EUROPEAN CENTRAL BANK

EUROSYSTEM

Economic Bulletin

Issue 5 / 2023

Contents

Update on economic, financial and monetary developments

Summary

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. It therefore decided at its meeting on 27 July 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, the dynamics of underlying inflation, and the strength of monetary policy transmission. The developments since its meeting on 15 June support the expectation that inflation will drop further over the remainder of 2023 but will stay above target for an extended period. While some measures show signs of easing, underlying inflation remains high overall. The past rate increases continue to be transmitted forcefully: financing conditions have tightened again and are increasingly dampening demand, which is an important factor in bringing inflation back to 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 to achieve a timely return of inflation to the 2% medium-term target. The Governing Council will continue to follow a data-dependent approach to determining the appropriate level and duration of restriction. In particular, its interest rate decisions will continue to 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.

The Governing Council also decided to set the remuneration of minimum reserves at 0%. This decision will preserve the effectiveness of monetary policy by maintaining the current degree of control over the monetary policy stance and ensuring the full pass-through of the interest rate decisions to money markets. At the same time, it will improve the efficiency of monetary policy by reducing the overall amount of interest that needs to be paid on reserves in order to implement the appropriate stance.

Economic activity

The near-term economic outlook for the euro area has deteriorated, owing largely to weaker domestic demand. High inflation and tighter financing conditions are dampening spending. This is weighing especially on manufacturing output, which is also being held down by weak external demand. Housing and business investment are showing signs of weakness as well. Services remain more resilient, especially in contact-intensive subsectors such as tourism. But momentum is slowing in the services sector. The economy is expected to remain weak in the short run. Over

time, falling inflation, rising incomes and improving supply conditions should support the recovery.

The labour market remains robust. The unemployment rate stayed at its historical low of 6.5% in May and many new jobs are being created, especially in the services sector. At the same time, forward-looking indicators suggest that this trend might slow down in the coming months and may turn negative for manufacturing.

As the energy crisis fades, governments should roll back the related support measures promptly and in a concerted manner. This is essential to avoid driving up medium-term inflationary pressures, which would otherwise call for a stronger monetary policy response. The Governing Council welcomes the Eurogroup statement of 13 July 2023 on the euro area fiscal stance, which is consistent with this assessment.[1] 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 can help reduce price pressures in the medium term, while supporting the green transition, which is also being furthered by the Next Generation EU programme. The reform of the EU's economic governance framework should be concluded before the end of 2023.

Inflation

Inflation came down further in June, reaching 5.5%, after 6.1% in May. Energy prices fell again, dropping by 5.6%, year on year. Food price inflation continued to slow but remained high, at 11.6%.

Inflation excluding energy and food edged up to 5.5% in June, with goods and services following diverging trends. Goods inflation decreased further, to 5.5%, from 5.8% in May. Conversely, services inflation rose to 5.4%, from 5.0% in May, owing to robust spending on holidays and travel and also reflecting upward base effects.

The drivers of inflation are changing. External sources of inflation are easing. By contrast, domestic price pressures, including from rising wages and still robust profit margins, are becoming an increasingly important driver of inflation.

While some measures are moving lower, underlying inflation remains high overall, including owing to the persistent impact of past energy price increases on economy-wide prices. Although most measures of longer-term inflation expectations currently stand at around 2%, some indicators remain elevated and need to be monitored closely.

Risk assessment

The outlook for economic growth and inflation remains highly uncertain. Downside risks to growth include Russia's unjustified war against Ukraine and an increase in

[1] See "Eurogroup statement on the euro area fiscal stance for 2024".

broader geopolitical tensions, which could fragment global trade and thus weigh on the euro area economy. Growth could also be slower if the effects of monetary policy are more forceful than expected, or if the world economy weakens and thereby dampens demand for euro area exports. 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, also related to Russia's unilateral withdrawal from the Black Sea Grain Initiative. Adverse weather conditions, in light of the unfolding climate crisis, may push up food prices by more than projected. 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 owing to a stronger transmission of monetary policy – would lead to lower price pressures, especially over the medium term. Moreover, inflation would come down faster if declining energy prices and lower food price increases were to pass through to the prices of other goods and services more quickly than currently anticipated.

Financial and monetary conditions

The monetary policy tightening continues to be transmitted strongly to broader financing conditions. Risk-free interest rates over short to medium-term maturities have increased since the meeting in June and funding has become more expensive for banks, in part owing to the ongoing phasing-out of the ECB's targeted longer-term refinancing operations (TLTROs). The large TLTRO repayment in June went smoothly, as banks were well prepared. Average lending rates for business loans and mortgages rose again in May, to 4.6% and 3.6% respectively.

Higher borrowing rates and the associated cuts in spending plans led to a further sharp drop in credit demand in the second quarter, as reported in the July 2023 euro area bank lending survey. Moreover, credit standards for loans to firms and households tightened further, as banks are becoming more concerned about the risks faced by their customers and are less willing to bear these risks. Tighter financing conditions are also making housing less affordable and less attractive as an investment, and demand for mortgages has dropped for the fifth quarter in a row.

Against this background, the annual growth rate of lending continued to decrease in June, falling to 3.0% for firms and 1.7% for households, with annualised growth rates of 0.0% and -0.2% in the second quarter respectively. Amid weak lending and the reduction in the Eurosystem balance sheet, the annual growth rate of broad money fell to 0.6% in June, with an annualised growth rate of -1.1% in the second quarter.

Monetary policy decisions

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 4.25%, 4.50% and 3.75% respectively, with effect from 2 August 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 TLTROs, the Governing Council will regularly assess how targeted lending operations and their ongoing repayment are contributing to its monetary policy stance.

The Governing Council also decided to set the remuneration of minimum reserves at 0%. The change will become effective as of the beginning of the reserve maintenance period starting on 20 September 2023. This decision does not prejudge the outcome of the ongoing review of the ECB's operational framework.

Conclusion

Inflation continues to decline but is still expected to remain too high for too long. The Governing Council therefore decided at its meeting on 27 July 2023 to raise the three key ECB interest rates by 25 basis points.

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 to achieve a timely return of inflation to its 2% medium-term target. It will continue to follow a data-dependent approach to determining the appropriate level and duration of restriction. In particular, its interest rate decisions will continue to 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.

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.

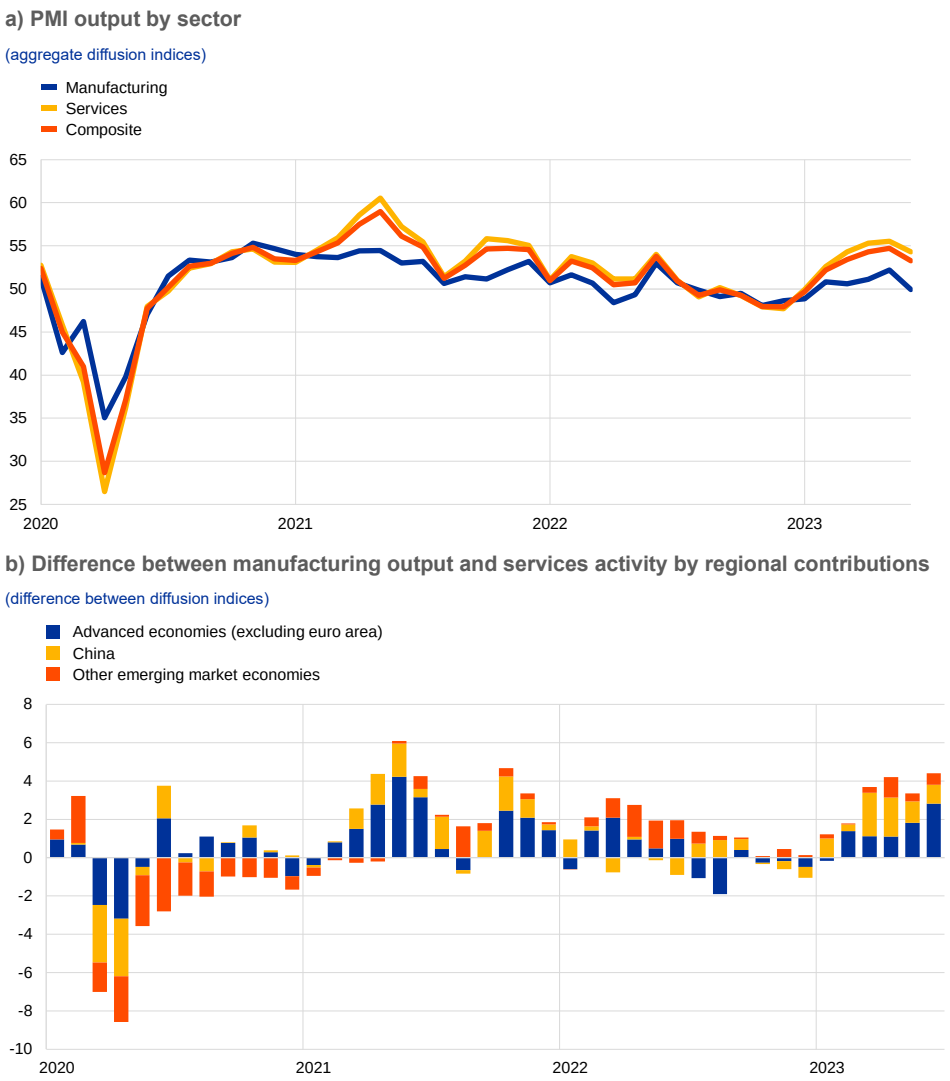
1 External environment

Global economic activity in the second quarter of 2023 remained resilient, but incoming data show some loss of momentum. The global divergence between the services and manufacturing sectors widened further in June, driven by the recent lacklustre performance of manufacturing in advanced economies. At the same time, the near-term global trade outlook is clouded by weak merchandise trade, particularly in advanced economies, while services trade continues to improve. Headline inflation across OECD economies continued to decline as food and energy price pressures abate, while core inflation remains at high levels.

Global activity remained resilient in the second quarter, but incoming survey data have started to show signs of a loss of momentum. The global composite output Purchasing Managers' Index (PMI) declined in June for the first time this year, amid moderation in both manufacturing and services (Chart 1, panel a). The services output PMI edged down, but it remained above the neutral threshold and close to its historical benchmark. At the same time, the manufacturing output PMI fell into contractionary territory, particularly in advanced economies. This weakness in manufacturing, possibly due to the higher sensitivity to tightening financial conditions and to the continued rotation of demand towards services, has in recent months led to a decoupling between manufacturing and services activity.

