-0.2	-0.2	-0.7	0.4	0.2	0.2	0.3	0.3	-1.2	0.0
2023 Q1	0.1	1.0	-1.1	2.1	0.1	1.2	-0.9	0.8	0.6	-0.1	2.7	-0.7
Q2	0.0	-1.1	-0.3	-0.5	-0.2	1.3	0.0	0.0	0.3	0.1	0.6	1.4
	annual percentage changes											
2020	-6.0	-0.7	-6.1	-5.0	-14.0	2.1	-0.7	-0.8	-5.6	-2.8	-18.1	-7.1
2021	5.5	0.4	8.6	2.6	7.4	8.6	5.4	1.9	6.1	3.3	4.2	6.5
2022	3.5	0.0	1.5	1.3	7.7	5.7	-0.1	1.8	4.6	1.7	11.9	2.2
2022 Q3	2.6	0.3	1.8	0.7	4.5	7.1	-0.7	1.3	3.7	1.1	6.8	0.2
Q4	2.0	-0.2	1.4	-0.2	2.7	4.1	0.4	1.0	3.0	1.9	6.9	-0.9
2023 Q1	1.6	1.4	-0.2	1.0	2.4	5.4	-0.2	1.3	2.1	1.1	7.1	-2.4
Q2	0.5	0.7	-1.1	0.3	-0.1	4.6	-0.4	0.7	1.6	0.7	3.4	0.0
	contributions to quarter-on-quarter percentage changes in value added; percentage points											
2022 Q3	0.4	0.0	0.1	-0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	-
Q4	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.1	0.0	-
2023 Q1	0.1	0.0	-0.2	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	-
Q2	0.0	0.0	-0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-
	contributions to annual percentage changes in value added; percentage points											
2020	-6.0	0.0	-1.2	-0.3	-2.7	0.1	0.0	-0.1	-0.7	-0.5	-0.6	-
2021	5.5	0.0	1.7	0.2	1.3	0.5	0.3	0.2	0.7	0.7	0.1	-
2022	3.5	0.0	0.3	0.1	1.4	0.3	0.0	0.2	0.5	0.3	0.4	-
2022 Q3	2.6	0.0	0.4	0.0	0.8	0.4	0.0	0.1	0.4	0.2	0.2	-
Q4	2.0	0.0	0.3	0.0	0.5	0.2	0.0	0.1	0.4	0.4	0.2	-
2023 Q1	1.6	0.0	0.0	0.1	0.5	0.3	0.0	0.1	0.2	0.2	0.2	-
Q2	0.5	0.0	-0.2	0.0	0.0	0.2	0.0	0.1	0.2	0.1	0.1	-

Sources: Eurostat and ECB calculations.

2 Economic activity

2.3 Employment [1]
(quarterly data seasonally adjusted; annual data unadjusted)

	Total	By employment status		By economic activity									
		Employ-ees	Self-employed	Agricul-ture, forestry and fishing	Manufac-turing, energy and utilities	Con-struc-tion	Trade, transport, accom-modation and food services	Infor-mation and com-munica-tion	Finance and insur-ance	Real estate	Professional, business and support services	Public adminis-tration, edu-cation, health and social work	Arts, entertainment and other services
	1	2	3	4	5	6	7	8	9	10	11	12	13
Persons employed													
as a percentage of total persons employed													
2020	100.0	86.0	14.0	3.0	14.6	6.2	24.5	3.0	2.4	1.0	13.8	24.8	6.6
2021	100.0	86.1	13.9	3.0	14.3	6.3	24.2	3.1	2.4	1.0	14.0	24.9	6.6
2022	100.0	86.3	13.7	2.9	14.2	6.4	24.5	3.2	2.4	1.0	14.1	24.8	6.5
annual percentage changes													
2020	-1.4	-1.4	-1.2	-2.6	-1.9	0.8	-3.6	1.9	0.4	0.7	-2.0	1.0	-3.1
2021	1.5	1.6	0.4	0.2	-0.3	3.3	0.5	4.8	1.0	1.0	3.0	2.1	0.9
2022	2.3	2.5	1.1	-0.3	1.3	3.2	3.3	5.8	-0.1	3.0	3.1	1.6	1.6
2022 Q3	1.9	2.0	1.2	-0.6	1.3	3.3	2.0	6.3	-0.4	3.9	2.5	1.5	0.8
Q4	1.6	1.7	0.7	-0.9	1.1	2.3	1.7	4.6	0.4	3.1	2.1	1.3	1.1
2023 Q1	1.6	1.7	1.3	-1.2	1.3	1.6	2.2	4.5	1.0	2.5	2.0	1.2	1.0
Q2	1.3	1.3	1.4	-2.2	1.1	0.6	1.9	3.7	0.9	2.7	2.0	1.1	0.2
Hours worked													
as a percentage of total hours worked													
2020	100.0	82.0	18.0	4.3	15.1	7.0	24.1	3.3	2.6	1.1	13.7	23.0	5.7
2021	100.0	81.8	18.2	4.1	15.0	7.3	24.4	3.4	2.5	1.1	14.0	22.5	5.8
2022	100.0	81.9	18.1	3.9	14.6	7.2	25.3	3.5	2.5	1.1	14.0	21.9	5.9
annual percentage changes													
2020	-8.0	-7.3	-11.3	-3.4	-7.5	-6.2	-14.6	-1.9	-2.2	-5.1	-8.4	-2.4	-12.3
2021	5.6	5.4	6.4	0.1	4.8	9.4	6.8	7.5	3.1	7.1	7.7	3.5	5.9
2022	3.5	3.6	3.0	-0.9	0.9	3.3	7.4	6.0	-0.3	5.1	4.1	0.7	5.9
2022 Q3	2.7	3.0	1.4	-0.4	2.0	3.6	3.4	7.5	0.2	4.8	3.9	1.3	2.4
Q4	2.2	2.3	1.9	-0.5	1.2	3.2	3.0	5.0	0.9	3.4	3.2	1.1	2.7
2023 Q1	2.0	2.2	0.8	-0.5	1.7	1.5	2.7	4.2	1.3	1.6	2.5	1.3	1.9
Q2	1.4	1.5	1.1	-2.6	1.2	1.1	1.5	3.7	1.4	2.5	2.3	1.5	0.7
Hours worked per person employed													
annual percentage changes													
2020	-6.7	-5.9	-10.2	-0.9	-5.7	-6.9	-11.3	-3.8	-2.6	-5.8	-6.5	-3.3	-9.5
2021	4.1	3.8	6.0	0.0	5.1	5.8	6.3	2.6	2.1	6.0	4.5	1.4	5.0
2022	1.1	1.0	1.8	-0.6	-0.3	0.1	3.9	0.1	-0.3	2.0	1.0	-0.9	4.1
2022 Q3	0.8	1.0	0.2	0.2	0.6	0.3	1.4	1.1	0.6	0.9	1.4	-0.2	1.6
Q4	0.6	0.5	1.2	0.4	0.1	0.9	1.2	0.4	0.5	0.3	1.0	-0.3	1.7
2023 Q1	0.3	0.5	-0.5	0.7	0.4	-0.1	0.5	-0.3	0.2	-0.9	0.5	0.1	0.9
Q2	0.1	0.2	-0.3	-0.5	0.1	0.5	-0.4	0.0	0.4	-0.2	0.2	0.4	0.5

Sources: Eurostat and ECB calculations.
1) Data for employment are based on the ESA 2010.

2 Economic activity

2.4 Labour force, unemployment and job vacancies
(seasonally adjusted, unless otherwise indicated)

	Labour force, millions	Under-employment, % of labour force	Unemployment [1]											Job vacancy rate [3]
			Total		Long-term unemployment, % of labour force [2]	By age				By gender				
						Adult		Youth		Male		Female		
			Millions	% of labour force		Millions	% of labour force	Millions	% of labour force	Millions	% of labour force	Millions	% of labour force	% of total posts
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
% of total in 2020			100.0			80.1		19.9		51.3		48.7		
2020	162.757	3.5	12.963	8.0	3.0	10.380	7.0	2.584	18.2	6.644	7.6	6.319	8.3	1.8
2021	165.051	3.4	12.787	7.8	3.2	10.303	6.9	2.483	16.9	6.517	7.4	6.270	8.1	2.4
2022	167.817	3.1	11.341	6.8	2.7	9.083	6.0	2.258	14.6	5.687	6.4	5.654	7.2	3.1
2022 Q3	167.971	3.0	11.427	6.8	2.5	9.058	5.9	2.369	15.2	5.746	6.4	5.681	7.2	3.1
Q4	168.630	3.0	11.227	6.7	2.5	8.973	5.9	2.254	14.3	5.599	6.2	5.628	7.1	3.1
2023 Q1	169.496	3.0	11.149	6.6	2.5	8.963	5.8	2.185	13.8	5.592	6.2	5.556	7.0	3.0
Q2	.	.	.	6.4	.	.	5.6	.	13.9	.	6.1	.	6.7	3.0
2023 Feb.	-	-	11.181	6.6	-	8.952	5.8	2.229	14.1	5.625	6.2	5.556	7.0	-
Mar.	-	-	11.078	6.5	-	8.868	5.8	2.210	14.0	5.570	6.2	5.507	6.9	-
Apr.	-	-	11.047	6.5	-	8.833	5.7	2.214	13.9	5.566	6.2	5.481	6.9	-
May	-	-	10.970	6.5	-	8.736	5.7	2.233	14.0	5.515	6.1	5.455	6.8	-
June	-	-	10.871	6.4	-	8.678	5.6	2.194	13.8	5.507	6.1	5.364	6.7	-
July	-	-	10.944	6.4	-	8.738	5.7	2.206	13.8	5.559	6.2	5.385	6.8	-

Sources: Eurostat and ECB calculations.
1) Where annual and quarterly Labour Force Survey data have not yet been published, they are estimated as simple averages of the monthly data. There is a break in series from the first quarter of 2021 due to the implementation of the Integrated European Social Statistics Regulation. Owing to technical issues with the introduction of the new German system of integrated household surveys, including the Labour Force Survey, the figures for the euro area include data from Germany, starting in the first quarter of 2020, which are not direct estimates from Labour Force Survey microdata, but based on a larger sample including data from other integrated household surveys.
2) Not seasonally adjusted.
3) The job vacancy rate is equal to the number of job vacancies divided by the sum of the number of occupied posts and the number of job vacancies, expressed as a percentage. Data are non-seasonally adjusted and cover industry, construction and services (excluding households as employers and extra-territorial organisations and bodies).

2.5 Short-term business statistics

	Industrial production						Construction production	Retail sales				Services production [1]	New passenger car registrations
	Total (excluding construction)		Main Industrial Groupings					Total	Food, beverages, tobacco	Non-food	Fuel		
		Manu-facturing	Inter-mediate goods	Capital goods	Consumer goods	Energy							
	1	2	3	4	5	6	7	8	9	10	11	12	13
% of total in 2015	100.0	88.7	32.1	34.5	21.8	11.6	100.0	100.0	40.4	52.5	7.1	100.0	100.0
					annual percentage changes								
2020	-7.7	-8.2	-7.2	-11.2	-4.2	-4.4	-5.4	-0.8	3.7	-2.2	-14.4	-9.8	-24.3
2021	8.9	9.8	9.6	11.7	8.1	1.4	6.0	5.1	0.9	7.8	9.6	8.1	-2.9
2022	2.2	3.0	-1.3	5.5	5.4	-3.7	2.4	0.7	-2.7	2.5	6.3	10.0	-4.3
2022 Q1	1.6	2.1	1.0	0.3	6.3	-1.4	6.1	5.8	-1.7	11.1	12.5	12.3	-12.3
Q2	2.0	2.6	-0.3	4.5	3.3	-1.8	2.7	1.0	-2.7	3.0	7.7	13.2	-16.2
Q3	3.4	4.0	-1.7	9.9	3.1	-1.7	0.8	-0.6	-1.5	-0.6	3.2	9.1	1.5
Q4	2.1	3.5	-4.4	7.2	8.9	-9.3	0.3	-2.6	-5.0	-1.6	3.0	6.2	15.3
2023 Feb.	1.7	2.5	-5.1	9.6	3.3	-4.4	2.0	-2.3	-4.6	-0.7	0.4	4.2	11.6
Mar.	-1.5	-1.0	-4.6	-1.9	5.4	-6.4	-0.9	-3.3	-6.1	-1.5	1.8	4.7	30.8
Apr.	-0.1	0.8	-6.2	8.5	-0.7	-8.1	0.2	-2.8	-4.5	-1.2	-3.1	3.2	19.4
May	-2.4	-1.9	-5.6	2.5	-3.0	-6.7	0.3	-2.3	-2.9	-1.5	-1.5	4.5	20.3
June	-1.1	-0.4	-6.3	4.7	-0.5	-7.3	-0.3	-1.0	-2.7	0.6	-1.8	3.4	19.0
July	-2.2	-1.8	-5.0	0.4	-1.2	-5.7	.	-1.0	-2.2	1.1	-3.4	.	16.5
				month-on-month percentage changes (s.a.)									
2023 Feb.	1.8	1.3	0.8	1.8	1.6	0.8	2.1	-0.1	-0.4	0.1	-1.3	0.6	3.4
Mar.	-4.5	-5.1	-1.1	-15.4	-1.1	-1.1	-1.9	-0.4	-0.8	-0.7	0.4	0.9	-1.2
Apr.	1.3	1.9	-0.7	15.3	-2.2	-0.1	-0.4	0.0	-0.2	0.3	-2.3	0.4	-1.2
May	0.1	0.1	0.4	1.1	0.2	-2.2	0.2	0.6	0.3	0.4	0.5	1.7	-0.2
June	0.4	0.9	-1.0	-0.3	-1.3	0.4	-1.0	0.2	0.2	0.3	-0.3	-0.5	1.7
July	-1.1	-2.1	0.2	-2.7	0.6	1.6	.	-0.2	0.4	0.5	-1.2	.	3.7

Sources: Eurostat, ECB calculations and European Automobile Manufacturers Association (col. 13).
1) Excluding trade and financial services.

2 Economic activity

2.6 Opinion surveys
(seasonally adjusted)

	European Commission Business and Consumer Surveys (percentage balances, unless otherwise indicated)								Purchasing Managers' Surveys (diffusion indices)			
	Economic sentiment indicator (long-term average = 100)	Manufacturing industry		Consumer confidence indicator	Construction confidence indicator	Retail trade confid-ence indicator	Service industries		Purchasing Managers' Index (PMI) for manu-facturing	Manu-facturing output	Business activity for services	Composite output
		Industrial confidence indicator	Capacity utilisation (%)				Services confidence indicator	Capacity utilisation (%)				
	1	2	3	4	5	6	7	8	9	10	11	12
1999-15	98.7	-5.2	80.6	-11.7	-15.4	-8.6	7.3	-	51.2	52.5	53.0	52.8
2020	88.0	-13.2	74.3	-14.2	-7.0	-12.6	-15.9	86.3	48.6	48.0	42.5	44.0
2021	110.7	9.4	81.8	-7.5	4.2	-1.8	8.3	87.7	60.2	58.3	53.6	54.9
2022	101.9	4.8	82.0	-21.9	5.2	-3.8	9.3	90.1	52.1	49.3	52.1	51.4
2022 Q3	97.2	1.9	81.7	-27.0	2.9	-6.8	7.6	90.8	49.3	46.3	49.9	49.0
Q4	95.3	-0.9	81.4	-24.4	3.1	-4.8	5.0	90.4	47.1	45.9	49.0	48.2
2023 Q1	99.2	0.1	81.3	-19.6	1.2	-1.0	9.4	90.0	48.2	49.8	52.8	52.0
Q2	96.8	-5.2	80.7	-17.0	-0.8	-4.0	7.4	90.2	44.7	46.4	54.5	52.3
2023 Mar.	98.8	-0.8	-	-19.1	0.9	-1.8	8.9	-	47.3	50.4	55.0	53.7
Apr.	98.8	-2.9	81.2	-17.5	0.7	-0.9	9.6	89.9	45.8	48.5	56.2	54.1
May	96.3	-5.3	-	-17.4	-0.4	-5.3	7.0	-	44.8	46.4	55.1	52.8
June	95.2	-7.3	-	-16.1	-2.6	-5.9	5.7	-	43.4	44.2	52.0	49.9
July	94.5	-9.3	80.2	-15.1	-3.6	-4.5	5.4	90.6	42.7	42.7	50.9	48.6
Aug.	93.3	-10.3	-	-16.0	-5.2	-5.0	3.9	-	43.5	43.4	47.9	46.7

Sources: European Commission (Directorate-General for Economic and Financial Affairs) (col. 1-8) and Markit (col. 9-12).

2.7 Summary accounts for households and non-financial corporations
(current prices, unless otherwise indicated; not seasonally adjusted)

	Households							Non-financial corporations					
	Saving rate (gross)	Debt ratio	Real gross disposable income	Financial investment	Non-financial investment (gross)	Net worth [2]	Hous-ing wealth	Profit rate [3]	Saving rate (gross)	Debt ratio [4]	Financial investment	Non-financial investment (gross)	Finan-cing
	Percentage of gross disposable income (adjusted) [1]		Annual percentage changes					Percentage of gross value added		Percent-age of GDP	Annual percentage changes		
	1	2	3	4	5	6	7	8	9	10	11	12	13
2020	19.6	95.4	-0.1	4.2	-1.7	5.6	4.8	46.0	24.6	78.7	3.7	-12.0	2.6
2021	17.5	95.6	1.6	3.7	17.4	8.0	8.2	48.6	26.6	76.5	5.5	7.5	3.5
2022	13.5	93.0	-0.1	2.6	12.4	1.5	6.9	48.7	23.8	72.1	2.9	9.3	2.0
2022 Q2	14.6	95.2	0.2	2.8	16.6	4.4	10.1	48.8	24.7	74.0	4.8	-4.3	3.2
Q3	13.9	94.4	0.0	2.8	10.6	3.0	9.1	49.0	24.1	74.1	4.2	25.0	3.0
Q4	13.5	93.0	-0.7	2.6	6.5	1.5	6.9	48.7	23.8	72.1	2.9	2.3	2.0
2023 Q1	13.4	91.3	0.5	2.4	5.4	2.8	5.4	48.6	23.9	70.2	2.4	1.3	1.5

Sources: ECB and Eurostat.
1) Based on four-quarter cumulated sums of saving, debt and gross disposable income (adjusted for the change in pension entitlements).
2) Financial assets (net of financial liabilities) and non-financial assets. Non-financial assets consist mainly of housing wealth (residential structures and land). They also include non-financial assets of unincorporated enterprises classified within the household sector.
3) The profit rate is gross entrepreneurial income (broadly equivalent to cash flow) divided by gross value added.
4) Defined as consolidated loans and debt securities liabilities.

2.8 Euro area balance of payments, current and capital accounts
(EUR billions; seasonally adjusted unless otherwise indicated; transactions)

	Current account												Capital account [1]	
	Total			Goods		Services		Primary income		Secondary income			
	Credit	Debit	Balance	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
	1	2	3	4	5	6	7	8	9	10	11	12	13
2022 Q3	1,356.3	1,444.0	-87.7	755.1	806.6	320.0	319.8	238.5	229.2	42.7	88.5	25.4	16.1
Q4	1,360.4	1,365.1	-4.8	749.2	751.0	312.2	267.8	256.3	263.8	42.6	82.5	58.3	35.7
2023 Q1	1,377.6	1,340.3	37.3	750.2	694.1	322.4	299.3	265.0	272.0	40.0	75.0	34.6	31.1
Q2	1,362.0	1,315.8	46.2	737.7	660.0	326.0	309.4	255.4	262.4	42.9	84.0	20.4	14.4
2023 Jan.	460.6	455.6	5.0	247.4	244.1	108.3	97.7	90.7	90.2	14.2	23.6	11.6	13.4
Feb.	454.7	442.7	11.9	248.3	228.5	106.6	96.9	86.5	92.5	13.3	24.8	5.9	4.4
Mar.	462.3	441.9	20.4	254.6	221.4	107.4	104.7	87.8	89.2	12.5	26.6	17.1	13.2
Apr.	432.5	430.0	2.5	231.8	215.5	107.6	104.4	79.7	82.5	13.4	27.7	6.4	5.7
May	460.8	452.9	7.9	249.8	227.9	109.8	104.1	86.4	94.1	14.8	26.8	5.2	4.0
June	468.7	432.9	35.8	256.0	216.7	108.6	100.9	89.3	85.7	14.7	29.5	8.9	4.7
12-month cumulated transactions													
2023 June	5,456.3	5,465.3	-9.0	2,992.2	2,911.7	1,280.6	1,196.3	1,015.3	1,027.3	168.3	329.9	138.7	97.3
12-month cumulated transactions as a percentage of GDP													
2023 June	39.3	39.4	-0.1	21.6	21.0	9.2	8.6	7.3	7.4	1.2	2.4	1.0	0.7

1) The capital account is not seasonally adjusted.

2.9 Euro area external trade in goods [1] , values and volumes by product group [2]
(seasonally adjusted, unless otherwise indicated)

	Total (n.s.a.)		Exports (f.o.b.)					Imports (c.i.f.)					
			Total				Memo item:	Total				Memo items:	
	Exports	Imports		Intermediate goods	Capital goods	Consumption goods	Manu-facturing		Intermediate goods	Capital goods	Consumption goods	Manu-facturing	Oil
	1	2	3	4	5	6	7	8	9	10	11	12	13
Values (EUR billions; annual percentage changes for columns 1 and 2)													
2022 Q3	20.2	47.6	729.8	365.5	133.5	217.0	588.4	859.7	531.0	117.3	168.8	534.1	108.1
Q4	14.9	20.2	733.4	361.2	139.8	221.2	605.7	796.2	481.6	114.1	170.0	517.6	97.1
2023 Q1	8.6	0.4	722.3	346.2	137.6	224.0	597.0	722.8	425.0	113.3	160.5	500.5	77.7
Q2	-1.9	-14.3	708.6	.	.	.	588.1	703.8	.	.	.	498.1	.
2023 Jan.	11.1	10.2	239.6	115.0	45.0	74.1	197.2	251.5	149.4	39.1	53.7	169.0	30.1
Feb.	7.6	1.5	241.2	115.6	45.8	75.9	199.3	242.0	143.0	37.4	54.3	168.3	24.4
Mar.	7.5	-8.8	241.5	115.6	46.8	74.0	200.5	229.3	132.6	36.8	52.5	163.2	23.2
Apr.	-3.6	-11.8	233.2	109.0	47.0	72.0	193.3	241.1	141.1	37.7	55.5	168.9	25.5
May	-2.6	-13.1	238.3	109.9	49.3	72.9	196.3	238.0	138.1	39.0	55.6	169.1	24.2
June	0.3	-17.7	237.2	.	.	.	198.4	224.6	.	.	.	160.2	.
Volume indices (2000 = 100; annual percentage changes for columns 1 and 2)													
2022 Q3	2.8	14.9	106.5	104.8	105.9	114.5	106.3	124.0	121.8	123.7	121.0	122.8	140.4
Q4	1.5	3.6	107.2	104.0	109.7	114.6	106.9	119.8	116.2	120.3	121.6	120.6	144.8
2023 Q1	1.5	-1.3	106.3	102.0	105.6	117.0	106.0	114.8	111.6	119.8	115.9	117.3	142.7
Q2	.	.	.	.	.	.	.	.	.	.	.	.	.
2022 Dec.	-1.1	-3.4	105.6	101.0	108.0	115.7	105.3	117.2	114.2	113.4	120.1	116.8	147.0
2023 Jan.	2.8	4.1	105.9	102.0	103.9	117.1	104.7	117.9	114.9	122.4	117.1	118.4	151.7
Feb.	-0.4	-0.5	106.8	101.5	105.8	118.9	106.7	117.3	114.3	118.8	117.5	118.5	144.6
Mar.	2.2	-6.8	106.2	102.5	107.2	115.1	106.4	109.3	105.7	118.4	113.1	114.9	131.7
Apr.	-6.1	-4.3	103.0	98.5	107.2	112.3	103.2	119.1	115.4	124.7	119.2	121.7	158.7
May	-3.3	-4.6	106.4	100.0	111.5	114.9	107.0	118.9	114.5	125.9	120.5	122.0	151.7

Sources: ECB and Eurostat.
1) Differences between ECB's b.o.p. goods (Table 2.8) and Eurostat's trade in goods (Table 2.9) are mainly due to different definitions.
2) Product groups as classified in the Broad Economic Categories.

3 Prices and costs

3.1 Harmonised Index of Consumer Prices [1]
(annual percentage changes, unless otherwise indicated)

	Total					Total (s.a.; percentage change vis-à-vis previous period) [2]						Administered prices	
	Index: 2015 = 100	Total	Total excluding food and energy	Goods	Services	Total	Processed food	Unpro-cessed food	Non-energy industrial goods	Energy (n.s.a.)	Services	Total HICP excluding administered prices	Admini-stered prices
	1	2	3	4	5	6	7	8	9	10	11	12	13
% of total in 2021	100.0	100.0	68.7	58.2	41.8	100.0	16.7	5.1	26.9	9.5	41.8	86.7	13.3
2020	105.1	0.3	0.7	-0.4	1.0	-	-	-	-	-	-	0.2	0.6
2021	107.8	2.6	1.5	3.4	1.5	-	-	-	-	-	-	2.5	3.1
2022	116.8	8.4	3.9	11.9	3.5	-	-	-	-	-	-	8.5	7.8
2022 Q3	118.1	9.3	4.4	13.2	3.9	2.3	4.0	2.8	2.0	4.4	1.1	9.5	7.8
Q4	120.8	10.0	5.1	14.0	4.3	2.3	3.7	2.9	1.4	4.6	1.5	10.0	9.5
2023 Q1	121.3	8.0	5.5	10.3	4.7	0.8	3.3	2.7	1.7	-6.0	1.2	8.1	7.3
Q2	123.2	6.2	5.5	6.8	5.2	0.6	1.8	0.8	0.7	-4.3	1.3	6.1	6.8
2023 Mar.	122.3	6.9	5.7	8.1	5.1	0.3	0.9	2.2	0.2	-2.2	0.4	7.0	5.9
Apr.	123.1	7.0	5.6	8.1	5.2	0.2	0.4	-1.6	0.2	-0.9	0.6	7.0	6.4
May	123.2	6.1	5.3	6.8	5.0	-0.1	0.4	-0.5	0.2	-2.1	0.1	6.1	6.2
June	123.5	5.5	5.5	5.5	5.4	0.3	0.4	0.8	0.2	-0.7	0.5	5.2	7.7
July	123.4	5.3	5.5	4.8	5.6	0.3	0.4	1.0	0.3	-0.2	0.4	5.2	6.3
Aug. [3]	124.1	5.3	5.3	.	5.5	0.6	0.4	-0.2	0.4	3.2	0.2	.	.

	Goods						Services					
	Food (including alcoholic beverages and tobacco)			Industrial goods			Housing		Transport	Communi-cation	Recreation and personal care	Miscel-laneous
	Total	Processed food	Unpro-cessed food	Total	Non-energy industrial goods	Energy		Rents				
	14	15	16	17	18	19	20	21	22	23	24	25
% of total in 2021	21.8	16.7	5.1	36.4	26.9	9.5	12.2	7.5	6.5	2.7	11.4	9.0
2020	2.3	1.8	4.0	-1.8	0.2	-6.8	1.4	1.3	0.5	-0.6	1.0	1.4
2021	1.5	1.5	1.6	4.5	1.5	13.0	1.4	1.2	2.1	0.3	1.5	1.6
2022	9.0	8.6	10.4	13.6	4.6	37.0	2.4	1.7	4.4	-0.2	6.1	2.1
2022 Q3	10.7	10.5	11.6	14.7	5.0	39.7	2.6	1.9	4.3	-0.2	7.2	2.1
Q4	13.5	13.4	13.7	14.2	6.2	33.9	3.0	2.1	5.6	-0.7	7.1	2.8
2023 Q1	14.9	15.4	13.3	7.8	6.7	10.0	3.6	2.5	5.8	0.2	7.2	3.8
Q2	12.5	13.5	9.5	3.7	5.8	-1.8	3.7	2.7	6.1	0.4	7.5	4.1
2023 Mar.	15.5	15.7	14.7	4.3	6.6	-0.9	3.7	2.7	5.9	0.3	7.8	3.9
Apr.	13.5	14.6	10.0	5.2	6.2	2.3	3.6	2.6	6.1	0.4	7.7	4.0
May	12.5	13.4	9.6	3.7	5.8	-1.8	3.7	2.7	4.7	0.7	7.6	4.1
June	11.6	12.4	9.0	2.2	5.5	-5.6	3.7	2.7	7.4	0.0	7.2	4.3
July	10.8	11.3	9.2	1.6	5.0	-6.1	3.7	2.7	7.1	0.0	7.5	4.3
Aug. [3]	9.8	10.4	7.8	.	4.8	-3.3	.	.	.	.	.	.