The global divergence between the services and manufacturing sectors widened further in June. PMI data suggest that the divergence is currently driven by the recent lacklustre performance of manufacturing in advanced economies. Earlier in the year China's rebound in services demand – following the reopening of the Chinese economy – was the main factor behind the divergence (Chart 1, panel b). Going forward, while the weakness in manufacturing could potentially spill back to services through lower aggregate demand, national accounts data for major economies show that services consumption is still below pre-pandemic benchmarks, in contrast with goods consumption, leaving room for further improvement over upcoming months.

Chart 1
Global (excluding euro area) composite PMI

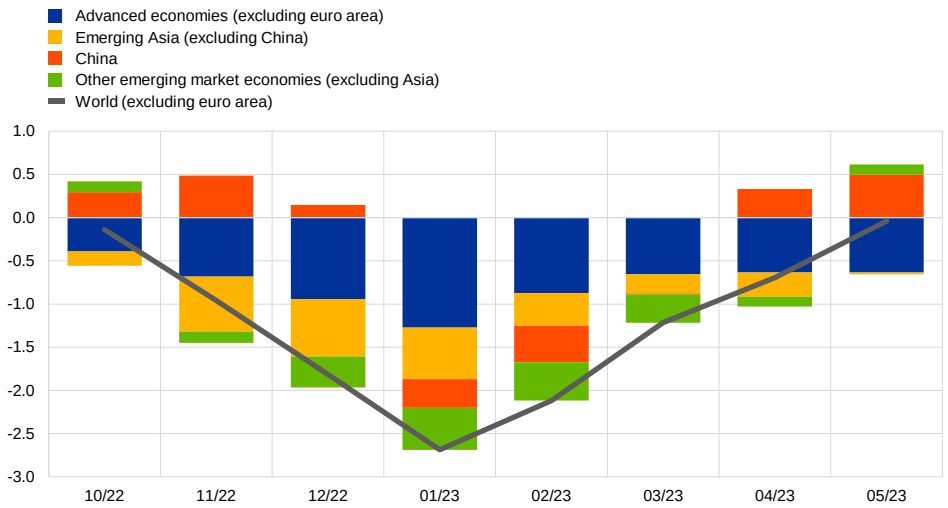


Sources: S&P Global, Haver Analytics and ECB calculations.
Notes: Panel a) shows composite output, manufacturing output and services activity diffusion indices, whereas panel b) shows the difference between global services activity and manufacturing output. The latest observations are for June 2023.

The near-term global trade outlook is clouded by weak merchandise trade, while services trade continues to improve. At the start of the second quarter, merchandise trade momentum gradually improved amid supply bottlenecks dissipating further and the reopening in China, but it remained muted reflecting weak data releases, particularly in advanced economies (Chart 2). Global demand for goods continues to soften on the back of uneven growth dynamics between goods and services and points to a subdued merchandise trade, as also indicated by the latest contractionary new export order PMI readings. In contrast, services trade remains strong, with tourism in particular still recovering towards pre-pandemic levels.

Chart 2
Merchandise trade momentum

(real imports, 3-month-on-3-month percentage changes)

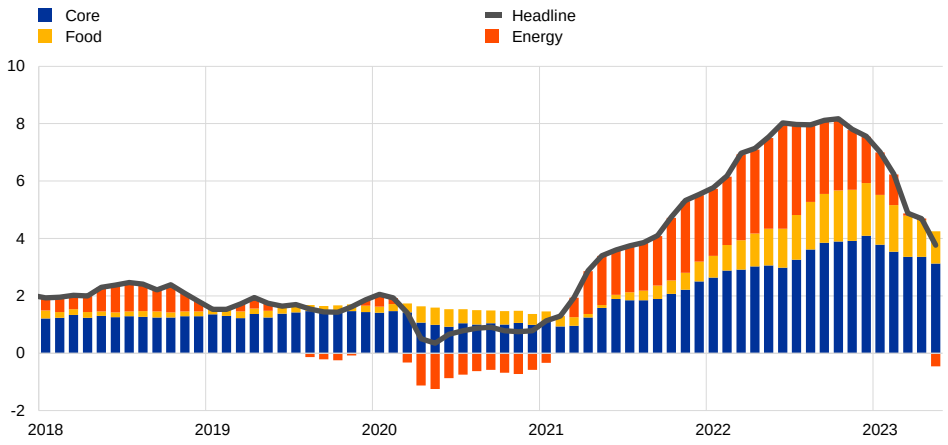


Sources: CPB and ECB staff calculations.
Note: The latest observations are for May 2023.

OECD headline inflation continued to decline as food and energy price pressures abate while core inflation remained at high levels. In May, annual headline consumer price index (CPI) inflation in OECD countries (excluding Türkiye) declined strongly to 6.5% from 7.4% in April, mainly driven by falling energy and food prices, together with base effects. In contrast, core inflation declined only marginally to 6.9% (Chart 3). Similarly, core inflation momentum remains high and edged down only slightly, pointing to persistent price pressures. Indeed, while producer prices are declining strongly, wages continue to exert upward pressure.

Chart 3
OECD consumer price inflation

(annual percentage changes; percentage point contributions)



Sources: OECD and ECB staff calculations.
Notes: The OECD aggregate excludes Türkiye and is calculated using OECD CPI annual weights. The latest observations are for May 2023.

Oil prices increased by 13% since the June Governing Council meeting following Saudi Arabia's one-month extension of its production cut (Chart 4). Saudi Arabia announced that it would cut its production by one million barrels per day in July, and this cut has now been extended to also cover August. At the same time, Russia announced a 0.5 million barrels per day cut for August. The cuts are expected to further tighten the oil market in a period it was already expected to move from being in surplus to deficit. On the demand side, in the last couple of months, strong oil demand from travel and transport activity in China has counterbalanced weak industrial demand in advanced economies. But more recently, improved risk sentiment reflecting in part positive US economic data surprises and lower headline inflation releases contributed positively to oil prices. European gas prices declined by 16% since the June Governing Council meeting after a short period of volatility. Gas prices rallied by 33% in the two days leading up to the Governing Council meeting in June mainly due to gas field outages in Norway. The price decline since then reflects the fact that gas storage remains high and gas demand low. International food commodity prices increased by 3% since the June Governing Council meeting as Russia withdrew from the Black Sea deal on Ukrainian grain. Since last year, Ukraine has found alternative routes which it could possibly use for some of the grain exports that are usually shipped via the Black Sea, albeit at higher costs. Therefore, the disruptions to grain supplies are expected to be smaller than at the start of the Russian invasion, implying that price spikes such as those seen in the spring of 2022 are unlikely to occur. However, weather developments pose further upside risks to food commodity prices, as short-term drought risks in the northern hemisphere remain elevated. Meanwhile, in metal markets, weak activity in the industrial sector and the property development sector in China was counterbalanced by the improved risk sentiment.

Chart 4

Oil price developments

(USD per barrel)

Source: Refinitiv.
Notes: The lines mark the following events: 10 March 2023 for the Silicon Valley Bank failure, 2 April 2023 for the OPEC+ cut announcement, 15 June 2023 for the June Governing Council and 3 July 2023 for the cut extension announcement by Saudi Arabia and Russia. The latest observations are for 26 July 2023.

In the United States, economic activity has been more resilient than expected. Growth for the first quarter of 2023 was revised upwards to an annualised 2.0%. Moreover, monthly indicators for the second quarter, including non-residential construction, employment and inventory data, came in stronger than expected. In particular, although gradually cooling, the buoyant US labour market continues to support growth. The unemployment rate remains at very low levels, employment continues to grow, and vacancies are only falling slowly. However, despite the past resilience, downside risks to activity prevail. For instance, the US manufacturing PMI has been in contractionary territory for most of the last few months. Moreover, delinquency rates on credit card debt and car loans have risen rapidly over the last few months, suggesting slowing consumption ahead. Annual headline CPI inflation fell in June to 3.0%, while underlying inflationary pressures remain high, with core at 4.8%. At the same time, annual nominal wage growth is still 4.7%, above a level considered compatible with the inflation target.

In China, GDP growth slowed significantly in the second quarter. Although year-on-year GDP growth rose to 6.3% in the second quarter, reflecting base effects due to COVID-19-related lockdowns a year ago, it decelerated in quarter-on-quarter terms to 0.8%, from 2.2% in the first quarter. The consumption-led recovery appears to have been short-lived, owing to a renewed decline in the housing sector and a deceleration in consumer spending. Exports also declined sharply, reflecting weak external demand, in particular for manufactured goods. This is due to the post-pandemic global rotation in demand from manufactured goods to services. The decline in the growth momentum is expected to prompt additional monetary and fiscal policy support going forward. Indeed, in mid-June, the People's Bank of China lowered to 2.65% the one-year medium-term lending facility rate.

In Japan, recent indicators point towards some moderation in economic growth in the second quarter. Consumer sentiment, despite further declines in real wages, should provide support to the recovery in private consumption, which has remained relatively sluggish thus far. Also, business sentiment indicators point to solid but moderate growth momentum. Headline inflation rose slightly to 3.3% in June, reflecting increases in regulated electricity prices. Core inflation (excluding energy and food prices) remained unchanged from the previous month at 2.6%, implying a firm underlying price momentum. As regards wages, the final annual spring wage negotiation (Shunto) results point to wage increases of 3.6%, the highest since the early 1990s.

In the United Kingdom, a stream of positive data news suggests stronger than expected resilience of the economy, while inflation remains high. Monthly real GDP declined less than expected by 0.1% in May, following an increase in April, as domestic demand has remained resilient, favoured by a robust labour market and despite the worsening cost-of-living crisis. Growth is still expected to pick up in the third quarter, but tighter financial conditions are weighing on private consumption and investment. Headline inflation fell to 7.9% in June, while core inflation decreased to 6.9% due to an easing in services price inflation. The outturn was below market expectations, but in line with the Bank of England's May 2023 Monetary Policy Report forecast. Looking ahead, headline inflation is expected to decline further,

mainly on account of the waning contribution from energy prices. Still, price pressures are expected to remain elevated due to the tight labour market, resilient demand and persistence in food price inflation.

2 Economic activity

Euro area activity stagnated in the first quarter of 2023, amid a drop in domestic demand, and improved moderately in the second quarter, in line with the June Eurosystem staff macroeconomic projections for the euro area.[2] *Conditions continue to differ across and within sectors of the economy: the manufacturing and construction sectors have been particularly affected by weaker demand and tightening financing conditions, while services have been more resilient, in particular leisure activities. But momentum is slowing in the services sector and the economy is expected to remain weak in the short term. Household incomes are benefiting from the strong labour market, bolstered by robust employment growth, as well as easing inflation. Nevertheless, the outlook for economic growth remains highly uncertain. Although falling inflation, rising incomes and improving supply conditions should support a recovery, weakening global demand and the growing impact of tightening financing conditions are expected to weigh on economic activity.*

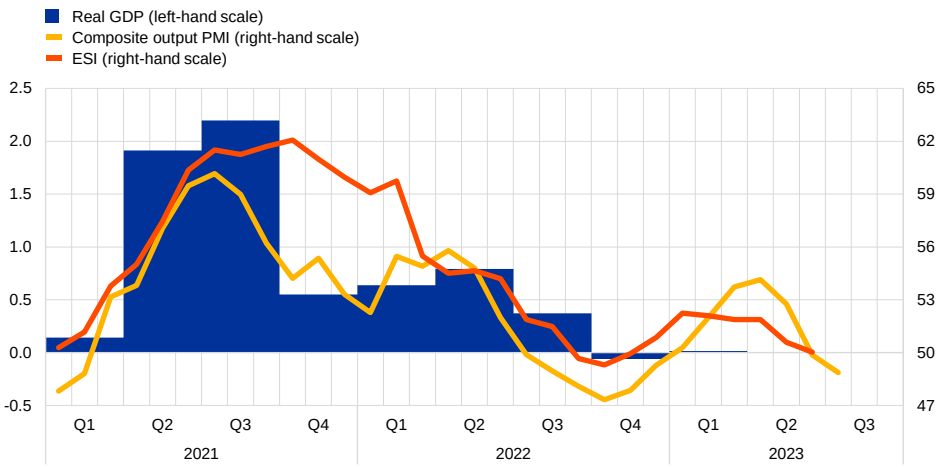
After being flat in the first quarter, euro area real GDP growth improved moderately in the second quarter. Following a contraction of 0.1% quarter on quarter at the end of last year, euro area real GDP was flat in the first quarter of 2023, based on updated data releases for that quarter for several euro area countries, including a significant upward revision of Irish GDP (from -4.6% to -2.8%) (Chart 5). For the second quarter of 2023, incoming data suggest a slight improvement in GDP growth. According to the June Eurosystem staff macroeconomic projections, it was expected to expand by 0.3% quarter on quarter. Contact-intensive services are expected to have supported economic activity in the second quarter, while manufacturing production is likely to have contracted again. The composite output Purchasing Managers' Index (PMI) for the euro area slipped into contractionary territory in June, reflecting heterogenous developments across sectors. The PMI for services activity averaged 54.4 in the second quarter, continuing to indicate growth (Chart 6, panel b), despite having moderated in June. New orders and activity expectations for services have, however, also started to decline, although they are still in line with ongoing growth. By contrast, the PMI for industrial output declined further in June, having contracted to 46.4 in the second quarter. Outstanding business deteriorated, reflecting sustained but moderating production growth, alongside falling new orders (Chart 6, panel a). Weak industrial production at the end of the first quarter resulted in a negative carry-over to the second quarter, although this was largely offset by a positive carry-over from services production. Furthermore, despite having recovered in April and May, the average level of industrial production (excluding construction) in those two months was 1.5% below that of the first quarter of the year. The European Commission's Economic Sentiment Indicator (ESI) declined further in June and was consistent with modest growth in the second quarter (Chart 5).

[2] According to the flash estimate released by Eurostat on 31 July, euro area real GDP increased by 0.3% in the second quarter of the year. This estimate was not available at the time of the July Governing Council meeting.

Chart 5

Euro area real GDP, composite output PMI and ESI

(left-hand scale: quarter-on-quarter percentage changes; right-hand scale: diffusion index)

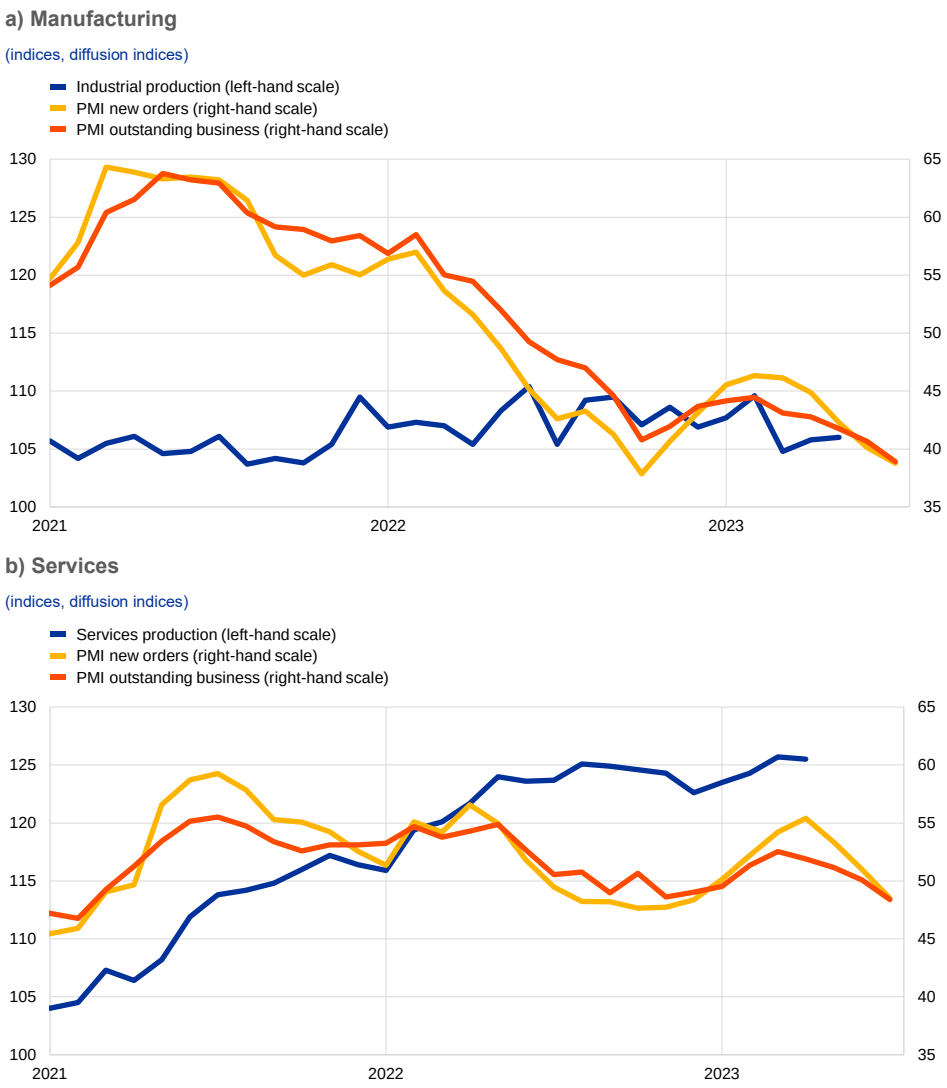


Sources: Eurostat, European Commission, S&P Global Market Intelligence and ECB calculations.
Notes: The two lines indicate monthly developments; the bars show quarterly data. The European Commission's Economic Sentiment Indicator (ESI) has been standardised and rescaled to have the same mean and standard deviation as the composite output Purchasing Managers' Index (PMI). The latest observations are for the first quarter of 2023 for real GDP, June 2023 for the ESI and July 2023 for the composite output PMI.

Euro area output is expected to rise moderately in the third quarter, mainly supported by the services sector. Activity in the manufacturing sector is estimated to remain weak, on the back of the growing impact of weak global trade and the strengthening of monetary policy transmission. However, expected demand remains robust in contact-intensive services, particularly in travel services, as indicated by the European Commission's business and consumer survey. This is consistent with the main findings from the ECB's recent contacts with the non-financial sector (Box 3), which pointed to a high degree of heterogeneity of expected activity across and within sectors, with demand in tourism-related sectors remaining strong and expected to support activity in the third quarter. Although the PMI for services was still improving in July, the pace was much slower than earlier this year, suggesting that the weakening of the manufacturing sector is starting to spill over to services. Going forward, the outlook for activity will continue to benefit from the tailwinds generated by receding supply bottlenecks, moderating energy prices and resilient labour markets. These supporting factors will cushion weakening global demand and the increasing impact of tightening financing conditions.

Chart 6

PMI indicators across sectors of the economy



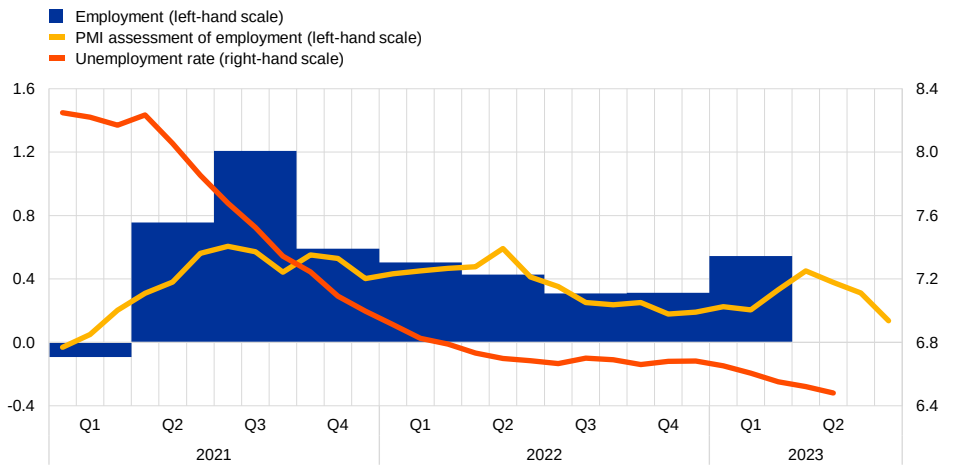
Sources: Eurostat and S&P Global Market Intelligence.
Note: The latest observations are for April 2023 for services production, May 2023 for industrial production and July 2023 for the Purchasing Managers' Indices (PMIs).

The labour market remains robust, driven by the services sector, although more recent indicators suggest signs of weakness. Following the strong employment growth of 0.5% in the first quarter of the year (Chart 7), recent monthly data suggest slightly weaker labour market momentum in the second quarter. While the unemployment rate remained unchanged at 6.5% in May, down by 0.2 percentage points since May 2022, the positive employment dynamics are continuing to be driven by an increase in the labour force. More specifically, the labour force dynamics for young, low-skilled and foreign workers are above their long-term trends and would seem to underly much of this positive trend.

Chart 7

Euro area employment, PMI employment indicator and the unemployment rate

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



Sources: Eurostat, S&P Global Market Intelligence and ECB calculations.
Notes: The two lines indicate monthly developments, while the bars show quarterly data. The Purchasing Managers' Index (PMI) is expressed in terms of the deviation from 50 divided by 10. The latest observations are for the first quarter of 2023 for employment, July 2023 (Eurostat flash estimate) for the PMI employment indicator and May 2023 for the unemployment rate.