Sources: Eurostat and ECB calculations.
1) Data refer to the changing composition of the euro area.
2) In May 2016 the ECB started publishing enhanced seasonally adjusted HICP series for the euro area, following a review of the seasonal adjustment approach as described in Box 1, *Economic Bulletin*, Issue 3, ECB, 2016 (https://www.ecb.europa.eu/pub/pdf/ecbu/eb201603.en.pdf).
3) Flash estimate.

3.2 Industry, construction and property prices
(annual percentage changes, unless otherwise indicated)

	Industrial producer prices excluding construction [1]										Con-struction [2]	Residential property prices [3]	Experimental indicator of commercial property prices [3]
	Total (index: 2015 = 100)	Total		Industry excluding construction and energy						Energy			
			Manu-facturing	Total	Intermediate goods	Capital goods	Consumer goods						
							Total	Food, beverages and tobacco	Non-food				
	1	2	3	4	5	6	7	8	9	10	11	12	13
% of total in 2015	100.0	100.0	77.3	72.1	28.9	20.7	22.5	16.6	5.9	27.9			
2020	102.0	-2.6	-1.7	-0.1	-1.6	0.9	0.9	1.1	0.6	-9.7	1.7	5.3	1.6
2021	114.5	12.3	7.4	5.8	10.9	2.5	2.1	3.3	1.8	32.2	5.6	8.1	0.6
2022	153.8	34.3	16.9	14.1	20.3	7.2	12.1	16.4	7.7	85.2	11.5	7.0	0.8
2022 Q3	163.1	41.1	17.7	14.7	20.2	7.7	14.0	19.0	8.6	107.8	11.9	6.6	0.4
Q4	161.9	27.2	14.5	13.1	15.4	7.6	15.3	19.9	9.3	56.1	11.6	2.9	-2.6
2023 Q1	156.2	10.9	9.0	9.8	8.7	7.2	14.1	17.4	8.5	11.5	10.2	0.3	.
Q2	147.2	-1.4	0.9	3.7	-1.1	5.7	9.4	9.5	6.5	-13.1	6.4	.	.
2023 Feb.	156.5	12.7	9.9	10.3	9.4	7.4	14.6	18.3	8.7	15.8	-	-	-
Mar.	154.4	5.5	5.7	8.1	5.8	6.7	12.9	15.3	8.1	0.0	-	-	-
Apr.	149.3	0.9	3.1	5.1	1.2	6.2	10.6	11.3	7.2	-9.2	-	-	-
May	146.4	-1.6	0.6	3.4	-1.5	5.7	9.4	9.3	6.4	-13.5	-	-	-
June	145.8	-3.4	-1.1	2.5	-2.8	5.3	8.4	8.0	5.9	-16.4	-	-	-
July	145.0	-7.6	-0.8	1.6	-4.0	4.7	7.4	6.6	5.0	-24.2	-	-	-

Sources: Eurostat, ECB calculations, and ECB calculations based on MSCI data and national sources (col. 13).
1) Domestic sales only.
2) Input prices for residential buildings.
3) Experimental data based on non-harmonised sources (see https://www.ecb.europa.eu/stats/ecb_statistics/governance_and_quality_framework/html/experimental-data.en.html for further details).

3.3 Commodity prices and GDP deflators
(annual percentage changes, unless otherwise indicated)

	GDP deflators								Oil prices (EUR per barrel)	Non-energy commodity prices (EUR)					
	Total (s.a.; index: 2015 = 100)	Total	Domestic demand				Exports [1]	Imports [1]		Import-weighted [2]			Use-weighted [2]		
			Total	Private consumption	Govern-ment consumption	Gross fixed capital formation				Total	Food	Non-food	Total	Food	Non-food
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
% of total										100.0	45.4	54.6	100.0	50.4	49.6
2020	107.3	1.8	1.3	0.6	3.4	1.0	-1.4	-2.7	37.0	1.4	3.3	-0.3	-1.0	-0.3	-1.8
2021	109.5	2.1	2.8	2.2	1.6	3.7	5.8	7.9	59.8	29.6	21.5	37.2	29.1	22.2	37.1
2022	114.6	4.6	6.8	6.8	4.3	7.7	12.7	17.6	95.0	18.1	29.0	9.0	19.2	28.2	9.9
2022 Q3	115.0	4.6	7.5	7.5	4.9	7.7	13.6	19.8	98.3	14.4	30.0	1.5	14.7	26.9	2.3
Q4	117.3	5.7	6.9	8.6	6.1	7.4	10.2	12.8	86.6	5.3	13.8	-2.3	4.9	12.2	-3.1
2023 Q1	119.4	6.2	5.5	7.9	4.5	6.4	5.5	3.9	75.8	-10.5	-5.3	-15.1	-11.3	-6.5	-16.4
Q2	120.9	6.2	4.0	6.8	4.9	4.6	0.5	-3.7	71.6	-18.1	-16.0	-20.3	-18.4	-16.1	-21.3
2023 Mar.	-	-	-	-	-	-	-	-	73.3	-17.9	-13.3	-22.1	-18.2	-13.6	-23.2
Apr.	-	-	-	-	-	-	-	-	76.7	-19.1	-14.8	-23.1	-19.2	-14.8	-24.2
May	-	-	-	-	-	-	-	-	69.7	-19.1	-17.5	-20.7	-19.4	-17.6	-21.7
June	-	-	-	-	-	-	-	-	69.0	-16.0	-15.6	-16.5	-16.6	-15.7	-17.6
July	-	-	-	-	-	-	-	-	72.5	-14.3	-14.4	-14.2	-15.6	-15.2	-16.2
Aug.	-	-	-	-	-	-	-	-	78.8	-16.5	-16.8	-16.1	-17.0	-16.2	-18.0

Sources: Eurostat, ECB calculations and Bloomberg (col. 9).
1) Deflators for exports and imports refer to goods and services and include cross-border trade within the euro area.
2) Import-weighted: weighted according to 2009-11 average import structure; use-weighted: weighted according to 2009-11 average domestic demand structure.

3 Prices and costs

3.4 Price-related opinion surveys
(seasonally adjusted)

	European Commission Business and Consumer Surveys (percentage balances)					Purchasing Managers' Surveys (diffusion indices)			
	Selling price expectations (for next three months)				Consumer price trends over past 12 months	Input prices		Prices charged	
	Manu-facturing	Retail trade	Services	Construction		Manu-facturing	Services	Manu-facturing	Services
	1	2	3	4	5	6	7	8	9
1999-15	4.3	5.7	-	-4.4	32.4	56.7	56.3	-	49.7
2020	-0.3	2.0	-0.6	-5.1	11.5	49.0	52.1	48.7	47.2
2021	31.6	24.0	10.3	19.7	30.4	84.0	61.9	66.8	53.4
2022	48.4	52.9	27.2	42.5	71.6	77.1	75.4	69.6	62.0
2022 Q3	46.2	54.7	27.7	40.9	76.5	74.3	74.9	67.1	61.8
Q4	40.2	51.7	29.0	41.7	78.1	65.8	74.3	63.7	62.0
2023 Q1	23.7	43.5	26.0	27.1	78.4	51.3	69.9	57.8	61.2
Q2	7.5	30.1	18.1	11.8	76.9	41.6	64.3	49.2	58.0
2023 Mar.	17.8	41.3	23.5	21.4	78.6	46.8	68.5	53.4	59.8
Apr.	11.5	34.8	19.6	15.3	78.3	44.0	67.2	51.6	58.7
May	6.5	30.1	18.7	12.3	77.4	41.3	64.4	49.0	59.1
June	4.4	25.3	16.1	7.7	74.9	39.5	61.3	47.0	56.3
July	3.4	23.4	16.5	4.9	73.5	35.8	61.0	45.0	56.1
Aug.	3.6	22.8	16.7	6.0	72.9	39.7	62.2	46.2	55.6

Sources: European Commission (Directorate-General for Economic and Financial Affairs) and Markit.

3.5 Labour cost indices
(annual percentage changes, unless otherwise indicated)

	Total (index: 2020 = 100)	Total	By component		For selected economic activities		Memo item: Indicator of negotiated wages [1]
			Wages and salaries	Employers' social contributions	Business economy	Mainly non-business economy	
	1	2	3	4	5	6	7
% of total in 2018	100.0	100.0	75.3	24.7	69.0	31.0	
2020	100.0	3.1	3.7	1.5	2.8	3.9	1.8
2021	101.3	1.2	1.4	0.8	1.1	1.5	1.3
2022	105.8	4.4	3.7	6.6	4.8	3.7	2.9
2022 Q3	102.4	3.5	2.7	5.7	3.7	3.2	3.0
Q4	113.8	5.6	5.0	7.4	5.6	5.6	3.1
2023 Q1	103.0	5.0	4.6	6.1	5.3	4.5	4.4
Q2	.	.	.	.	.	.	4.3

Sources: Eurostat and ECB calculations.
1) Experimental data based on non-harmonised sources (see https://www.ecb.europa.eu/stats/ecb_statistics/governance_and_quality_framework/html/experimental-data.en.html for further details).

3 Prices and costs

3.6 Unit labour costs, compensation per labour input and labour productivity
(annual percentage changes, unless otherwise indicated; quarterly data seasonally adjusted; annual data unadjusted)

	Total (index: 2015 =100)	Total	By economic activity									
			Agriculture, forestry and fishing	Manu-facturing, energy and utilities	Con-struction	Trade, transport, accom-modation and food services	Information and commu-nication	Finance and insurance	Real estate	Professional, business and support services	Public ad-ministration, education, health and social work	Arts, enter-tainment and other services
	1	2	3	4	5	6	7	8	9	10	11	12
Unit labour costs												
2020	110.2	4.5	-0.4	2.0	4.8	7.5	-0.1	1.0	1.2	3.6	6.3	17.0
2021	110.0	-0.2	2.0	-4.0	5.3	-1.4	1.5	-1.3	4.1	1.3	1.0	-0.6
2022	113.6	3.3	4.6	3.3	5.7	1.8	3.4	3.7	5.0	3.5	3.4	-3.5
2022 Q3	113.9	3.3	4.3	2.0	5.9	2.1	2.4	3.6	6.4	3.6	3.8	-1.1
Q4	116.3	4.7	5.3	3.1	7.2	4.3	4.1	3.5	4.4	5.1	4.8	-1.1
2023 Q1	118.9	6.0	3.6	7.4	5.0	6.5	4.4	6.4	5.1	6.7	4.2	-0.4
Q2	119.7	6.5	3.5	7.6	5.7	8.2	4.9	5.7	5.8	6.4	5.4	2.9
Compensation per employee												
2020	107.0	-0.4	1.5	-2.4	-1.2	-4.0	0.1	-0.2	-0.2	-0.2	2.3	-1.1
2021	111.2	3.9	2.3	4.5	4.6	5.4	5.2	3.0	5.0	4.3	2.1	2.7
2022	116.0	4.3	5.0	3.5	3.7	6.1	3.3	3.6	3.8	5.1	3.5	6.2
2022 Q3	116.4	3.8	5.2	2.5	3.3	4.6	3.1	3.2	3.8	4.9	3.4	4.8
Q4	118.4	4.9	6.0	3.5	4.6	5.3	3.7	3.5	2.2	6.0	5.4	4.7
2023 Q1	120.6	5.5	6.3	5.9	4.4	6.7	5.2	5.1	3.8	6.8	4.1	5.5
Q2	121.3	5.5	6.5	5.3	5.4	6.1	5.9	4.3	3.7	6.0	5.0	6.1
Labour productivity per person employed												
2020	97.1	-4.7	1.9	-4.3	-5.8	-10.7	0.1	-1.1	-1.4	-3.7	-3.7	-15.5
2021	101.1	4.1	0.3	8.9	-0.7	6.9	3.7	4.4	0.9	3.0	1.2	3.2
2022	102.1	1.0	0.3	0.2	-1.9	4.2	-0.1	-0.1	-1.1	1.5	0.1	10.0
2022 Q3	102.2	0.5	0.9	0.5	-2.4	2.5	0.7	-0.4	-2.4	1.2	-0.4	6.0
Q4	101.8	0.2	0.7	0.4	-2.5	1.0	-0.4	0.0	-2.1	0.8	0.5	5.8
2023 Q1	101.4	-0.5	2.6	-1.5	-0.6	0.2	0.8	-1.3	-1.2	0.1	-0.1	6.0
Q2	101.3	-0.9	2.9	-2.1	-0.3	-2.0	1.0	-1.3	-2.0	-0.4	-0.4	3.1
Compensation per hour worked												
2020	113.9	5.8	4.1	3.0	5.1	7.1	3.2	1.8	4.4	5.9	5.5	6.8
2021	114.1	0.2	-0.3	-0.7	-0.7	-0.4	2.6	1.1	0.4	0.3	1.0	-1.4
2022	117.8	3.2	5.8	3.9	4.0	1.8	3.4	3.8	2.7	3.9	4.5	2.9
2022 Q3	118.1	2.8	5.2	1.9	3.1	2.4	2.1	2.3	3.0	3.1	3.6	3.7
Q4	120.5	4.3	7.0	3.3	3.5	3.9	3.6	3.1	1.7	5.1	5.8	3.4
2023 Q1	122.0	5.0	4.9	5.5	4.3	5.7	5.3	4.9	4.4	6.0	3.9	4.7
Q2	122.7	5.4	6.6	5.1	5.0	6.5	5.6	4.1	4.2	5.8	4.5	5.2
Hourly labour productivity												
2020	104.7	2.1	2.8	1.5	1.2	0.7	4.1	1.5	4.6	3.0	-0.4	-6.6
2021	104.7	0.0	0.3	3.6	-6.2	0.6	1.0	2.2	-4.8	-1.4	-0.2	-1.7
2022	104.6	-0.1	0.9	0.5	-2.0	0.3	-0.3	0.2	-3.1	0.5	1.0	5.7
2022 Q3	104.8	-0.3	0.7	-0.2	-2.7	1.0	-0.4	-0.9	-3.3	-0.1	-0.2	4.3
Q4	104.4	-0.4	0.3	0.2	-3.3	-0.3	-0.8	-0.5	-2.4	-0.2	0.8	4.1
2023 Q1	103.6	-0.8	1.9	-1.8	-0.5	-0.3	1.1	-1.5	-0.3	-0.4	-0.2	5.1
Q2	103.5	-0.9	3.4	-2.3	-0.8	-1.6	0.9	-1.8	-1.8	-0.6	-0.8	2.6

Sources: Eurostat and ECB calculations.