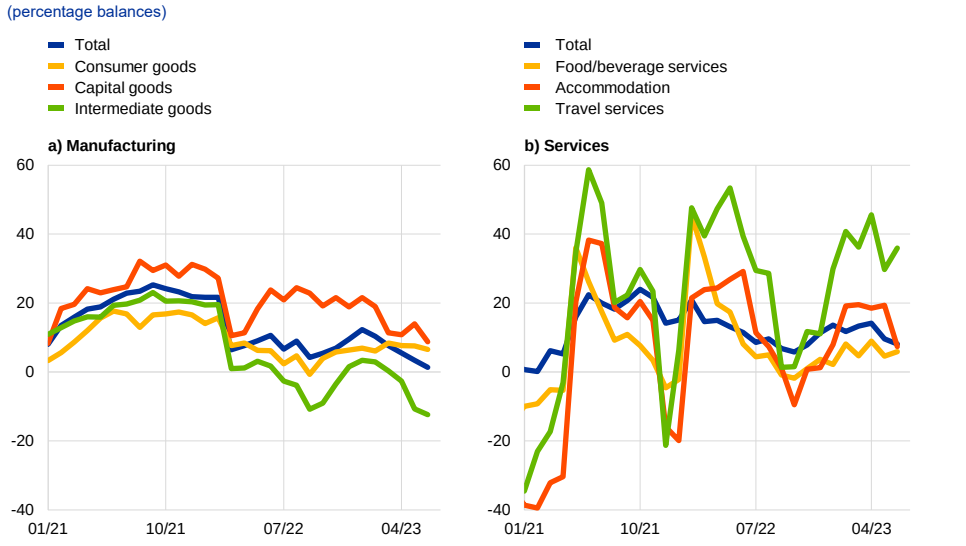
While the PMI employment indicator suggests a slowdown in employment dynamics, it still points to employment growth in the second quarter. While the PMI employment indicator dropped to 53.1 in June, it continued to point to an expansion in employment. However, the aggregate PMI employment indicator hides a pronounced sectoral divide. The expansion in June was confined to the services sector, with the manufacturing component moving into contractionary territory for the first time since January 2021. At 49.8, the index suggests growing downside risks to employment growth, in particular in countries with a higher proportion of employment in the manufacturing sector. The preliminary PMI indicators for July show a further deceleration in employment dynamics, suggesting rather meagre (or even flat) employment growth in the third quarter.

Private consumption is expected to have been sluggish in the second quarter, despite resilient services consumption, reflecting a further contraction for goods. Private consumption contracted by 0.3% in the first quarter, driven by a decline in spending on goods. Incoming data point to a further drop in consumption of goods in the second quarter, while services consumption is likely to have remained resilient. The expectation of weak consumer goods spending is supported by recent developments in retail sales. From April to May retail sales were, on average, 0.3% below their level in the first quarter. However, this masked an increase in sales of non-food products and a decline in sales of fuels and food. At the same time, new passenger car registrations in the second quarter were 1% below their level in the first quarter, despite easing supply conditions. By contrast, services consumption is likely to have remained resilient, benefiting from lingering post-pandemic reopening effects, as suggested by the PMI for contact-intensive services activity, which, despite moderating in June, remained in expansionary territory in the second quarter.

Incoming data show signs of a stronger outlook for contact-intensive services than for consumer spending on goods, especially in the short term. The European Commission's business and consumer survey results for June suggest that expected demand for contact-intensive services remained above its historical average level in June (Chart 8, panel b). The ECB's June Consumer Expectations Survey (CES) and the ECB's recent contacts with the non-financial sector likewise point to relatively strong expected demand for contact-intensive services. The European Commission's consumer confidence indicator rose further in June and July, mainly reflecting improving household expectations about their financial and general economic situation. Strong nominal labour and non-labour income growth has so far supported households' purchasing power. However, the tightening of financing conditions and higher interest rates are likely to increase households' incentive to save, weighing on private consumption. CES evidence shows that consumers' expectations concerning interest rates on mortgages and savings accounts have increased, in line with actual interest rate developments (Box 2). Consistent with this, the household savings rate marginally increased to 14.1% of disposable income in the first quarter of 2023.

Chart 8

Expected manufacturing production and expected services demand



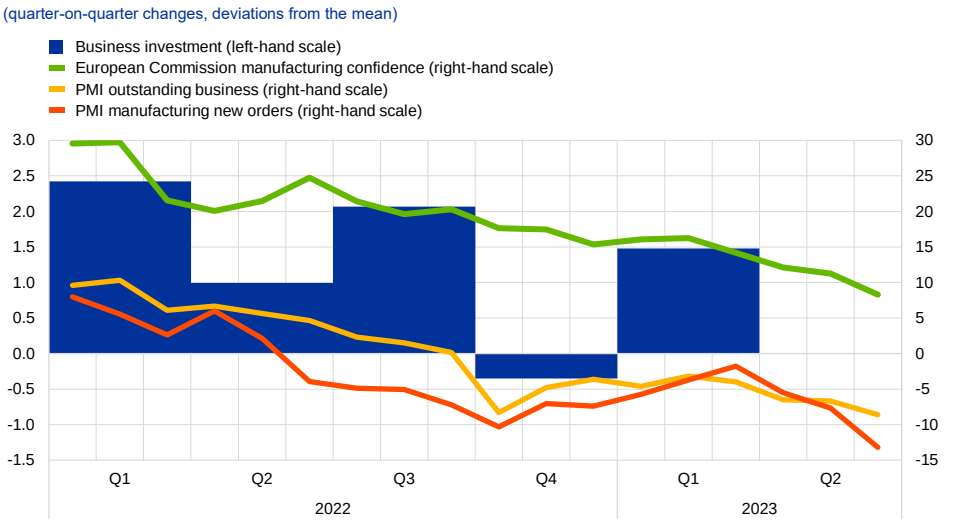
Source: European Commission.
Note: The latest observations are for June 2023.

Despite its resilience at the beginning of the year, business investment is expected to have weakened in the second quarter as activity slows in response to increasingly tighter financing conditions. Quarter-on-quarter headline non-construction investment remained flat in the first quarter of 2023, but would have been higher had the volatile contribution from intangible investment in Ireland been excluded. Although capital goods production bounced back in April and May, survey data suggest a weakening in business investment in the current quarter. The output PMI fell below the no-growth threshold in the second quarter. Despite an improvement in suppliers' delivery times, the PMIs for new orders and for outstanding business for the manufacturing and capital goods sector declined further

in the second quarter, remaining in negative territory, and firms' confidence in that sector also deteriorated (Chart 9). The July 2023 euro area bank lending survey (BLS) indicates that firms' demand for long-term loans and loans for fixed investment has diminished markedly in recent quarters and is expected to continue to decline in the second quarter. In past recession episodes, this pattern has preceded major falls in business investment, but this is not reflected in the overall flat annual growth observed so far. Consistent with the information from the BLS, the October 2022/March 2023 Survey on the Access to Finance of Enterprises (SAFE) suggests that more firms expect a deterioration in the availability of bank loans over the next six months, despite a mild improvement. The SAFE also points to firms anticipating an increase in turnover in the second and third quarters, with internal financing becoming increasingly important, thereby partially offsetting the negative effects of higher borrowing costs on business investment. Moreover, the evidence provided by the July 2023 ECB's Corporate Telephone Survey (CTS) suggests that green and digital investments, which are also the main beneficiaries of Next Generation EU (NGEU) funds, remain relatively resilient. Both internal funding and NGEU funds are key to sustaining capital investment going forward.

Chart 9

Business investment and capital goods indicators



Sources: Eurostat, European Commission, S&P Global Market Intelligence and ECB calculations.
Notes: Business investment is proxied by non-construction investment and excludes Irish intellectual property products. The Purchasing Managers' Indices (PMIs) for outstanding business and for new orders are expressed as deviations from 50 and the European Commission's manufacturing confidence indicator as deviations from its long-term average. The latest observations are for the first quarter of 2023 for investment and June 2023 for the other variables.

Housing investment is estimated to have contracted in the second quarter, amid deteriorating housing demand and financing conditions. After a quarter-on-quarter increase of 1.3% in the first quarter of 2023, thanks to a large backlog of orders and favourable weather conditions, housing investment declined in the second quarter, based on both hard and soft indicators. In terms of hard indicators, the number of residential building permits issued – a leading indicator of construction activity – has plunged over the last year, reaching a seven-year low (disregarding the pandemic lockdowns of April and May 2020) in March 2023. Building construction output in April and May stood 1.2% below its average in the first quarter. In terms of

soft indicators, the output PMI for residential construction sank deeper into contractionary territory until June, despite strong improvements in suppliers' delivery times and with input prices in retreat. The European Commission's index for building construction activity in the past three months recorded its fifth consecutive decline in the second quarter, with depressed demand, tight financial conditions and labour shortages retaining their firm grip on production in this sector. Forward-looking indicators also suggest subdued activity in the third quarter, with rising mortgage rates and elevated construction costs weighing on housing affordability and profitability respectively, as confirmed by the latest ECB surveys. According to the CES, households' perceptions of housing as a good investment bottomed out in January, but were still downbeat in June (Box 2). In the latest CTS, companies reported declining activity and orders, especially in residential building construction, owing to elevated cost pressures and rising interest rates.

Euro area export volumes are expected to grow at a subdued rate in the second quarter due to weakening global trade and euro exchange rate appreciation. The growth momentum for extra-euro area goods exports (based on three-month-on-three-month growth rates) fell moderately in May, with weak global trade dampening demand for euro area goods and the effects of the appreciation of the euro since autumn last year weighing on competitiveness. The boost for manufacturing exports from easing supply bottlenecks appears to be fading, with firms reporting that they have brought order backlogs back down to normal levels. Exports of services, in particular travel services, bolstered total euro area exports. The growth momentum for euro area import volumes has stabilised but remains negative, reflecting weak domestic demand. This has resulted in firms reducing their stocks and a decline in energy imports. Forward-looking indicators continue to point to a subdued near-term outlook for euro area export volumes. New manufacturing export orders fell deeper into contractionary territory in June and, despite lower energy prices having relieved some of the pressure on euro area exporters' competitiveness, global trade in goods remains weak. At the same time, the PMI for new orders for services exports slowed. Tourism is, however, expected to be buoyant this summer season, on the back of a strong increase in bookings earlier this year.

Beyond the near term, GDP growth is expected to gradually strengthen. On the one hand, the economy is expected to return to growth in the coming quarters as energy prices moderate, foreign demand strengthens and supply bottlenecks are resolved. Furthermore, real incomes are set to improve, underpinned by a robust labour market, with unemployment hitting new historical lows, and moderating inflation. On the other hand, the ECB's monetary policy tightening is increasingly feeding through to the real economy and, together with the gradual withdrawal of fiscal support, this will weigh on domestic demand and price pressures in the medium term.