4 Financial market developments

4.1 Money market interest rates
(percentages per annum; period averages)

	Euro area [1)]					United States	Japan
	Euro short-term rate (€STR)	1-month deposits (EURIBOR)	3-month deposits (EURIBOR)	6-month deposits (EURIBOR)	12-month deposits (EURIBOR)	Secured overnight financing rate (SOFR)	Tokyo overnight average rate (TONAR)
	1	2	3	4	5	6	7
2020	-0.55	-0.50	-0.43	-0.37	-0.31	0.36	-0.04
2021	-0.57	-0.56	-0.55	-0.52	-0.49	0.04	-0.02
2022	-0.01	0.09	0.35	0.68	1.10	1.63	-0.03
2023 Feb.	2.27	2.37	2.64	3.14	3.53	4.54	-0.02
Mar.	2.57	2.71	2.91	3.27	3.65	4.64	-0.02
Apr.	2.90	2.95	3.17	3.50	3.74	4.81	-0.02
May	3.08	3.15	3.37	3.68	3.86	5.02	-0.05
June	3.24	3.34	3.54	3.83	4.01	5.06	-0.07
July	3.40	3.47	3.67	3.94	4.15	5.10	-0.05
Aug.	3.64	3.63	3.78	3.94	4.07	5.30	-0.06

Source: Refinitiv and ECB calculations.
1) Data refer to the changing composition of the euro area, see the General Notes.

4.2 Yield curves
(End of period; rates in percentages per annum; spreads in percentage points)

	Spot rates					Spreads			Instantaneous forward rates			
	Euro area [1), 2)]					Euro area [1), 2)]	United States	United Kingdom	Euro area [1), 2)]			
	3 months	1 year	2 years	5 years	10 years	10 years - 1 year	10 years - 1 year	10 years - 1 year	1 year	2 years	5 years	10 years
	1	2	3	4	5	6	7	8	9	10	11	12
2020	-0.75	-0.76	-0.77	-0.72	-0.57	0.19	0.80	0.32	-0.77	-0.77	-0.60	-0.24
2021	-0.73	-0.72	-0.68	-0.48	-0.19	0.53	1.12	0.45	-0.69	-0.58	-0.12	0.24
2022	1.71	2.46	2.57	2.45	2.56	0.09	-0.84	-0.24	2.85	2.48	2.47	2.76
2023 Feb.	2.66	3.16	3.08	2.80	2.76	-0.40	-1.10	-0.26	3.28	2.77	2.63	2.77
Mar.	2.75	2.80	2.62	2.35	2.41	-0.39	-1.16	-0.52	2.67	2.25	2.27	2.58
Apr.	2.88	2.94	2.68	2.37	2.44	-0.50	-1.36	-0.60	2.74	2.20	2.30	2.65
May	3.07	3.02	2.64	2.29	2.38	-0.63	-1.55	-0.53	2.65	2.02	2.23	2.65
June	3.39	3.45	3.12	2.58	2.51	-0.94	-1.59	-0.96	3.21	2.45	2.25	2.56
July	3.48	3.42	3.02	2.53	2.54	-0.87	-1.43	-0.86	3.04	2.31	2.33	2.70
Aug.	3.46	3.38	2.95	2.52	2.57	-0.81	-1.30	-0.80	2.96	2.24	2.39	2.77

Source: ECB calculations.
1) Data refer to the changing composition of the euro area, see the General Notes.
2) ECB calculations based on underlying data provided by Euro MTS Ltd and ratings provided by Fitch Ratings.

4.3 Stock market indices
(index levels in points; period averages)

	Dow Jones EURO STOXX indices												United States	Japan
	Benchmark		Main industry indices											
	Broad index	50	Basic materials	Consumer services	Consumer goods	Oil and gas	Financials	Industrials	Technology	Utilities	Telecoms	Health care	Standard & Poor's 500	Nikkei 225
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2019	373.6	3,435.2	731.7	270.8	183.7	111.9	155.8	650.9	528.2	322.0	294.2	772.7	2,915.5	21,697.2
2020	360.0	3,274.3	758.9	226.8	163.2	83.1	128.6	631.4	630.2	347.1	257.6	831.9	3,217.3	22,703.5
2021	448.3	4,023.6	962.9	289.8	183.0	95.4	164.4	819.0	874.3	377.7	279.6	886.3	4,277.6	28,836.5
2023 Feb.	455.8	4,238.1	983.5	291.6	170.5	122.4	192.5	814.0	849.1	357.3	288.7	817.0	4,079.7	27,509.1
Mar.	448.5	4,201.7	968.8	292.2	175.7	116.6	182.1	809.6	834.4	358.9	296.7	797.0	3,968.6	27,693.2
Apr.	460.9	4,358.3	990.6	305.7	184.2	120.7	183.3	817.9	843.4	383.5	305.9	843.0	4,121.5	28,275.8
May	456.4	4,319.3	975.3	301.8	180.5	116.0	178.9	824.6	858.8	379.9	296.5	835.4	4,146.2	30,147.5
June	455.5	4,324.4	952.1	302.2	170.0	112.7	179.3	835.9	904.5	376.5	277.4	806.2	4,345.4	32,754.5
July	460.1	4,364.5	964.7	305.9	172.9	111.0	185.8	838.3	899.6	375.8	277.8	814.8	4,508.1	32,694.1
Aug.	453.9	4,296.8	966.3	297.6	167.8	115.8	188.6	816.5	867.9	362.6	269.1	828.5	4,457.4	32,167.4

Source: Refinitiv.

4 Financial market developments

4.4 MFI interest rates on loans to and deposits from households (new business) [1], [2]
(Percentages per annum; period average, unless otherwise indicated)

	Deposits				Revolving loans and overdrafts	Extended credit card credit	Loans for consumption			Loans to sole proprietors and unincorporated partnerships	Loans for house purchase					Composite cost-of-borrowing indicator
	Over-night	Redeem-able at notice of up to 3 months	With an agreed maturity of:				By initial period of rate fixation		APRC [3]		By initial period of rate fixation				APRC [3]	
			Up to 2 years	Over 2 years			Floating rate and up to 1 year	Over 1 year			Floating rate and up to 1 year	Over 1 and up to 5 years	Over 5 and up to 10 years	Over 10 years		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2022 Aug.	0.01	0.70	0.42	1.02	4.97	15.89	6.68	5.92	6.51	2.96	2.07	2.44	2.63	2.08	2.49	2.26
Sep.	0.02	0.71	0.63	1.27	5.27	15.83	6.55	5.96	6.58	3.09	2.26	2.59	2.84	2.25	2.67	2.45
Oct.	0.03	0.73	0.93	1.60	5.58	15.97	6.83	6.21	6.87	3.55	2.66	2.82	3.05	2.41	2.90	2.67
Nov.	0.05	0.75	1.21	1.81	5.81	15.98	6.43	6.55	7.13	3.96	2.93	3.04	3.30	2.55	3.11	2.89
Dec.	0.07	0.80	1.42	1.91	5.95	15.90	6.66	6.42	7.00	3.99	3.08	3.16	3.29	2.61	3.18	2.94
2023 Jan.	0.10	0.86	1.60	2.08	6.34	15.99	7.44	6.97	7.60	4.28	3.46	3.32	3.39	2.77	3.39	3.10
Feb.	0.12	1.17	1.91	2.20	6.59	16.08	7.39	7.08	7.80	4.57	3.66	3.48	3.52	2.94	3.55	3.24
Mar.	0.15	1.20	2.11	2.26	6.76	16.07	7.83	7.23	7.92	4.69	3.88	3.78	3.56	3.14	3.72	3.37
Apr.	0.18	1.25	2.28	2.42	7.02	16.25	8.29	7.43	8.13	4.91	4.11	3.85	3.61	3.19	3.81	3.48
May	0.21	1.30	2.47	2.48	7.19	16.34	8.36	7.60	8.33	5.08	4.23	3.98	3.65	3.31	3.93	3.58
June	0.23	1.37	2.71	2.59	7.27	16.35	7.02	7.49	7.99	5.14	4.39	4.07	3.71	3.41	4.04	3.70
July [(p)]	0.27	1.43	2.82	2.86	7.48	16.40	8.41	7.72	8.41	5.23	4.47	4.14	3.72	3.45	4.08	3.75

Source: ECB.
1) Data refer to the changing composition of the euro area.
2) Including non-profit institutions serving households.
3) Annual percentage rate of charge (APRC).

4.5 MFI interest rates on loans to and deposits from non-financial corporations (new business) [1], [2]
(Percentages per annum; period average, unless otherwise indicated)

	Deposits			Revolving loans and overdrafts	Other loans by size and initial period of rate fixation									Composite cost-of-borrowing indicator
	Over-night	With an agreed maturity of:			up to EUR 0.25 million			over EUR 0.25 and up to 1 million			over EUR 1 million			
		Up to 2 years	Over 2 years		Floating rate and up to 3 months	Over 3 months and up to 1 year	Over 1 year	Floating rate and up to 3 months	Over 3 months and up to 1 year	Over 1 year	Floating rate and up to 3 months	Over 3 months and up to 1 year	Over 1 year	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2022 Aug.	0.01	0.15	1.61	1.86	2.08	2.49	2.94	1.86	2.13	2.30	1.55	1.88	2.22	1.87
Sep.	0.05	0.70	1.79	2.23	2.48	2.91	3.24	2.31	2.55	2.45	2.31	2.34	2.38	2.40
Oct.	0.08	0.92	1.83	2.54	2.96	3.52	3.62	2.74	3.02	2.75	2.45	2.76	2.82	2.72
Nov.	0.15	1.49	2.34	2.90	3.33	3.76	4.01	3.12	3.37	3.06	2.88	3.30	3.29	3.10
Dec.	0.19	1.80	2.61	3.21	3.74	3.99	4.19	3.46	3.55	3.27	3.29	3.59	3.29	3.41
2023 Jan.	0.23	1.99	2.72	3.58	4.13	4.20	4.39	3.77	3.92	3.45	3.41	3.75	3.39	3.63
Feb.	0.31	2.30	2.81	3.82	4.39	4.54	4.71	4.05	4.09	3.69	3.69	3.54	3.58	3.86
Mar.	0.41	2.57	2.95	4.12	4.70	4.83	4.88	4.33	4.48	3.84	4.08	4.32	3.88	4.22
Apr.	0.44	2.80	3.11	4.39	4.86	4.74	4.96	4.60	4.58	3.98	4.32	4.37	3.69	4.39
May	0.49	2.96	3.13	4.56	5.04	5.07	5.16	4.75	4.84	4.01	4.47	4.58	4.01	4.57
June	0.55	3.20	3.10	4.78	5.23	5.43	5.27	4.95	4.99	4.17	4.71	4.88	4.12	4.78
July [(p)]	0.60	3.31	3.58	4.89	5.51	5.52	5.43	5.12	5.02	4.33	4.82	5.02	4.34	4.93

Source: ECB.
1) Data refer to the changing composition of the euro area.
2) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector.