3 Prices and costs

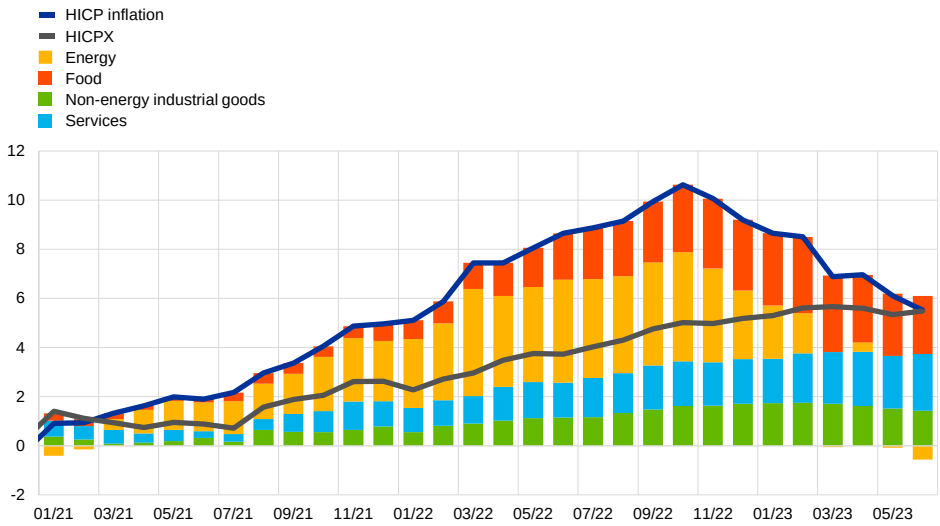
Inflation came down further in June 2023, reaching 5.5% after 6.1% in May. Energy prices fell again, dropping by 5.6% year on year. Food inflation continued to slow but remained high, at 11.6%. Inflation excluding energy and food edged up from 5.3% in May to 5.5% in June owing to robust spending on holidays and travel, reflecting upward base effects and a rise in services inflation to 5.4%. External sources of inflation are easing, while domestic price pressures, including from rising wages and still robust profit margins, are becoming an increasingly significant driver of inflation. While some measures are decreasing, underlying inflation remains high overall, in part owing to the persistent impact of past energy price increases on economy-wide prices. Although most measures of longer-term inflation expectations currently stand at around 2%, some indicators remain elevated.

Harmonised Index of Consumer Prices (HICP) inflation in the euro area continued to decline in June. The further decrease to 5.5%, from 7.0% in April and 6.1.% in May, was largely driven by energy inflation, which continued on its descending path, falling to -5.6% in June from -1.8% in the previous month. Inflation rates for other goods (both food and non-energy industrial goods) also declined further in June. In fact, the only main component that saw an increase was services, which registered 5.4%, edging up from 5.0% in May. This implies a rise in HICP inflation excluding energy and food (HICPX) to 5.5% after its decline to 5.3% in May. The robust services inflation reflects the strength of tourism, recreation and pent-up demand, as well as increasing labour costs. However, the uptick in June was essentially a result of upward base effects related to last year's temporary introduction of a €9 public transport ticket in Germany (Chart 10).

Chart 10

Headline inflation and its main components

(annual percentage changes; percentage point contributions)



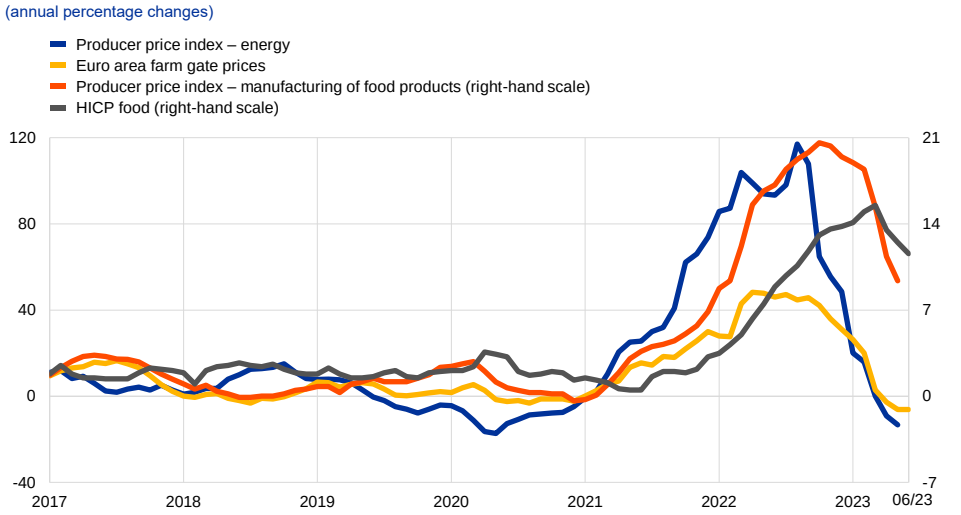
Sources: Eurostat and ECB calculations.
Note: The latest observations are for June 2023.

Energy inflation remains negative, primarily owing to downward base effects, but also to a further moderation in the level of consumer energy prices in June. Since its peak in October 2022 this level has unwound by 14%, mostly owing to lower fuel and gas prices. At the same time, while in recent months consumer electricity prices inflation has been declining in year-on-year terms, it is still 40% higher than before the pandemic; it is not, however, putting further pressure on overall consumer energy price inflation. Pipeline pressures for energy prices have continued to fall, with annual growth in energy producer prices declining to -13.3% in May 2023, down from a peak of 117.3% in August 2022 (Chart 11).

Although it is declining, food inflation remains high, with previous cost shocks still passing through. Food inflation declined from 12.5% in May to 11.6% in June, with processed food standing at 12.4%, down from 13.4% in May. Unprocessed food also registered a decline, to 9.0% from 9.6% in May. Although the peak seems to have passed, food inflation remains high, especially for processed food, and it continues to be a burden for households' purchasing power (Chart 11). While the impacts of earlier cost shocks, such as with energy prices, should gradually abate, a stronger contribution to high food inflation could come from the strengthened growth in labour costs, Russia's unilateral decision to end the Black Sea Grain Initiative and the extreme weather conditions in some countries, as droughts and floods could imply upward pressures.

Chart 11

HICP food prices and costs of energy and food input



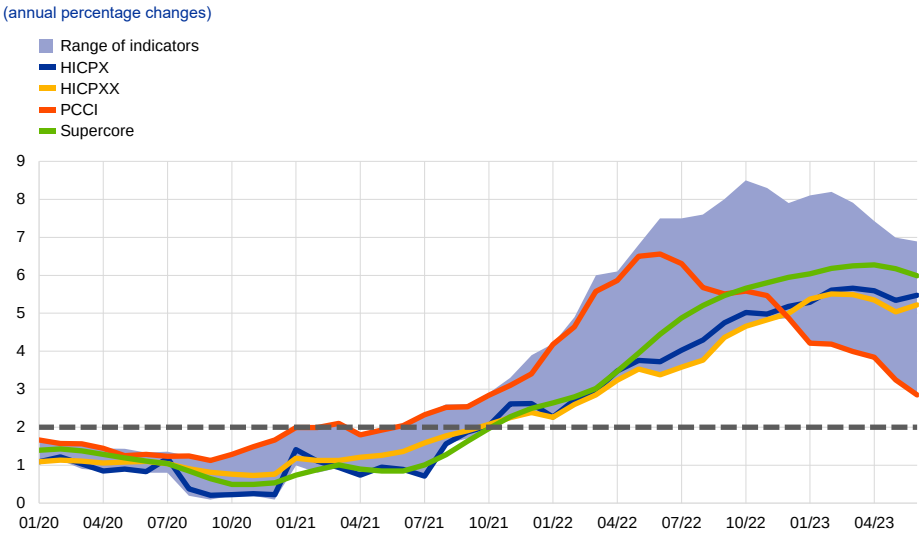
Source: Eurostat.
Note: The latest observations are for May 2023 for "Producer price index – energy" and "Producer price index – manufacture of food products" and June 2023 for the remaining items.

While some measures show signs of easing, underlying inflation remains high overall. (Chart 12). This owes inter alia to the persistent impact of past energy price increases on economy-wide prices. HICPX inflation edged up to 5.5% in June from 5.3% in May owing to upward base effects in services, namely those stemming from the above-mentioned German public transport ticket. These upward base effects also affected some other indicators, most notably the HICPXX (i.e. HICPX minus

volatile travel, footwear and clothing-related items), which also rose in June. By contrast, other regularly monitored indicators continued on the declining path that started in April. The domestic inflation indicator, which excludes items with a high import content, remained broadly unchanged in June. The Supercore indicator, which comprises cyclically sensitive HICP items, decreased to 6.0%, down from 6.2% in May. The model-based Persistent and Common Component of Inflation (PCCI) measure, which is expressed in terms of an annualised rate, declined further in June (regardless of whether energy is included). Overall, recent developments in these measures suggest a turning point in underlying inflationary pressures. Nonetheless, the range of monitored underlying inflation measures remains wide and at an elevated level, reflecting still high uncertainty and highlighting the need to monitor a broad set of data (see Box 5).

Chart 12

Indicators of underlying inflation



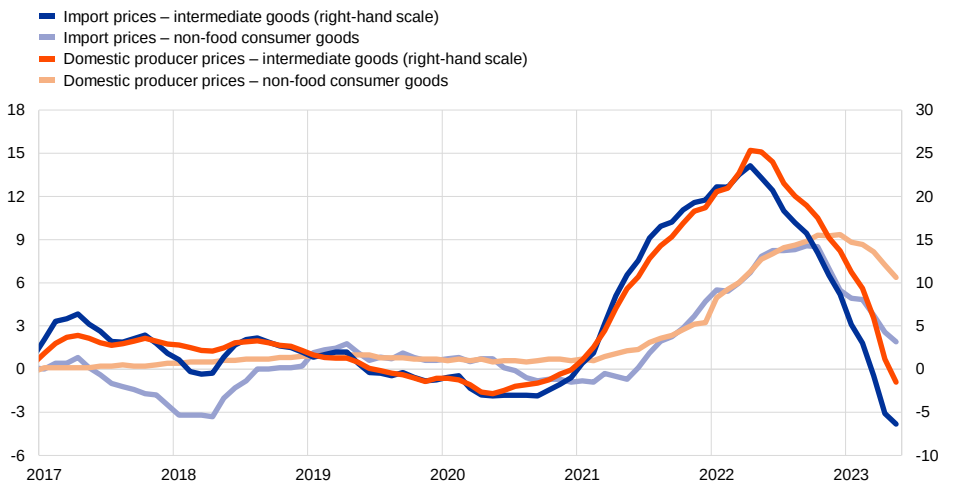
Sources: Eurostat and ECB calculations.
Notes: The range of indicators of underlying inflation includes HICP excluding energy, HICP excluding energy and unprocessed food, HICPX, HICPXX, 10% and 30% trimmed means, PCCI and a weighted median. The grey dashed line represents the ECB's inflation target of 2% over the medium term. The latest observations are for June 2023.