4.6 Debt securities issued by euro area residents, by sector of the issuer and original maturity
(EUR billions; transactions during the month and end-of-period outstanding amounts; market values)

	Outstanding amounts							Gross issues [1]						
	Total	MFIs	Non-MFI corporations			General government		Total	MFIs	Non-MFI corporations			General government	
			Financial corpo-rations other than MFIs	FVCs	Non-financial corpo-rations		of which central govern-ment			Financial corpo-rations other than MFIs	FVCs	Non-financial corpo-rations		of which central govern-ment
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
					Short-term									
2020	1,488.6	429.7	126.0	51.3	96.7	836.1	722.5	.	.	.	.	.	.	.
2021	1,407.5	427.9	126.9	49.9	88.0	764.7	674.9	387.2	138.4	79.1	26.4	32.1	137.6	104.8
2022	1,371.5	466.8	143.0	49.8	94.7	667.0	621.7	481.7	182.4	117.4	48.0	48.1	133.9	97.1
2023 Feb.	1,374.1	529.3	137.2	51.1	94.2	613.4	569.4	495.0	224.6	98.5	35.2	49.1	122.8	96.2
Mar.	1,423.7	536.6	136.0	50.9	96.4	654.7	603.4	583.5	239.4	122.3	38.7	53.3	168.5	131.0
Apr.	1,454.9	564.9	133.9	47.7	102.3	653.7	603.5	511.4	218.1	100.9	31.9	60.2	132.2	103.3
May	1,457.4	580.5	137.3	50.3	102.9	636.8	599.6	515.1	242.0	118.0	37.9	53.7	101.4	86.5
June	1,478.7	581.6	130.5	49.1	93.1	673.5	634.2	515.7	222.0	114.9	36.0	45.8	133.1	107.1
July	1,463.0	574.0	129.1	45.3	96.0	664.0	635.3	488.2	181.4	113.7	31.1	53.7	139.5	122.0
					Long-term									
2020	19,285.0	4,077.2	3,104.3	1,260.9	1,543.3	10,560.1	9,773.2	.	.	.	.	.	.	.
2021	19,926.3	4,182.6	3,385.6	1,342.8	1,600.6	10,757.5	9,936.5	316.9	67.9	84.0	34.3	23.3	141.8	128.3
2022	17,902.9	3,972.3	3,267.0	1,333.8	1,397.7	9,265.9	8,553.9	300.1	78.4	74.5	29.0	16.7	130.6	121.1
2023 Feb.	18,187.1	4,081.0	3,288.5	1,325.5	1,418.9	9,398.7	8,675.3	353.7	99.1	54.1	12.9	17.6	182.9	165.8
Mar.	18,409.2	4,104.4	3,277.4	1,322.9	1,415.5	9,611.8	8,876.2	339.1	84.5	70.4	30.9	15.5	168.6	156.1
Apr.	18,411.1	4,118.5	3,279.6	1,332.9	1,419.2	9,593.8	8,873.4	308.5	72.7	76.1	34.4	16.4	143.2	137.3
May	18,573.7	4,191.4	3,329.2	1,368.3	1,427.4	9,625.6	8,908.1	372.0	100.0	100.2	56.2	27.3	144.5	136.2
June	18,669.3	4,202.9	3,337.5	1,375.6	1,429.4	9,699.4	8,979.2	401.5	114.4	83.9	30.9	30.6	172.6	160.9
July	18,765.7	4,300.6	3,350.2	1,365.4	1,436.2	9,678.8	8,958.5	348.5	142.8	57.9	11.5	17.9	129.9	125.1

Source: ECB.
1) In order to facilitate comparison, annual data are averages of the relevant monthly data.

4.7 Annual growth rates and outstanding amounts of debt securities and listed shares
(EUR billions and percentage changes; market values)

	Debt securities							Listed shares			
	Total	MFIs	Non-MFI corporations			General government		Total	MFIs	Financial corporations other than MFIs	Non-financial corporations
			Financial corporations other than MFIs	FVCs	Non-financial corporations		of which central government				
	1	2	3	4	5	6	7	8	9	10	11
					Outstanding amount						
2020	20,773.5	4,506.9	3,230.3	1,312.3	1,640.1	11,396.2	10,495.7	8,519.7	473.8	1,338.1	6,706.9
2021	21,333.7	4,610.5	3,512.5	1,392.7	1,688.5	11,522.2	10,611.3	10,414.6	600.0	1,560.1	8,253.5
2022	19,274.5	4,439.2	3,410.0	1,383.6	1,492.4	9,932.9	9,175.6	8,747.0	524.9	1,363.3	6,858.1
2023 Feb.	19,561.2	4,610.2	3,425.7	1,376.6	1,513.1	10,012.1	9,244.7	9,622.5	630.3	1,495.2	7,496.4
Mar.	19,832.9	4,641.0	3,413.4	1,373.8	1,511.9	10,266.5	9,479.6	9,642.9	558.8	1,447.7	7,635.9
Apr.	19,866.0	4,683.4	3,413.6	1,380.7	1,521.5	10,247.5	9,476.9	9,694.8	566.4	1,442.1	7,685.7
May	20,031.1	4,772.0	3,466.5	1,418.6	1,530.3	10,262.4	9,507.7	9,415.6	545.4	1,396.8	7,472.9
June	20,148.0	4,784.5	3,468.0	1,424.7	1,522.5	10,372.9	9,613.5	9,673.6	587.2	1,480.2	7,605.6
July	20,228.7	4,874.5	3,479.3	1,410.7	1,532.1	10,342.7	9,593.8	9,829.7	623.3	1,526.5	7,679.3
					Growth rate [1]						
2022 Dec.	3.7	4.7	4.7	-0.1	1.2	3.2	3.8	0.0	-1.8	1.2	-0.1
2023 Jan.	4.0	7.1	4.0	-0.3	1.0	3.1	3.7	0.0	-2.2	0.6	0.1
Feb.	4.1	7.8	3.1	-0.9	1.6	3.3	3.9	0.1	-2.4	0.7	0.2
Mar.	3.8	7.1	2.3	-1.7	-0.1	3.4	4.0	0.0	-2.4	0.5	0.1
Apr.	4.3	8.2	1.5	-1.6	0.5	4.1	4.8	0.0	-2.2	0.5	0.1
May	4.4	9.1	2.2	1.5	0.6	3.6	4.5	-0.2	-2.6	0.5	-0.1
June	5.2	10.2	3.3	2.9	0.9	4.3	5.1	-0.9	-2.4	1.6	-1.3
July	5.8	12.1	3.3	1.2	1.5	4.6	5.3	-0.9	-1.4	0.9	-1.2

Source: ECB.
1) For details on the calculation of growth rates, see the Technical Notes.

4 Financial market developments

4.8 Effective exchange rates [1]
(period averages; index: 1999 Q1=100)

	EER-18						EER-41	
	Nominal	Real CPI	Real PPI	Real GDP deflator	Real ULCM	Real ULCT	Nominal	Real CPI
	1	2	3	4	5	6	7	8
2020	99.7	93.7	93.8	89.8	75.1	88.1	119.2	93.9
2021	99.6	93.7	93.5	89.0	70.4	86.4	120.5	94.3
2022	95.3	90.8	93.4	83.9	65.4	81.4	116.1	90.9
2022 Q3	93.7	89.3	92.5	82.0	63.6	79.7	113.9	89.0
Q4	95.7	91.9	95.0	84.7	64.4	81.9	116.7	91.8
2023 Q1	97.1	92.8	96.9	86.5	67.1	84.2	119.4	93.1
Q2	98.2	93.5	97.9	.	.	.	121.4	94.3
2023 Mar.	97.3	92.9	97.1	-	-	-	119.7	93.4
Apr.	98.4	93.8	98.0	-	-	-	121.5	94.6
May	98.0	93.2	97.7	-	-	-	120.9	93.9
June	98.2	93.5	98.0	-	-	-	121.8	94.5
July	99.2	94.6	99.2	-	-	-	123.7	95.9
Aug.	99.0	94.8	99.2	-	-	-	123.7	96.1
Percentage change versus previous month								
2023 Aug.	-0.1	0.2	0.0	-	-	-	0.0	0.2
Percentage change versus previous year								
2023 Aug.	6.1	6.6	7.6	-	-	-	8.9	8.3

Source: ECB.
1) For a definition of the trading partner groups and other information see the General Notes to the Statistics Bulletin.

4.9 Bilateral exchange rates
(period averages; units of national currency per euro)

	Chinese renminbi	Czech koruna	Danish krone	Hungarian forint	Japanese yen	Polish zloty	Pound sterling	Romanian leu	Swedish krona	Swiss franc	US Dollar
	1	2	3	4	5	6	7	8	9	10	11
2020	7.875	26.455	7.454	351.249	121.846	4.443	0.890	4.8383	10.485	1.071	1.142
2021	7.628	25.640	7.437	358.516	129.877	4.565	0.860	4.9215	10.146	1.081	1.183
2022	7.079	24.566	7.440	391.286	138.027	4.686	0.853	4.9313	10.630	1.005	1.053
2022 Q3	6.898	24.579	7.439	403.430	139.164	4.744	0.856	4.9138	10.619	0.973	1.007
Q4	7.258	24.389	7.438	410.825	144.238	4.727	0.870	4.9208	10.938	0.983	1.021
2023 Q1	7.342	23.785	7.443	388.712	141.981	4.708	0.883	4.9202	11.203	0.992	1.073
Q2	7.644	23.585	7.450	372.604	149.723	4.537	0.869	4.9488	11.469	0.978	1.089
2023 Mar.	7.381	23.683	7.446	385.013	143.010	4.689	0.882	4.9263	11.228	0.991	1.071
Apr.	7.556	23.437	7.452	375.336	146.511	4.632	0.881	4.9365	11.337	0.985	1.097
May	7.595	23.595	7.449	372.371	148.925	4.534	0.870	4.9477	11.370	0.975	1.087
June	7.765	23.695	7.449	370.602	153.149	4.461	0.859	4.9600	11.677	0.976	1.084
July	7.948	23.892	7.451	379.035	155.937	4.443	0.859	4.9411	11.634	0.966	1.106
Aug.	7.910	24.108	7.452	385.047	157.962	4.460	0.859	4.9411	11.812	0.959	1.091
Percentage change versus previous month											
2023 Aug.	-0.5	0.9	0.0	1.6	1.3	0.4	0.0	0.0	1.5	-0.8	-1.3
Percentage change versus previous year											
2023 Aug.	14.8	-1.9	0.2	-4.2	15.4	-5.6	1.6	1.0	12.5	-1.1	7.7

Source: ECB.

4 Financial market developments

4.10 Euro area balance of payments, financial account
(EUR billions, unless otherwise indicated; outstanding amounts at end of period; transactions during period)

	Total [1]			Direct investment		Portfolio investment		Net financial derivatives	Other investment		Reserve assets	Memo: Gross external debt
	Assets	Liabilities	Net	Assets	Liabilities	Assets	Liabilities		Assets	Liabilities		
	1	2	3	4	5	6	7	8	9	10	11	12
	Outstanding amounts (international investment position)											
2022 Q2	32,312.5	31,585.7	726.9	12,488.2	10,282.9	11,594.6	13,006.6	28.5	7,079.3	8,296.2	1,122.0	16,312.4
Q3	32,357.3	31,562.6	794.7	12,741.7	10,485.1	11,275.1	12,693.3	37.1	7,167.7	8,384.1	1,135.7	16,437.5
Q4	30,995.1	30,507.8	487.3	12,132.7	10,013.1	11,152.5	12,716.7	68.0	6,527.7	7,778.0	1,114.3	15,425.2
2023 Q1	31,605.7	31,273.6	332.1	12,307.7	9,926.6	11,324.3	13,378.3	30.8	6,809.3	7,968.7	1,133.6	15,719.0
	Outstanding amounts as a percentage of GDP											
2023 Q1	231.1	228.7	2.4	90.0	72.6	82.8	97.8	0.2	49.8	58.3	8.3	115.0
	Transactions											
2022 Q3	-85.2	-49.0	-36.2	10.1	-23.4	-173.4	4.2	38.5	32.4	-29.8	7.3	-
Q4	-531.8	-590.4	58.6	-265.5	-250.7	95.5	86.7	-4.1	-367.0	-426.4	9.3	-
2023 Q1	404.2	356.6	47.6	58.3	3.7	61.6	158.0	15.5	287.2	194.9	-18.5	-
Q2	134.9	64.6	70.3	43.6	57.8	155.1	76.8	7.0	-72.6	-70.0	1.9	-
2023 Jan.	183.2	162.5	20.8	-2.8	-8.5	58.0	26.0	-0.6	137.4	145.0	-8.7	-
Feb.	97.7	97.2	0.5	54.0	1.0	14.8	42.9	10.4	30.0	53.4	-11.4	-
Mar.	123.2	96.9	26.3	7.2	11.3	-11.2	89.2	5.7	119.9	-3.5	1.6	-
Apr.	2.7	32.4	-29.8	0.8	-8.1	40.4	6.7	1.0	-37.7	33.8	-1.8	-
May	79.6	57.5	22.1	19.6	56.2	37.3	-21.5	13.3	8.0	22.9	1.4	-
June	52.7	-25.4	78.1	23.1	9.7	77.4	91.7	-7.3	-42.9	-126.8	2.4	-
	12-month cumulated transactions											
2023 June	-77.9	-218.3	140.4	-153.5	-212.7	138.7	325.7	56.8	-120.0	-331.4	0.0	-
	12-month cumulated transactions as a percentage of GDP											
2023 June	-0.6	-1.6	1.0	-1.1	-1.5	1.0	2.3	0.4	-0.9	-2.4	0.0	-

Source: ECB.
1) Net financial derivatives are included in total assets.

5 Financing conditions and credit developments

5.1 Monetary aggregates [1]
(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

			M3								
			M2					M3-M2			
	M1			M2-M1							
Currency in circulation	Overnight deposits		Deposits with an agreed maturity of up to 2 years	Deposits redeemable at notice of up to 3 months			Repos	Money market fund shares	Debt securities with a maturity of up to 2 years		
1	2	3	4	5	6	7	8	9	10	11	12
Outstanding amounts											
2020	1,363.7	8,906.5	10,270.1	1,026.7	2,449.4	3,476.1	13,746.3	101.8	627.0	4.4	733.1	14,479.4
2021	1,469.7	9,831.1	11,300.9	916.1	2,506.4	3,422.5	14,723.3	118.0	647.2	21.5	786.7	15,510.0
2022	1,538.5	9,783.0	11,321.4	1,377.8	2,566.6	3,944.4	15,265.8	123.3	649.9	46.4	819.7	16,085.5
2022 Q3	1,538.2	10,180.3	11,718.6	1,175.8	2,552.7	3,728.4	15,447.0	120.4	598.0	48.8	767.3	16,214.3
Q4	1,538.5	9,783.0	11,321.4	1,377.8	2,566.6	3,944.4	15,265.8	123.3	649.9	46.4	819.7	16,085.5
2023 Q1	1,544.1	9,447.6	10,991.6	1,644.4	2,549.7	4,194.1	15,185.7	103.2	681.3	93.4	877.9	16,063.6
Q2	1,534.7	9,179.7	10,714.3	1,871.3	2,534.3	4,405.6	15,119.9	113.2	697.3	91.8	902.3	16,022.2
2023 Feb.	1,539.6	9,593.3	11,132.9	1,544.7	2,557.5	4,102.2	15,235.1	124.2	651.9	80.8	856.9	16,092.0
Mar.	1,544.1	9,447.6	10,991.6	1,644.4	2,549.7	4,194.1	15,185.7	103.2	681.3	93.4	877.9	16,063.6
Apr.	1,536.8	9,373.1	10,909.9	1,702.7	2,537.5	4,240.2	15,150.1	101.5	677.0	86.2	864.8	16,014.8
May	1,537.1	9,280.7	10,817.8	1,766.2	2,527.8	4,294.0	15,111.7	111.9	686.4	96.7	895.0	16,006.7
June	1,534.7	9,179.7	10,714.3	1,871.3	2,534.3	4,405.6	15,119.9	113.2	697.3	91.8	902.3	16,022.2
July (p)	1,534.1	9,086.7	10,620.8	1,915.4	2,526.9	4,442.3	15,063.2	122.3	690.9	80.1	893.3	15,956.5
Transactions											
2020	139.2	1,265.5	1,404.7	-33.8	86.3	52.5	1,457.2	19.6	111.0	1.2	131.7	1,589.0
2021	107.4	915.6	1,023.0	-121.6	66.7	-55.0	968.0	12.1	20.9	14.4	47.3	1,015.3
2022	68.8	-46.6	22.2	427.3	56.7	484.1	506.3	3.7	3.0	77.4	84.2	590.5
2022 Q3	10.2	57.1	67.3	160.5	21.8	182.3	249.6	2.7	-11.0	38.7	30.3	279.9
Q4	0.3	-361.7	-361.4	212.5	13.9	226.4	-135.0	4.8	52.0	-1.3	55.4	-79.6
2023 Q1	4.3	-379.4	-375.1	261.1	-11.8	249.3	-125.9	-20.6	31.2	48.8	59.4	-66.5
Q2	-9.4	-249.0	-258.3	222.0	-32.4	189.5	-68.8	10.1	15.9	-2.8	23.2	-45.6
2023 Feb.	-1.1	-138.6	-139.7	84.2	-3.2	81.0	-58.7	-10.1	17.4	29.2	36.5	-22.2
Mar.	4.4	-139.2	-134.7	102.0	-7.7	94.3	-40.4	-20.4	29.2	15.1	24.0	-16.5
Apr.	-7.3	-69.9	-77.2	57.2	-12.2	45.0	-32.2	-1.5	-4.2	-5.6	-11.3	-43.5
May	0.3	-99.9	-99.5	59.7	-9.8	49.8	-49.7	9.8	9.3	8.7	27.9	-21.8
June	-2.4	-79.2	-81.6	105.1	-10.4	94.7	13.1	1.7	10.8	-5.9	6.6	19.7
July (p)	-0.7	-89.8	-90.5	45.7	-7.3	38.4	-52.2	9.4	-6.5	-11.1	-8.2	-60.3
Growth rates											
2020	11.4	16.4	15.7	-3.2	3.7	1.5	11.8	24.4	21.3	-	21.8	12.3
2021	7.9	10.3	10.0	-11.8	2.7	-1.6	7.0	12.0	3.3	371.3	6.5	7.0
2022	4.7	-0.5	0.2	45.7	2.3	14.0	3.4	3.0	0.5	520.2	11.3	3.8
2022 Q3	6.5	5.1	5.3	23.6	2.3	8.0	5.9	-4.5	-1.3	331.2	7.4	6.0
Q4	4.7	-0.5	0.2	45.7	2.3	14.0	3.4	3.0	0.5	520.2	11.3	3.8
2023 Q1	1.5	-5.6	-4.7	68.8	1.4	20.0	1.1	-17.5	15.3	520.6	23.8	2.1
Q2	0.4	-9.2	-8.0	85.6	-0.3	24.0	-0.5	-2.6	14.5	338.5	22.8	0.6
2023 Feb.	2.9	-4.0	-3.1	59.1	1.7	17.5	1.7	-6.1	11.6	460.0	21.0	2.6
Mar.	1.5	-5.6	-4.7	68.8	1.4	20.0	1.1	-17.5	15.3	520.6	23.8	2.1
Apr.	1.0	-6.7	-5.7	73.3	0.8	21.0	0.5	-13.7	13.2	351.8	20.1	1.4
May	0.7	-8.1	-7.0	81.0	0.2	22.6	-0.1	-10.9	14.6	418.8	23.1	0.9
June	0.4	-9.2	-8.0	85.6	-0.3	24.0	-0.5	-2.6	14.5	338.5	22.8	0.6
July (p)	0.1	-10.5	-9.2	85.2	-0.9	23.9	-1.4	-1.5	16.3	218.0	20.6	-0.4

Source: ECB.
1) Data refer to the changing composition of the euro area.

5 Financing conditions and credit developments

5.2 Deposits in M3 [1]
(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	Non-financial corporations [2]					Households [3]					Financial corporations other than MFIs and ICPFs [2]	Insurance corporations and pension funds	Other general government [4]
	Total	Overnight	With an agreed maturity of up to 2 years	Redeemable at notice of up to 3 months	Repos	Total	Overnight	With an agreed maturity of up to 2 years	Redeemable at notice of up to 3 months	Repos			
	1	2	3	4	5	6	7	8	9	10	11	12	13
Outstanding amounts													
2020	2,966.0	2,514.2	308.2	140.2	3.3	7,665.2	4,967.3	437.0	2,260.1	0.9	1,120.6	235.3	497.3
2021	3,231.5	2,807.0	288.9	128.7	6.9	8,090.5	5,383.9	372.5	2,333.4	0.7	1,275.5	227.8	546.3
2022	3,362.6	2,725.6	495.9	135.3	5.9	8,392.2	5,555.2	442.8	2,393.3	0.9	1,300.8	235.0	560.0
2022 Q3	3,368.1	2,837.4	388.3	133.7	8.8	8,372.0	5,620.1	370.0	2,380.9	1.0	1,493.4	243.9	551.9
Q4	3,362.6	2,725.6	495.9	135.3	5.9	8,392.2	5,555.2	442.8	2,393.3	0.9	1,300.8	235.0	560.0
2023 Q1	3,342.8	2,600.9	600.8	132.6	8.4	8,391.0	5,443.3	568.3	2,378.6	0.9	1,202.8	231.7	576.6
Q2	3,338.4	2,507.9	686.3	132.5	11.7	8,381.2	5,309.3	705.0	2,366.1	0.9	1,182.1	231.7	565.2
2023 Feb.	3,380.1	2,663.1	573.2	134.5	9.2	8,419.4	5,511.0	521.9	2,385.8	0.7	1,223.4	225.0	571.9
Mar.	3,342.8	2,600.9	600.8	132.6	8.4	8,391.0	5,443.3	568.3	2,378.6	0.9	1,202.8	231.7	576.6
Apr.	3,336.7	2,572.1	622.8	131.6	10.1	8,376.9	5,398.7	608.4	2,368.9	0.9	1,213.8	227.0	560.5
May	3,305.9	2,529.9	632.6	131.9	11.6	8,379.4	5,361.7	657.5	2,359.2	0.9	1,218.6	226.9	555.8
June	3,338.4	2,507.9	686.3	132.5	11.7	8,381.2	5,309.3	705.0	2,366.1	0.9	1,182.1	231.7	565.2
July [(p)]	3,305.0	2,462.7	699.6	132.0	10.7	8,378.7	5,264.1	756.3	2,357.5	0.8	1,191.6	215.3	560.8
Transactions													
2020	510.9	465.4	55.3	-6.8	-3.0	612.8	561.7	-53.8	105.0	0.0	160.2	20.6	33.1
2021	251.7	276.8	-21.4	-6.9	3.3	424.5	412.7	-65.1	77.0	-0.2	159.4	-9.5	46.6
2022	120.2	-90.0	205.6	5.9	-1.4	298.3	169.2	74.1	54.9	0.1	0.4	7.6	14.7
2022 Q3	46.4	-34.3	80.4	2.7	-2.3	113.2	77.4	15.2	20.3	0.3	89.5	11.4	-18.5
Q4	11.6	-100.4	113.0	1.6	-2.6	24.9	-61.4	74.3	12.1	-0.1	-168.1	-7.4	8.4
2023 Q1	-29.1	-135.3	104.6	-1.0	2.6	-34.7	-145.2	120.0	-9.7	0.1	-97.6	-2.1	12.7
Q2	-4.1	-91.2	84.3	-0.5	3.3	-9.5	-116.9	136.6	-29.0	-0.1	-21.9	0.2	-14.1
2023 Feb.	1.4	-35.6	35.4	-0.1	1.7	-20.5	-53.2	36.2	-3.3	-0.1	-51.0	-10.2	12.6
Mar.	-31.0	-58.8	28.7	-0.2	-0.7	-27.4	-66.9	46.6	-7.2	0.2	-16.5	7.1	2.5
Apr.	-4.2	-27.7	22.6	-1.0	1.8	-13.6	-44.3	40.4	-9.6	-0.1	14.4	-4.4	-18.6
May	-35.5	-45.0	8.0	0.3	1.2	0.9	-37.8	48.4	-9.8	0.1	-0.2	-0.5	-5.0
June	35.6	-18.6	53.7	0.2	0.3	3.2	-34.9	47.8	-9.6	-0.1	-36.1	5.1	9.4
July [(p)]	-31.4	-43.9	13.8	-0.4	-0.9	-1.9	-44.8	51.5	-8.5	0.0	11.9	-16.3	-4.4
Growth rates													
2020	20.6	22.5	21.5	-4.5	-46.6	8.7	12.8	-10.9	4.9	-5.4	16.0	9.5	7.1
2021	8.5	11.0	-7.0	-4.9	99.4	5.5	8.3	-14.9	3.4	-18.3	14.2	-4.0	9.4
2022	3.7	-3.2	70.0	4.6	-17.2	3.7	3.1	20.0	2.4	20.0	0.3	3.4	2.7
2022 Q3	5.9	3.2	34.0	1.8	-15.2	4.3	5.6	-4.2	2.6	55.7	14.3	7.2	6.5
Q4	3.7	-3.2	70.0	4.6	-17.2	3.7	3.1	20.0	2.4	20.0	0.3	3.4	2.7
2023 Q1	1.3	-9.4	106.0	3.1	-19.3	2.0	-1.3	56.8	1.4	-10.7	-8.7	0.6	3.5
Q2	0.8	-12.6	125.1	2.2	10.3	1.1	-4.4	97.1	-0.3	20.8	-14.2	1.0	-2.0
2023 Feb.	2.6	-7.0	98.1	4.1	-20.6	2.6	0.4	42.9	1.8	-25.6	-8.6	-2.9	4.7
Mar.	1.3	-9.4	106.0	3.1	-19.3	2.0	-1.3	56.8	1.4	-10.7	-8.7	0.6	3.5
Apr.	1.2	-10.1	108.1	2.6	7.8	1.6	-2.4	68.7	0.9	-7.0	-9.0	1.0	-1.4
May	0.2	-11.9	119.0	2.3	12.1	1.3	-3.6	83.3	0.3	18.9	-10.0	-1.2	-3.2
June	0.8	-12.6	125.1	2.2	10.3	1.1	-4.4	97.1	-0.3	20.8	-14.2	1.0	-2.0
July [(p)]	-0.6	-14.1	118.2	2.0	13.5	0.7	-5.7	111.7	-1.0	6.3	-15.4	-9.5	-2.4

Source: ECB.
1) Data refer to the changing composition of the euro area.
2) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector. These entities are included in MFI balance sheet statistics with financial corporations other than MFIs and insurance corporations and pension funds (ICPFs).
3) Including non-profit institutions serving households.
4) Refers to the general government sector excluding central government.