Inflation for non-energy industrial goods fell further, to 5.5% in June from 5.8% in May. Pipeline pressure indicators point to an ongoing process of moderation. Looking at the early stages of the pricing chain, producer price inflation for intermediate goods and import price inflation for intermediate goods both declined further in May. At the later stages, producer price inflation for non-food consumer goods edged down to stand at 6.4% in May, falling from 7.2% in April – the fifth consecutive month with a decline in annual terms, confirming the gradual easing of accumulated pipeline pressures for consumer goods. At the same time, while annual growth rates for import and producer prices of non-food consumer goods are easing, they remain at elevated levels, although for import prices the recent appreciation of the exchange rate should help (Chart 13).

Chart 13

Indicators of pipeline pressures

(annual percentage changes)



Sources: Eurostat and ECB calculations.
Note: The latest observations are for May 2023.

Wage growth has been picking up and is becoming an increasingly significant source of inflationary pressure. The annual growth in negotiated wages stood at 4.3% in the first quarter of 2023, up from 3.9% in the fourth quarter of 2022. Forward-looking information from recently concluded wage negotiations suggests that nominal wage pressures will remain strong beyond the first quarter of 2023. Actual wage growth, which is measured in terms of compensation per employee and compensation per hour, continued to increase. The annual growth rates of these two wage measures were revised upward compared with the first release, standing at 5.4% and 4.9% respectively in the first quarter of 2023, up from 4.8% and 4.1% in the fourth quarter of 2022. While unit profit growth remained relatively high in the first quarter of 2023, it eased in individual industrial sectors, notably in the more contact-intensive services.

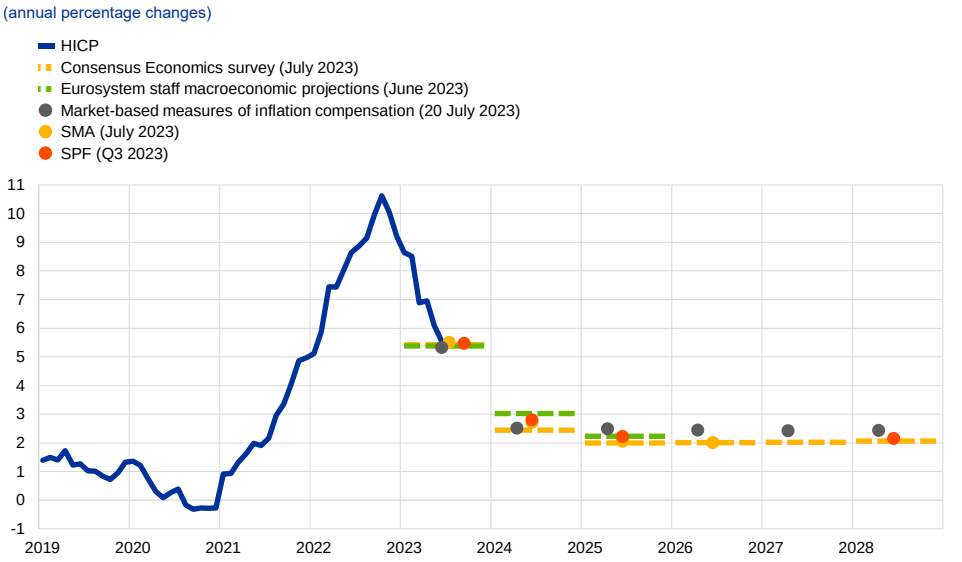
Most survey-based indicators of longer-term inflation expectations in the euro area remain more or less unchanged at around 2%, broadly in line with market-based measures of inflation compensation adjusted for risk premia (Chart 14). In the ECB Survey of Professional Forecasters (SPF) for the third quarter of 2023, average longer-term inflation expectations (now for 2028) and the median outcome remained unchanged at 2.1% and 2.0% respectively. In the July 2023 Consensus Economics survey, inflation expectations for 2028 also remained unchanged from April's 2.1%. In the July 2023 ECB Survey of Monetary Analysts (SMA), median longer-term expectations remained unchanged at 2.0%. In the ECB Consumer Expectations Survey for June 2023, median expectations three years ahead declined to 2.3%, down from 2.5% in May, continuing on their downward trajectory from their October 2022 peak.[3] Overall, market-based measures of inflation compensation, which are based on HICP excluding tobacco, increased

[3] See "ECB Consumer Expectations Survey results – June 2023", *Press Release*, ECB, Frankfurt am Main, 8 August 2023.

across maturities, notably at the short end. Indeed, the one-year forward inflation-linked swap rate one year ahead increased by 14 basis points and stood at around 2.5% at the end of the review period. At the longer end, the five-year forward inflation-linked swap rate five years ahead ended the review period slightly higher, standing at almost 2.6%. However, it should be noted that market-based measures of inflation compensation are not a direct gauge of market participants' genuine inflation expectations, given that these measures include inflation risk premia, which compensate for inflation risks. Overall, when cleansed for risk premia, market pricing continues to indicate a more optimistic inflation scenario over the next two years than the one suggested by the June 2023 Eurosystem staff macroeconomic projections for the euro area.

Chart 14

Survey-based indicators of inflation expectations and market-based measures of inflation compensation



Sources: Eurostat, Refinitiv, Consensus Economics survey, SPF, June 2023 Eurosystem staff macroeconomic projections for the euro area, SMA, and ECB calculations.
Notes: The market-based measures of the inflation compensation series are based on the one-year spot inflation rate, the one-year forward rate one year ahead, the one-year forward rate two years ahead and the one-year forward rate three years ahead. The observations for market-based measures of inflation compensation are for 20 July 2023. The SPF for the third quarter of 2023 was conducted between 30 June and 5 July 2023. The SMA shows quarterly forecasts. The cut-off for the Consensus Economics survey long-term forecasts was July 2023. The cut-off date for data included in the Eurosystem staff macroeconomic projections was 31 May 2023. The latest observation for HICP is for June 2023.

There are upside and downside risks to the inflation outlook. Upside risks to inflation include potential renewed upward pressures on the costs of energy and food owing to Russia's unilateral withdrawal from the Black Sea Grain Initiative and its military attacks on Ukrainian grain terminals and ports; adverse weather conditions, which could push up food prices more than projected; and a lasting rise in inflation expectations above our target or higher than anticipated increases in wages or profit margins, both of which could drive inflation up over the medium term. By contrast, weaker demand – for example owing to a stronger transmission of monetary policy – would lead to lower price pressures, especially over the medium term. Moreover, if declining energy prices and lower food price increases were to pass through to the

prices of other goods and services quicker than currently anticipated, inflation would come down faster.

4 Financial market developments

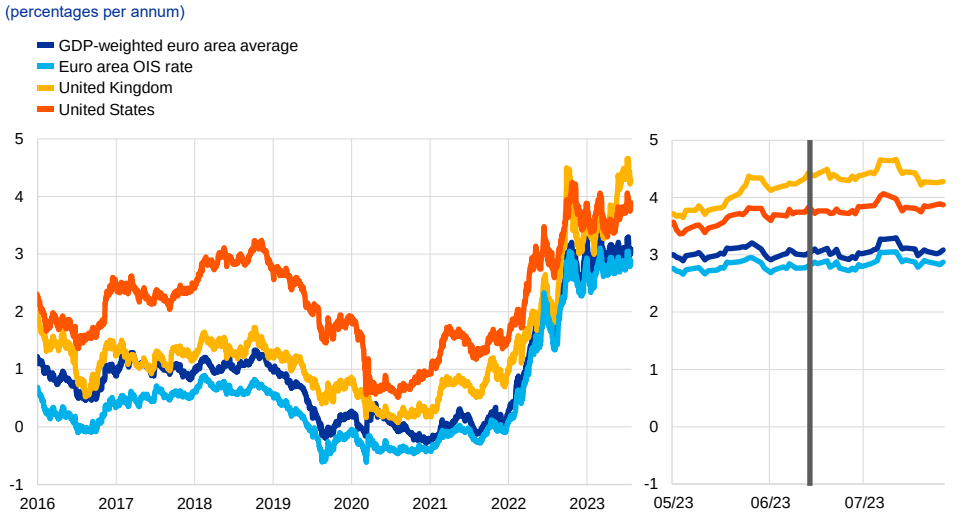
During the review period (15 June to 26 July 2023), financial market developments were driven largely by revisions to the inflation outlook and the expected implications for monetary policy. Following the June meeting of the Governing Council, market expectations for euro area near-term policy rates rose on the back of central bank communication on both sides of the Atlantic indicative of a tighter monetary policy stance. Since mid-July, however, these have returned to levels only slightly higher than those prevailing in mid-June amid lower-than-expected US inflation and the associated reappraisal of monetary policy. Sovereign bond yields in the euro area moved broadly in line with risk-free rates, without a visible impact from the ending of reinvestments under the ECB's asset purchase programme (APP) at the end of June. Overall, valuations of euro area risk assets remained broadly unchanged amid some intra-period volatility driven by market sensitivity to monetary policy communication and macroeconomic news. Euro area corporate bond spreads moved sideways. Despite some intra-period volatility, equity prices remained broadly unchanged against the backdrop of an evolving market reappraisal of monetary policy and the macroeconomic outlook. In foreign exchange markets, the euro appreciated against the US dollar and in trade-weighted terms.

Euro area near-term risk-free rates ended the review period broadly in line with levels seen before the June Governing Council meeting, after some intra-period moves. The euro short-term rate (€STR) averaged 337 basis points over the review period and closely followed the changes in the deposit facility rate. Excess liquidity decreased by approximately €526 billion to stand at €3,618 billion, mainly reflecting repayments of the third series of targeted longer-term refinancing operations (TLTRO III). The overnight index swap (OIS) forward curve, which is based on the benchmark €STR, rose for short and medium-term maturities after the Governing Council's monetary policy decision in June to raise the deposit facility rate by 25 basis points. This reflects market participants' expectations that policy rates will remain at higher levels for longer than previously expected. Near-term interest rates have retreated significantly since mid-July and returned to around their mid-June levels. As of the end of the review period, the OIS forward curve priced in an additional rate hike of 25 basis points for the July Governing Council meeting and a peak rate of around 3.9% for December 2023. The expectation for the terminal rate implied by the latest forward curve increased slightly compared with the OIS forward curve prevailing before the Governing Council meeting in June, while a first interest rate cut was seen as postponed to the second quarter of 2024.