5 Financing conditions and credit developments

5.3 Credit to euro area residents [1]
(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	Credit to general government			Credit to other euro area residents								
	Total	Loans	Debt securities	Total	Loans						Debt securities	Equity and non-money market fund investment fund shares
					Total		To non-financial corpor-ations [3]	To house-holds [4]	To financial corporations other than MFIs and ICPFs [3]	To insurance corporations and pension funds		
						Adjusted loans [2]						
	1	2	3	4	5	6	7	8	9	10	11	12
	Outstanding amounts											
2020	5,906.9	998.1	4,896.9	14,323.0	11,911.0	12,289.7	4,706.6	6,132.9	904.7	166.8	1,547.5	864.5
2021	6,542.7	996.6	5,544.3	14,802.7	12,332.1	12,716.3	4,861.3	6,373.6	937.6	159.7	1,582.4	888.1
2022	6,374.0	1,007.3	5,341.6	15,387.9	12,981.7	13,177.9	5,127.1	6,633.3	1,074.9	146.5	1,569.9	836.3
2022 Q3	6,359.7	1,002.3	5,333.1	15,421.7	13,051.1	13,204.2	5,165.6	6,613.7	1,110.6	161.2	1,545.9	824.6
Q4	6,374.0	1,007.3	5,341.6	15,387.9	12,981.7	13,177.9	5,127.1	6,633.3	1,074.9	146.5	1,569.9	836.3
2023 Q1	6,358.0	995.7	5,337.4	15,415.3	13,013.9	13,204.4	5,131.0	6,666.0	1,078.5	138.5	1,552.0	849.4
Q2	6,268.9	986.0	5,257.5	15,418.8	12,979.0	13,205.8	5,130.7	6,633.4	1,071.0	144.0	1,569.9	869.9
2023 Feb.	6,347.5	997.3	5,325.2	15,417.3	13,023.0	13,214.7	5,140.2	6,659.9	1,074.3	148.6	1,548.5	845.7
Mar.	6,358.0	995.7	5,337.4	15,415.3	13,013.9	13,204.4	5,131.0	6,666.0	1,078.5	138.5	1,552.0	849.4
Apr.	6,319.0	981.7	5,312.2	15,422.6	13,000.7	13,202.3	5,124.9	6,666.7	1,064.5	144.6	1,564.3	857.7
May	6,262.1	990.6	5,245.9	15,445.4	13,000.6	13,228.2	5,134.9	6,631.4	1,092.7	141.6	1,582.5	862.3
June	6,268.9	986.0	5,257.5	15,418.8	12,979.0	13,205.8	5,130.7	6,633.4	1,071.0	144.0	1,569.9	869.9
July [(p)]	6,228.1	983.1	5,219.5	15,436.2	12,993.0	13,219.4	5,135.5	6,626.3	1,095.8	135.5	1,565.4	877.8
	Transactions											
2020	1,040.0	13.5	1,026.4	733.6	534.7	555.5	287.6	209.3	20.7	17.1	170.7	28.2
2021	665.6	-0.4	675.6	561.9	473.9	507.3	175.9	261.8	46.4	-10.2	78.9	9.2
2022	177.1	9.9	166.4	634.6	623.2	679.9	268.5	242.3	125.4	-13.0	17.8	-6.4
2022 Q3	-36.6	2.1	-38.9	222.7	232.6	236.7	139.1	58.7	38.0	-3.2	-9.4	-0.5
Q4	44.3	4.1	39.7	3.6	-31.7	10.9	-17.4	27.4	-27.4	-14.2	22.6	12.6
2023 Q1	-80.5	-19.8	-60.6	-6.1	6.8	3.9	-3.0	14.1	3.4	-7.8	-20.9	7.9
Q2	-85.7	-9.6	-76.5	9.7	-29.6	3.1	4.0	-29.9	-9.2	5.5	22.9	16.4
2023 Feb.	2.1	1.1	1.1	-9.0	-7.8	-7.8	-2.2	4.4	-11.6	1.6	-8.3	7.1
Mar.	-25.1	-3.2	-21.9	6.5	1.8	4.1	-2.3	8.3	5.9	-10.0	2.6	2.0
Apr.	-34.4	-14.0	-20.5	7.8	-9.5	2.4	-2.7	1.9	-14.8	6.2	12.2	5.1
May	-63.3	8.9	-72.7	18.3	-5.3	17.8	7.7	-35.4	25.5	-3.1	17.0	6.7
June	12.0	-4.5	16.8	-16.4	-14.8	-17.2	-1.0	3.6	-19.9	2.4	-6.2	4.6
July [(p)]	-39.7	-2.9	-36.8	20.2	18.4	17.1	6.9	-6.2	26.2	-8.5	-4.9	6.7
	Growth rates											
2020	22.1	1.4	27.8	5.3	4.7	4.7	6.4	3.5	2.3	10.2	11.4	3.4
2021	11.3	0.0	13.8	3.9	4.0	4.1	3.7	4.3	5.1	-4.6	5.2	1.1
2022	2.8	1.0	3.1	4.3	5.0	5.4	5.5	3.8	13.4	-7.9	1.1	-0.6
2022 Q3	5.0	0.5	5.8	5.8	6.7	7.1	8.0	4.4	14.9	10.0	3.4	-3.0
Q4	2.8	1.0	3.1	4.3	5.0	5.4	5.5	3.8	13.4	-7.9	1.1	-0.6
2023 Q1	-0.1	-1.4	0.2	2.9	3.5	3.9	4.5	2.9	4.9	-9.8	-1.4	1.9
Q2	-2.5	-2.3	-2.5	1.5	1.4	2.0	2.4	1.1	0.5	-12.1	1.0	4.4
2023 Feb.	0.7	-0.8	1.0	3.3	3.9	4.3	5.0	3.2	6.2	-11.0	0.3	0.6
Mar.	-0.1	-1.4	0.2	2.9	3.5	3.9	4.5	2.9	4.9	-9.8	-1.4	1.9
Apr.	-0.8	-2.9	-0.5	2.5	2.9	3.3	3.8	2.6	2.7	-9.5	-1.3	3.0
May	-2.2	-1.7	-2.3	2.2	2.1	2.8	3.2	1.5	3.3	-13.0	2.3	2.5
June	-2.5	-2.3	-2.5	1.5	1.4	2.0	2.4	1.1	0.5	-12.1	1.0	4.4
July [(p)]	-2.9	-2.3	-3.0	1.3	1.1	1.6	1.7	0.7	3.2	-15.1	1.0	5.4

Source: ECB.
1) Data refer to the changing composition of the euro area.
2) Adjusted for loan sales and securitisation (resulting in derecognition from the MFI statistical balance sheet) as well as for positions arising from notional cash pooling services provided by MFIs.
3) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector. These entities are included in MFI balance sheet statistics with financial corporations other than MFIs and insurance corporations and pension funds (ICPFs).
4) Including non-profit institutions serving households.

5 Financing conditions and credit developments

5.4 MFI loans to euro area non-financial corporations and households [1]
(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	Non-financial corporations [2]					Households [3]				Other loans
	Total		Up to 1 year	Over 1 and up to 5 years	Over 5 years	Total		Loans for consumption	Loans for house purchase	
		Adjusted loans [4]					Adjusted loans [4]			
	1	2	3	4	5	6	7	8	9	10
Outstanding amounts										
2020	4,706.6	4,828.7	893.8	1,009.1	2,803.6	6,132.9	6,402.6	700.7	4,725.1	707.1
2021	4,861.3	4,993.1	885.3	1,005.5	2,970.5	6,373.6	6,638.4	698.5	4,971.1	703.9
2022	5,127.1	5,135.7	963.3	1,079.4	3,084.3	6,633.3	6,832.7	717.6	5,215.0	700.7
2022 Q3	5,165.6	5,148.4	1,008.0	1,068.1	3,089.5	6,613.7	6,806.5	714.0	5,195.4	704.2
Q4	5,127.1	5,135.7	963.3	1,079.4	3,084.3	6,633.3	6,832.7	717.6	5,215.0	700.7
2023 Q1	5,131.0	5,144.8	939.9	1,093.0	3,098.1	6,666.0	6,871.4	723.6	5,236.1	706.3
Q2	5,130.7	5,144.1	924.7	1,086.5	3,119.5	6,633.4	6,866.2	725.5	5,207.7	700.2
2023 Feb.	5,140.2	5,149.7	945.2	1,092.0	3,103.0	6,659.9	6,868.2	721.7	5,228.3	709.9
Mar.	5,131.0	5,144.8	939.9	1,093.0	3,098.1	6,666.0	6,871.4	723.6	5,236.1	706.3
Apr.	5,124.9	5,142.4	929.8	1,094.3	3,100.7	6,666.7	6,871.9	725.1	5,237.6	704.0
May	5,134.9	5,145.6	924.5	1,096.0	3,114.4	6,631.4	6,870.1	726.0	5,204.3	701.2
June	5,130.7	5,144.1	924.7	1,086.5	3,119.5	6,633.4	6,866.2	725.5	5,207.7	700.2
July [(p)]	5,135.5	5,147.2	922.6	1,087.9	3,124.9	6,626.3	6,857.9	727.1	5,202.8	696.4
Transactions										
2020	287.6	324.9	-53.5	138.5	202.6	209.3	193.7	-11.6	210.8	10.2
2021	175.9	208.0	-1.4	2.4	174.9	261.8	267.2	10.7	255.0	-3.9
2022	268.5	308.1	78.5	77.6	112.5	242.3	249.8	22.7	218.5	1.1
2022 Q3	139.1	139.3	55.4	39.9	43.8	58.7	59.5	4.9	55.6	-1.8
Q4	-17.4	7.0	-38.2	18.2	2.6	27.4	36.0	5.2	22.0	0.2
2023 Q1	-3.0	3.5	-21.1	10.9	7.2	14.1	22.0	4.2	14.7	-4.9
Q2	4.0	0.7	-13.7	-4.7	22.4	-29.9	-3.5	3.4	-27.9	-5.4
2023 Feb.	-2.2	-1.4	-10.4	5.6	2.6	4.4	6.3	1.6	5.1	-2.2
Mar.	-2.3	5.8	-2.8	2.2	-1.8	8.3	5.4	2.6	7.5	-1.9
Apr.	-2.7	0.6	-8.9	3.0	3.1	1.9	2.5	2.0	1.8	-1.9
May	7.7	-0.6	-6.6	1.2	13.1	-35.4	-3.6	1.3	-33.8	-2.9
June	-1.0	0.7	1.8	-8.9	6.1	3.6	-2.4	0.1	4.1	-0.7
July [(p)]	6.9	4.4	-0.9	1.8	6.0	-6.2	-7.2	2.5	-3.9	-4.7
Growth rates										
2020	6.4	7.1	-5.6	15.9	7.7	3.5	3.1	-1.6	4.7	1.5
2021	3.7	4.3	-0.1	0.2	6.2	4.3	4.2	1.5	5.4	-0.5
2022	5.5	6.3	8.8	7.7	3.8	3.8	3.8	3.3	4.4	0.2
2022 Q3	8.0	8.9	19.7	9.8	4.0	4.4	4.4	3.5	5.1	-0.1
Q4	5.5	6.3	8.8	7.7	3.8	3.8	3.8	3.3	4.4	0.2
2023 Q1	4.5	5.2	4.0	9.1	3.0	2.9	2.9	3.1	3.3	-0.7
Q2	2.4	3.0	-1.9	6.3	2.5	1.1	1.7	2.5	1.3	-1.7
2023 Feb.	5.0	5.7	5.1	9.2	3.5	3.2	3.2	2.8	3.7	-0.3
Mar.	4.5	5.2	4.0	9.1	3.0	2.9	2.9	3.1	3.3	-0.7
Apr.	3.8	4.6	1.6	8.6	2.9	2.6	2.5	3.1	3.0	-1.0
May	3.2	4.0	-0.7	8.2	2.7	1.5	2.1	2.8	1.8	-1.5
June	2.4	3.0	-1.9	6.3	2.5	1.1	1.7	2.5	1.3	-1.7
July [(p)]	1.7	2.2	-3.1	5.1	2.0	0.7	1.3	2.5	0.8	-2.1

Source: ECB.
1) Data refer to the changing composition of the euro area.
2) In accordance with the ESA 2010, in December 2014 holding companies of non-financial groups were reclassified from the non-financial corporations sector to the financial corporations sector. These entities are included in MFI balance sheet statistics with financial corporations other than MFIs and insurance corporations and pension funds (ICPFs).
3) Including non-profit institutions serving households.
4) Adjusted for loan sales and securitisation (resulting in derecognition from the MFI statistical balance sheet) as well as for positions arising from notional cash pooling services provided by MFIs.

5 Financing conditions and credit developments

5.5 Counterparts to M3 other than credit to euro area residents [1]
(EUR billions and annual growth rates; seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

	MFI liabilities						MFI assets			
	Central government holdings [2]	Longer-term financial liabilities vis-à-vis other euro area residents					Net external assets	Other		
		Total	Deposits with an agreed maturity of over 2 years	Deposits redeemable at notice of over 3 months	Debt securities with a maturity of over 2 years	Capital and reserves		Total	Repos with central counter-parties [3]	Reverse repos to central counter-parties [3]
	1	2	3	4	5	6	7	8	9	10
Outstanding amounts										
2020	723.2	6,955.9	1,913.6	42.2	1,990.8	3,009.2	1,441.4	487.2	136.7	141.1
2021	762.6	6,886.1	1,837.3	37.1	1,997.2	3,014.4	1,377.7	435.7	128.5	136.8
2022	683.4	6,736.8	1,780.8	31.0	2,119.3	2,805.7	1,333.6	410.2	137.8	147.6
2022 Q3	642.5	6,764.4	1,801.9	30.6	2,096.5	2,835.4	1,318.8	520.9	148.0	146.7
Q4	683.4	6,736.8	1,780.8	31.0	2,119.3	2,805.7	1,333.6	410.2	137.8	147.6
2023 Q1	580.0	6,895.4	1,792.7	35.0	2,171.2	2,896.5	1,434.9	330.8	152.1	165.8
Q2	477.6	6,965.8	1,807.5	40.4	2,232.3	2,885.6	1,484.6	293.3	168.6	172.6
2023 Feb.	553.6	6,818.8	1,785.7	33.8	2,177.0	2,822.3	1,336.3	363.4	154.6	159.6
Mar.	580.0	6,895.4	1,792.7	35.0	2,171.2	2,896.5	1,434.9	330.8	152.1	165.8
Apr.	586.5	6,907.3	1,807.4	35.8	2,168.6	2,895.5	1,448.2	318.8	153.3	161.9
May	483.6	6,979.3	1,806.0	37.6	2,213.1	2,922.6	1,472.5	289.6	174.0	184.1
June	477.6	6,965.8	1,807.5	40.4	2,232.3	2,885.6	1,484.6	293.3	168.6	172.6
July [(p)]	457.3	7,078.1	1,807.0	42.8	2,321.4	2,906.9	1,569.1	258.5	153.8	156.4
Transactions										
2020	299.6	-35.8	-15.1	-8.0	-101.1	88.3	-66.4	145.5	-43.6	-47.5
2021	40.0	-37.2	-75.1	-5.0	-39.7	82.5	-110.7	-98.7	-8.3	-4.3
2022	-76.0	31.5	-89.8	-5.2	14.7	111.8	-72.0	-193.6	10.5	17.9
2022 Q3	-115.0	-10.0	-47.1	0.0	-2.2	39.4	-42.2	10.9	-18.6	-10.6
Q4	40.8	64.3	-15.2	0.3	57.9	21.3	51.7	-74.0	-10.2	1.0
2023 Q1	-110.1	85.3	8.3	4.0	63.9	9.0	72.0	-76.7	15.0	18.9
Q2	-102.2	92.7	13.9	5.1	61.4	12.3	93.8	-72.9	16.5	6.7
2023 Feb.	-11.2	16.8	0.2	1.3	6.2	9.0	8.7	-18.5	-0.2	3.0
Mar.	26.2	22.7	8.0	1.1	9.3	4.2	61.4	-10.4	-2.5	6.5
Apr.	6.5	21.8	15.4	0.8	4.1	1.5	29.0	-17.7	1.2	-3.9
May	-102.7	40.3	-4.1	1.8	31.0	11.6	5.8	-45.0	20.7	22.2
June	-5.9	30.6	2.6	2.5	26.4	-0.9	59.1	-10.3	-5.4	-11.5
July [(p)]	-20.3	31.5	0.2	2.4	16.8	12.0	46.6	-76.4	-14.8	-16.2
Growth rates										
2020	84.6	-0.5	-0.8	-15.8	-4.7	3.0	-	-	-24.2	-25.2
2021	5.5	-0.5	-3.9	-11.9	-2.0	2.8	-	-	-6.0	-3.0
2022	-10.0	0.5	-4.8	-14.3	0.6	3.9	-	-	7.9	12.7
2022 Q3	-7.4	-0.4	-4.8	-18.6	-2.0	3.7	-	-	4.4	4.2
Q4	-10.0	0.5	-4.8	-14.3	0.6	3.9	-	-	7.9	12.7
2023 Q1	-22.6	2.3	-3.3	0.6	4.9	3.8	-	-	-4.2	1.3
Q2	-37.7	3.5	-2.2	30.9	8.7	2.9	-	-	1.7	10.2
2023 Feb.	-25.2	1.8	-3.8	-4.4	3.5	4.0	-	-	-7.6	0.2
Mar.	-22.6	2.3	-3.3	0.6	4.9	3.8	-	-	-4.2	1.3
Apr.	-23.9	2.3	-2.3	3.8	5.0	3.1	-	-	-16.0	-5.3
May	-35.0	3.1	-2.5	21.1	7.5	3.3	-	-	-4.2	8.2
June	-37.7	3.5	-2.2	30.9	8.7	2.9	-	-	1.7	10.2
July [(p)]	-39.0	3.9	-1.5	40.7	9.9	2.6	-	-	-10.9	-1.6

Source: ECB.
1) Data refer to the changing composition of the euro area.
2) Comprises central government holdings of deposits with the MFI sector and of securities issued by the MFI sector.
3) Not adjusted for seasonal effects.

6 Fiscal developments

6.1 Deficit/surplus
(as a percentage of GDP; flows during one-year period)

			Deficit (-)/surplus (+)			Memo item: Primary deficit (-)/ surplus (+)
	Total	Central government	State government	Local government	Social security funds	
	1	2	3	4	5	6
2019	-0.6	-1.0	0.1	0.1	0.3	1.0
2020	-7.1	-5.8	-0.4	0.0	-0.9	-5.6
2021	-5.3	-5.3	-0.1	0.0	0.0	-3.9
2022	-3.6	-3.9	0.0	0.0	0.3	-2.0
2022 Q2	-3.2	.	.	.	.	-1.7
Q3	-3.3	.	.	.	.	-1.7
Q4	-3.6	.	.	.	.	-2.0
2023 Q1	-3.7	.	.	.	.	-2.0

Sources: ECB for annual data; Eurostat for quarterly data.

6.2 Revenue and expenditure
(as a percentage of GDP; flows during one-year period)

			Revenue					Expenditure				
	Total	Current revenue				Capital revenue	Total	Current expenditure				Capital expenditure
			Direct taxes	Indirect taxes	Net social contributions				Compen-sation of employees	Intermediate consumption	Interest	Social benefits	
	1	2	3	4	5	6	7	8	9	10	11	12	13
2019	46.3	45.8	12.9	13.1	15.0	0.5	46.9	43.2	9.9	5.4	1.6	22.4	3.8
2020	46.4	45.9	12.9	12.7	15.5	0.5	53.5	48.9	10.6	5.9	1.5	25.3	4.6
2021	47.3	46.5	13.2	13.2	15.2	0.8	52.6	47.5	10.3	6.0	1.5	24.1	5.1
2022	47.1	46.4	13.6	13.0	14.9	0.8	50.8	45.7	9.9	5.9	1.7	22.9	5.1
2022 Q2	47.3	46.5	13.5	13.2	15.0	0.8	50.5	45.6	10.0	5.9	1.5	23.2	4.9
Q3	47.3	46.5	13.7	13.1	15.0	0.7	50.6	45.6	9.9	5.9	1.6	23.1	5.0
Q4	47.0	46.3	13.6	13.0	14.9	0.8	50.7	45.6	9.9	5.9	1.7	22.9	5.1
2023 Q1	46.8	46.0	13.5	12.9	14.9	0.8	50.5	45.4	9.9	5.8	1.7	22.8	5.1

Sources: ECB for annual data; Eurostat for quarterly data.

6.3 Government debt-to-GDP ratio
(as a percentage of GDP; outstanding amounts at end of period)

	Total	Financial instrument			Holder			Original maturity		Residual maturity			Currency	
		Currency and deposits	Loans	Debt securities	Resident creditors		Non-resident creditors	Up to 1 year	Over 1 year	Up to 1 year	Over 1 and up to 5 years	Over 5 years	Euro or participating currencies	Other curren-cies
						MFIs								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2019	84.0	3.0	13.2	67.8	45.7	30.9	38.3	7.8	76.3	15.6	27.8	40.7	82.7	1.3
2020	97.2	3.2	14.5	79.5	54.6	39.2	42.5	11.1	86.0	18.9	30.9	47.4	95.5	1.7
2021	95.4	3.0	13.9	78.5	55.6	41.7	39.8	9.9	85.5	17.6	30.3	47.5	94.0	1.4
2022	91.5	2.7	13.3	75.5	53.8	40.8	37.7	8.7	82.8	16.4	29.0	46.0	90.5	0.9
2022 Q2	94.0	2.9	13.5	77.5	.	.	.	.	.	.	.	.	.	.
Q3	92.7	2.9	13.6	76.3	.	.	.	.	.	.	.	.	.	.
Q4	91.4	2.7	13.3	75.4	.	.	.	.	.	.	.	.	.	.
2023 Q1	91.2	2.6	12.9	75.8	.	.	.	.	.	.	.	.	.	.

Sources: ECB for annual data; Eurostat for quarterly data.

6 Fiscal developments

6.4 Annual change in the government debt-to-GDP ratio and underlying factors [1]
(as a percentage of GDP; flows during one-year period)

	Change in debt-to-GDP ratio [2]	Primary deficit (+)/ surplus (-)	Deficit-debt adjustment								Interest-growth differential	Memo item: Borrowing requirement
			Total	Transactions in main financial assets					Revaluation effects and other changes in volume	Other		
				Total	Currency and deposits	Loans	Debt securities	Equity and investment fund shares				
	1	2	3	4	5	6	7	8	9	10	11	12
2019	-2.0	-1.0	0.1	0.2	0.1	0.0	0.0	0.2	-0.1	0.0	-1.2	0.9
2020	13.1	5.6	2.2	2.5	2.0	0.4	-0.1	0.1	-0.3	0.0	5.3	9.5
2021	-1.7	3.9	-0.3	0.7	0.4	0.1	0.0	0.1	-0.1	-0.8	-5.3	5.1
2022	-4.0	2.0	-0.3	-0.3	-0.6	0.1	0.1	0.2	0.6	-0.6	-5.6	2.8
2022 Q2	-3.9	1.7	0.5	1.0	0.8	0.0	0.0	0.2	0.1	-0.7	-6.1	3.6
Q3	-4.5	1.7	-0.3	0.0	-0.3	0.2	0.0	0.2	0.4	-0.6	-5.9	2.7
Q4	-3.9	2.0	-0.3	-0.3	-0.7	0.2	0.0	0.2	0.6	-0.6	-5.5	2.8
2023 Q1	-3.8	2.0	-0.7	-0.7	-1.1	0.1	0.1	0.1	0.7	-0.6	-5.2	2.4

Sources: ECB for annual data; Eurostat for quarterly data.
1) Intergovernmental lending in the context of the financial crisis is consolidated except in quarterly data on the deficit-debt adjustment.
2) Calculated as the difference between the government debt-to-GDP ratios at the end of the reference period and a year earlier.

6.5 Government debt securities [1]
(debt service as a percentage of GDP; flows during debt service period; average nominal yields in percentages per annum)

	Debt service due within 1 year [2]					Average residual maturity in years [3]	Average nominal yields [4]						
	Total	Principal		Interest			Outstanding amounts					Transactions	
			Maturities of up to 3 months		Maturities of up to 3 months		Total	Floating rate	Zero coupon	Fixed rate		Issuance	Redemption
											Maturities of up to 1 year		
	1	2	3	4	5	6	7	8	9	10	11	12	13
2020	14.9	13.5	4.2	1.4	0.4	7.6	2.0	1.2	-0.1	2.2	2.1	0.0	0.8
2021	14.1	12.8	4.2	1.3	0.3	7.9	1.6	1.1	-0.4	1.9	1.9	-0.1	0.5
2022	13.2	11.9	4.2	1.3	0.3	8.0	1.6	1.2	0.4	1.8	1.9	1.1	0.5
2022 Q2	13.5	12.3	4.4	1.3	0.3	8.0	1.6	1.1	-0.2	1.9	1.8	0.1	0.4
Q3	13.0	11.8	3.7	1.3	0.3	8.1	1.6	1.1	0.0	1.9	1.9	0.6	0.4
Q4	13.2	11.9	4.2	1.3	0.3	8.0	1.6	1.2	0.4	1.8	1.9	1.1	0.5
2023 Q1	13.6	12.3	4.3	1.2	0.3	8.1	1.8	1.3	1.0	1.9	2.0	2.1	0.7
2023 Feb.	13.2	12.0	4.5	1.2	0.3	8.1	1.7	1.2	0.8	1.9	2.1	1.7	0.7
Mar.	13.6	12.3	4.3	1.2	0.3	8.1	1.8	1.3	1.0	1.9	2.0	2.1	0.7
Apr.	13.4	12.2	4.0	1.3	0.3	8.1	1.8	1.3	1.1	1.9	2.0	2.4	0.9
May	13.4	12.1	3.4	1.3	0.3	8.2	1.8	1.3	1.2	1.9	2.0	2.6	1.0
June	13.7	12.4	3.6	1.3	0.3	8.1	1.9	1.3	1.4	1.9	2.0	2.8	1.1
July	13.6	12.3	3.9	1.3	0.3	8.2	1.9	1.3	1.6	2.0	2.0	3.0	1.2

Source: ECB.
1) At face value and not consolidated within the general government sector.
2) Excludes future payments on debt securities not yet outstanding and early redemptions.
3) Residual maturity at the end of the period.
4) Outstanding amounts at the end of the period; transactions as 12-month average.

6 Fiscal developments

6.6 Fiscal developments in euro area countries
(as a percentage of GDP; flows during one-year period and outstanding amounts at end of period)

	Belgium	Germany	Estonia	Ireland	Greece	Spain	France	Croatia	Italy	Cyprus
	1	2	3	4	5	6	7	8	9	10
Government deficit (-)/surplus (+)										
2019	-2.0	1.5	0.1	0.5	0.9	-3.1	-3.1	0.2	-1.5	1.3
2020	-9.0	-4.3	-5.5	-5.0	-9.7	-10.1	-9.0	-7.3	-9.7	-5.8
2021	-5.5	-3.7	-2.4	-1.6	-7.1	-6.9	-6.5	-2.5	-9.0	-2.0
2022	-3.9	-2.6	-0.9	1.6	-2.3	-4.8	-4.7	0.4	-8.0	2.1
2022 Q2	-4.0	-1.7	-0.5	0.6	-2.8	-4.9	-4.1	-0.3	-7.4	0.9
Q3	-3.7	-2.3	-0.3	1.5	-3.1	-4.1	-4.2	0.5	-7.8	2.6
Q4	-3.9	-2.7	-0.9	1.6	-2.3	-4.8	-4.7	0.4	-8.0	2.1
2023 Q1	-4.5	-3.0	-1.2	2.0	-2.7	-4.4	-4.5	0.5	-8.2	2.4
Government debt										
2019	97.6	59.6	8.5	57.0	180.6	98.2	97.4	71.0	134.1	90.8
2020	112.0	68.7	18.5	58.4	206.3	120.4	114.6	87.0	154.9	113.8
2021	109.1	69.3	17.6	55.4	194.6	118.3	112.9	78.4	149.9	101.2
2022	105.1	66.3	18.4	44.7	171.3	113.2	111.6	68.4	144.4	86.5
2022 Q2	108.5	67.6	16.8	50.5	183.0	116.1	113.2	73.1	149.3	95.4
Q3	106.5	67.0	15.9	48.5	175.8	115.6	113.5	70.4	145.9	91.4
Q4	105.1	66.2	18.4	44.4	171.3	113.2	111.8	68.8	144.4	86.5
2023 Q1	107.4	65.9	17.2	43.5	168.3	112.8	112.4	69.5	143.5	84.0

	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Austria	Portugal	Slovenia	Slovakia	Finland
	11	12	13	14	15	16	17	18	19	20
Government deficit (-)/surplus (+)										
2019	-0.6	0.5	2.2	0.5	1.8	0.6	0.1	0.7	-1.2	-0.9
2020	-4.4	-6.5	-3.4	-9.7	-3.7	-8.0	-5.8	-7.7	-5.4	-5.6
2021	-7.1	-1.2	0.7	-7.8	-2.4	-5.8	-2.9	-4.6	-5.4	-2.8
2022	-4.4	-0.6	0.2	-5.8	0.0	-3.2	-0.4	-3.0	-2.0	-0.9
2022 Q2	-4.4	0.8	0.9	-6.5	-0.3	-1.9	0.1	-3.2	-3.3	-1.3
Q3	-4.1	0.8	0.8	-5.6	-0.5	-2.5	1.0	-3.0	-2.7	-0.9
Q4	-4.4	-0.6	0.2	-5.8	-0.1	-3.2	-0.4	-3.0	-2.0	-0.8
2023 Q1	-4.1	-1.2	-0.3	-4.9	-0.1	-3.4	0.1	-3.1	-2.5	-0.8
Government debt										
2019	36.5	35.8	22.4	40.3	48.5	70.6	116.6	65.4	48.0	64.9
2020	42.0	46.3	24.5	52.9	54.7	82.9	134.9	79.6	58.9	74.7
2021	43.7	43.7	24.5	55.1	52.5	82.3	125.4	74.5	61.0	72.6
2022	40.8	38.4	24.6	53.4	51.0	78.4	113.9	69.9	57.8	73.0
2022 Q2	41.7	39.6	25.3	53.7	50.0	82.6	123.1	73.5	59.2	72.5
Q3	40.0	37.3	24.6	52.8	48.2	81.4	119.9	72.4	57.5	71.8
Q4	40.8	38.4	24.6	53.2	50.1	78.5	113.9	69.9	57.8	72.9
2023 Q1	42.9	38.4	28.0	53.6	48.3	80.6	113.8	69.5	57.9	72.5

Source: Eurostat.