Long-term sovereign bond yields moved broadly in line with risk-free rates amid stable sovereign spreads (Chart 15). On 26 July the euro area GDP-weighted average ten-year sovereign bond yield stood at around 3.1%, just a few points below its level at the beginning of the review period, and overall below the level seen prior to the turmoil in the banking sector earlier this year. Ten-year sovereign bond yields in the euro area moved broadly in line with long-term risk-free rates with no impact apparent from the ending of APP reinvestments in July. Outside the euro area, the ten-year US sovereign bond yield edged up slightly to stand at 3.9%, while the UK sovereign bond yield decreased by 10 basis points to 4.3%.

Chart 15

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



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 26 July 2023.

Movements in corporate bond spreads were limited, with some diverging pattern between the high-yield and investment-grade segments. Spreads on investment-grade corporate bonds narrowed by 7 basis points and those on financial corporate bonds declined the most, by 12 basis points, ending the review period slightly lower than prior to the turmoil in the banking sector seen earlier this year.[4] The volatile reappraisal of monetary policy and the macroeconomic outlook left its footprint on high-yield corporate bond spreads, which widened by 25 basis points over the review period.

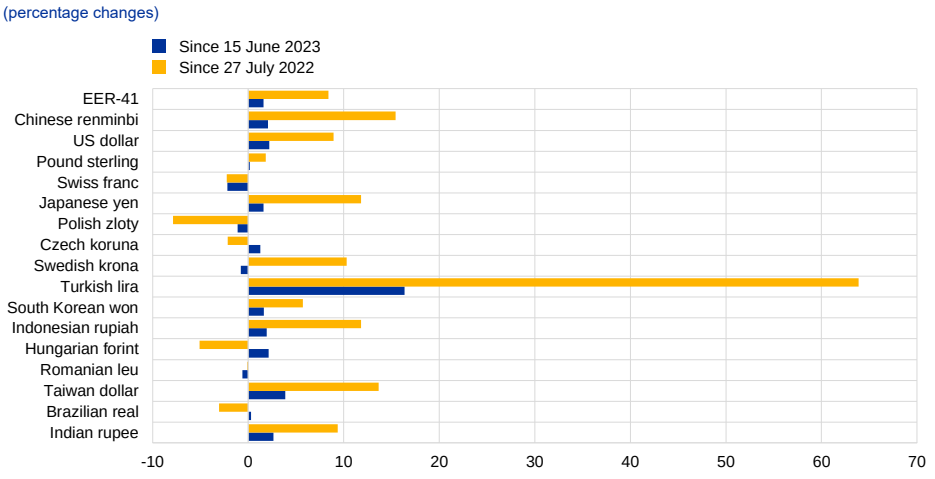
Despite some intra-period volatility, euro area equity prices remained broadly unchanged against the backdrop of an evolving market reappraisal of monetary policy and the macroeconomic outlook. Declines in euro area stock prices were broad-based, both across countries and sectors, in the first half of the review period, but tended to go into reverse over the final two weeks. All in all, composite euro area equity prices edged up a slight 0.2% at the end of the review period on the back of higher earnings expectations, while forward-looking measures of equity price volatility decreased from a temporary spike recorded in the first week of July. Overall, the equity prices of non-financial corporations (NFCs) decreased by around 0.9%, while euro area banks saw their equity prices rise by around 7.4%, rebounding from the turmoil seen in the banking sector in March. Despite the recent gains, bank equity prices are still below their pre-turmoil levels. In the United States, NFC equity prices gained around 2.9% over the review period, while bank equity prices increased by around 8.6%, slightly faster than their European peers, though ending up still below pre-March levels.

[4] For an insight into the evolving determinants of bond pricing in the euro area corporate bond market, see the box entitled "Changes in the investor base for euro area non-financial corporate bonds and implications for market pricing" in this issue of the Economic Bulletin.

In foreign exchange markets, the euro continued to appreciate, both against the US dollar and in trade-weighted terms (Chart 16). The euro appreciated by 2.2% against the US dollar amid improving risk sentiment. The nominal effective exchange rate of the euro – as measured against the currencies of 41 of the euro area's most important trading partners – also appreciated, by 1.6%, during the review period. This occurred amid a broad-based appreciation against other major currencies, including the Japanese yen (by 1.6%) and the Chinese renminbi (by 2.1%), as well as against the currencies of other major emerging economies, notably including the Turkish lira (16%). By contrast, the euro depreciated against the currencies of some non-euro area EU countries.

Chart 16

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



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 26 July 2023.

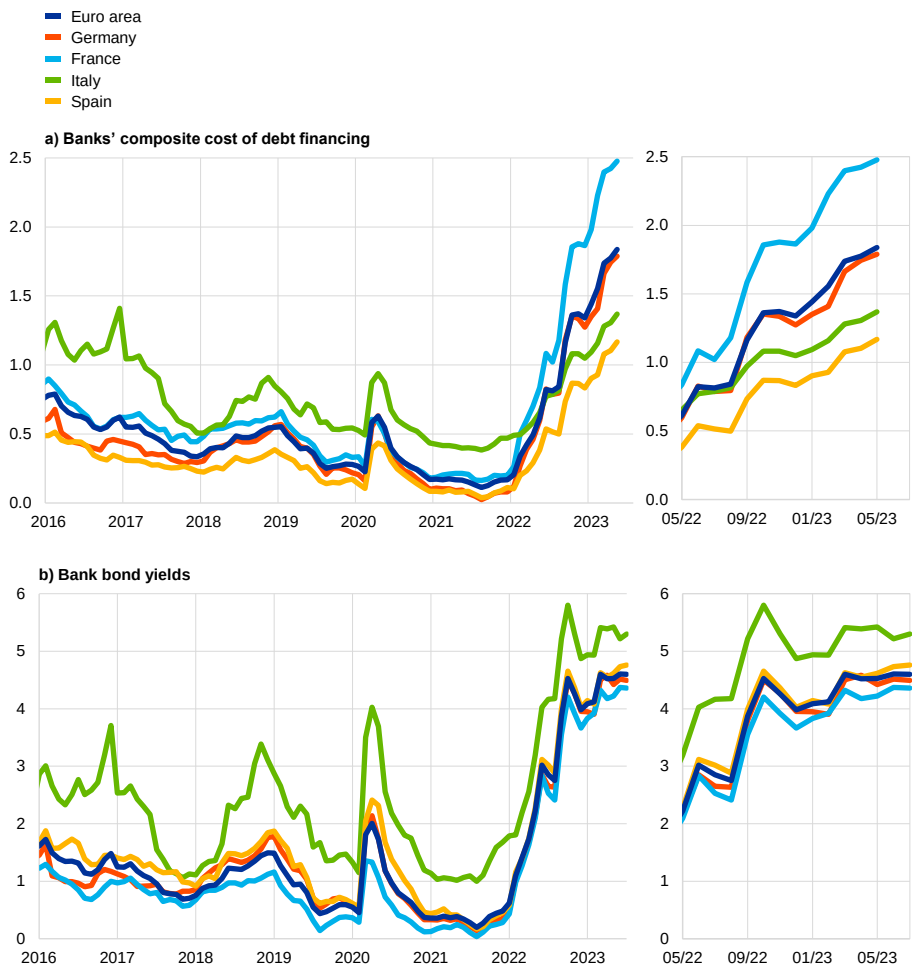
5 Financing conditions and credit developments

The ECB's monetary policy tightening continued to be transmitted strongly to broader financing conditions. Banks' funding costs continued to rise, reflecting further increases in deposit rates and the ongoing phasing-out of the targeted longer-term refinancing operations (TLTROs). Their repayments of funds borrowed under the third series of such operations (TLTRO III) – around €500 billion in June – went smoothly, as banks were well prepared. These repayments also contributed to a reduction in excess liquidity. In May 2023 bank lending rates increased further, reaching their highest levels since 2008 for firms and 2012 for households. Over the period from 15 June to 26 July 2023, the cost of equity financing of non-financial corporations (NFCs) remained virtually unchanged, while the cost of market-based debt financing declined marginally. The most recent euro area bank lending survey indicates that banks tightened their credit standards further for all loan categories and that loan demand from firms and households once again fell strongly in the second quarter of 2023, pointing to an ongoing weakening of loan dynamics. Bank lending to firms and households continued to moderate in June 2023 amid higher lending rates, weaker loan demand on the back of cuts in spending plans and tighter credit standards. In the same month, monetary dynamics weakened further, driven by their most liquid components, subdued credit growth and the reduction of 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 May 2023, thus reaching its highest level in more than ten years (Chart 17, panel a). This increase reflects higher deposit rates and stable bank bond yields (Chart 17, panel b). Deposit rates continued to rise steadily, with some variation across instruments. Depositors are reacting to the widening spread between time deposit rates and rates on overnight deposits by shifting their holdings from overnight to time deposits and to other instruments with higher remuneration. The pass-through of the increases in the key ECB interest rates to deposit rates has varied significantly across banks and has been accompanied by a redistribution of deposits between banks. Savers have moved deposits from banks with less attractive remuneration to banks that have raised 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 the TLTROs and the decline in overnight deposits.

Chart 17

Composite bank funding rates in selected euro area countries



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 May 2023 for composite bank funding rates and 26 July 2023 for bank bond yields.

Bank repayments of around €500 billion in funds borrowed under TLTRO III went smoothly, as banks were well prepared, with these repayments contributing to a reduction in excess liquidity and higher funding costs. In June 2023 banks repaid €506.3 billion of funds borrowed under TLTRO III, of which €29.5 billion were voluntary repayments and €476.8 billion were mandatory repayments, prompted by the maturing of the fourth TLTRO III operation. Following the settlement on 28 June, the overall amount of outstanding TLTRO III funds decreased to €592 billion, or 72% below the amount outstanding before the October 2022 recalibration of the remuneration of TLTRO III (€2.113 trillion).[5] Banks accommodated this large repayment by drawing on excess liquidity and by actively seeking to substitute funding in the market by issuing relatively large amounts of

[5] See "ECB recalibrates targeted lending operations to help restore price stability over the medium term", *press release*, ECB, 27 October 2022.

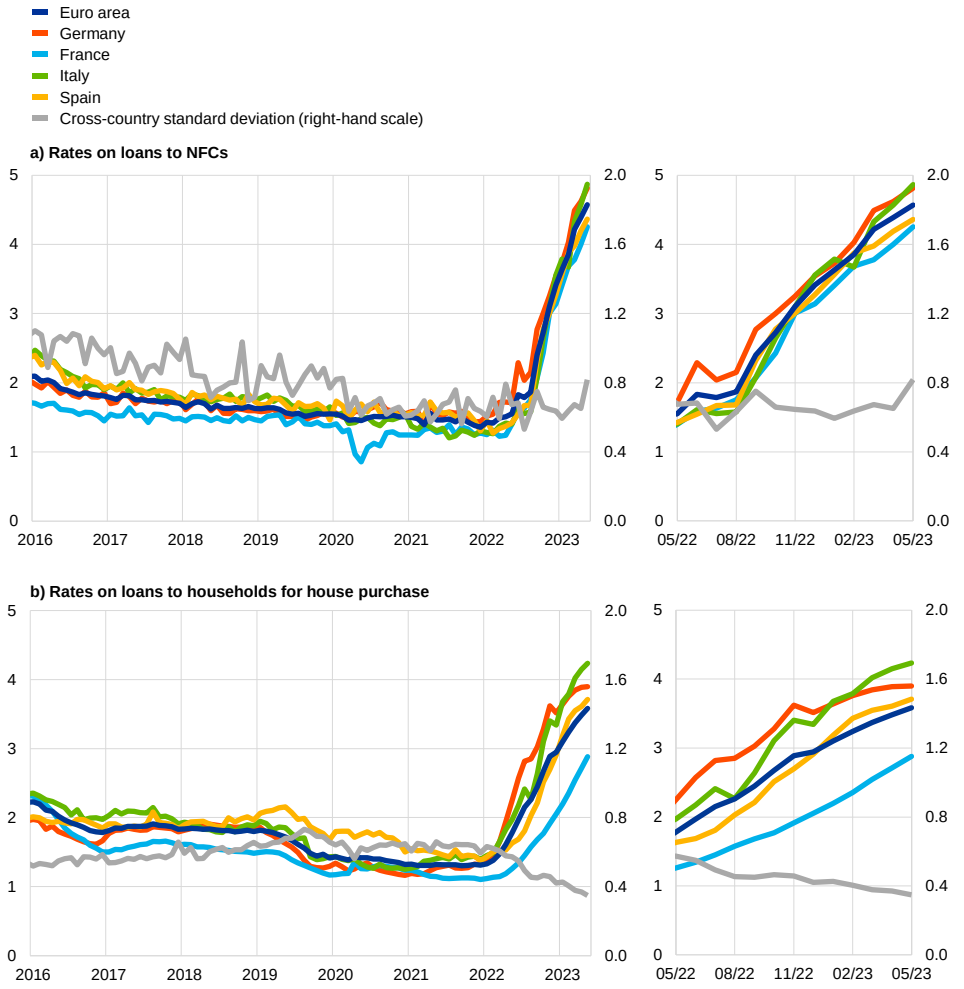
debt securities ahead of the repayment date. In addition to the increased issuance of debt securities, banks with outstanding TLTRO funds have competed more fiercely than other banks for deposits. Nevertheless, participation in main refinancing operations and three-month longer-term refinancing operations increased moderately, reflecting the fact that banks had had sufficient time to prepare their TLTRO repayments.

Bank lending rates for firms and households increased further, reaching their highest levels since December 2008 for firms and June 2012 for households. Higher ECB policy rates are being transmitted to bank lending conditions, with lending rates increasing and credit standards tightening strongly. The rise in lending rates is still higher for firms than for households across both countries and fixation periods (Chart 18). Bank rates on new loans to NFCs rose to 4.57% in May, their highest level since the end of 2008. This compares with 4.39% in April 2023 and 1.83% in June 2022, before the tightening cycle started. This increase was widespread across countries and fixation periods, with the largest rises being for loans with a fixation period of up to one year. Bank rates on new loans to households for house purchase also rose further in May, to stand at 3.58%, compared with 3.48% in April 2023 and 1.97% in June 2022. The increase in May was due to higher rates on fixed and flexible rate mortgages, amid some heterogeneity across countries. The results of the May 2023 Consumer Expectations Survey suggest that consumers expect mortgage rates to stabilise at around current levels over the next 12 months. However, a large net percentage of survey respondents perceived credit standards to be tight and expected it to become harder to obtain housing loans over the same period.

Chart 18

Composite bank lending rates for NFCs and households in selected countries

(annual percentages; standard deviation)



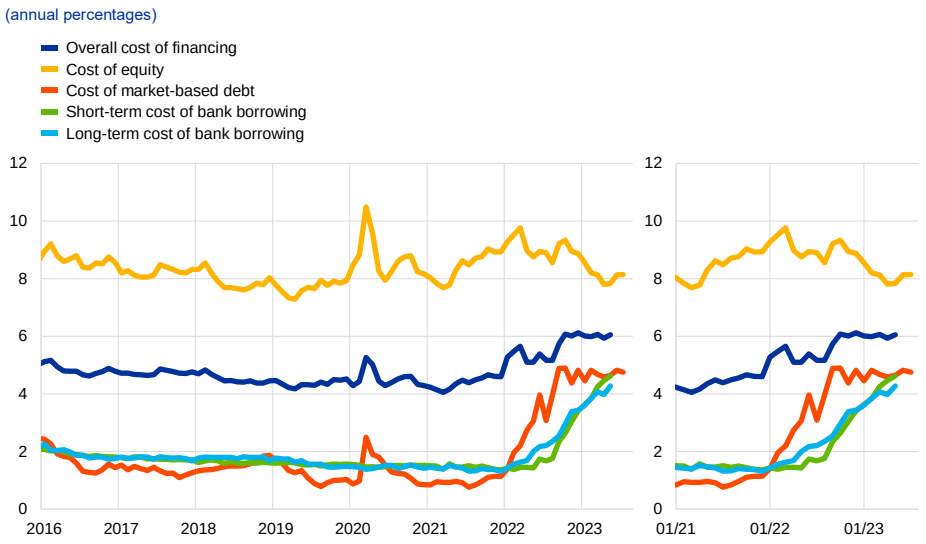
Source: ECB.
Notes: Composite bank lending rates are calculated by aggregating short and long-term rates using a 24-month moving average of new business volumes. The cross-country standard deviation is calculated using a fixed sample of 12 euro area countries. The latest observations are for April 2023.

Overall, lending rates have increased more quickly 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 since July 2022, and at a slower pace since the Governing Council's meeting on 4 May 2023. This is reflected in the first signs of moderation in the pace of lending rate increases in the second quarter of 2023 compared with the first quarter of 2023 and the fourth quarter of 2022. The cross-country dispersion of lending rates for firms increased somewhat from low levels, while the dispersion of lending rates for households remained at low levels in May 2023 (Chart 18). In a historical context, the spread between bank rates on small and large loans for euro area firms remained stable at low levels in May, although it varied to some extent from country to country.

From 15 June to 26 July 2023 the cost of equity financing for NFCs remained virtually unchanged, while the cost of market-based debt declined marginally. In May 2023 the overall cost of financing for NFCs – i.e. the composite cost of bank borrowing, market-based debt and equity – stood at 6.1%, around 10 basis points above its level in the previous month (Chart 19).[6] This was the result of a broad-based increase in the cost of all components of NFC financing in May, driven mainly by the cost of both short-term and long-term borrowing from banks. Notwithstanding the latest increase, the overall cost of financing in May remained close to the elevated levels reached in September 2022 and previously seen at the end of 2011. Over the review period the cost of market-based debt fell slightly, while the cost of equity remained virtually unchanged. The slight decline in the cost of market-based debt was due primarily to the compression of spreads on bonds issued by non-financial firms in the investment-grade segment not being fully compensated by a minor increase in the risk-free rate (approximated by the ten-year overnight index swap rate) and some widening of spreads on bonds issued by non-financial firms in the high-yield segment. The stability in the cost of equity over the review period reflected an equilibrium between the small increase in risk-free rates and the equally small decline in the equity risk premium.

Chart 19

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



Sources: ECB and ECB estimates, Eurostat, Dealogic, Merrill Lynch, Bloomberg and Thomson Reuters.
Notes: The overall cost of financing for NFCs is calculated as a weighted average of the cost of borrowing from banks, market-based debt and equity, based on their respective outstanding amounts. The latest observations are for 26 July 2023 for the cost of market-based debt (monthly average of daily data), 21 July 2023 for the cost of equity (weekly data) and May 2023 for the overall cost of financing and the cost of borrowing from banks (monthly data).

According to the July 2023 euro area bank lending survey**, credit standards for loans to firms tightened further in the second quarter of 2023, although the net percentage of banks reporting a tightening was smaller than in the previous quarter (Chart 20).** The tightening of credit standards was in line with banks' expectations in the previous quarter, remaining above the historical average since

[6] Owing to lags in the data available on the cost of borrowing from banks, the overall cost of financing for NFCs as of 26 July 2023 can only be calculated up to May.

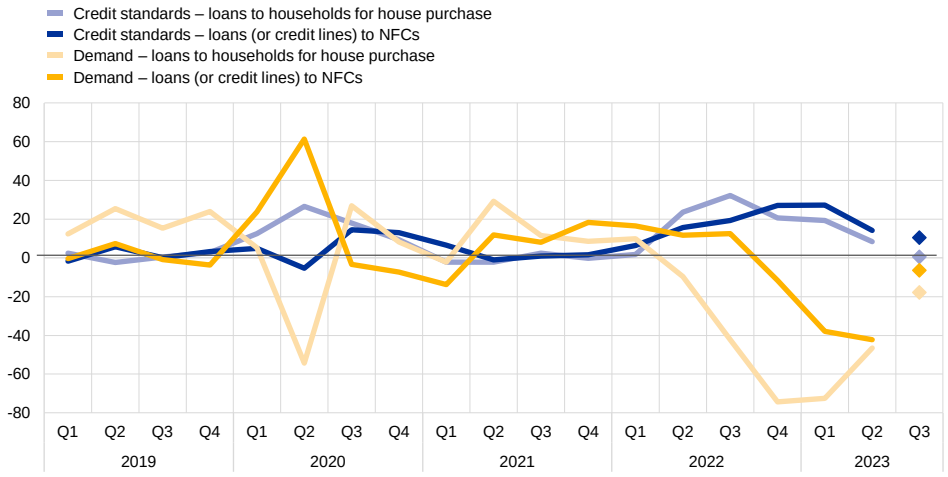
the start of the survey in 2003. The cumulated net tightening since the beginning of 2022 has been substantial, and the survey results have provided early indications about the significant weakening in lending dynamics observed since last autumn. Against the background of the typical lags in the impact of monetary policy transmission on the economy, risks related to the economic outlook and firm-specific situations remained the main drivers of the tightening of credit standards for loans to firms. Banks' lower risk tolerance, the higher cost of funds and the worsening of the balance sheet situation also contributed to the tightening, reflecting higher credit risks in the context of rising interest rates and weak economic growth. Banks also reported that credit standards for new loans to firms had tightened further across all main sectors of the economy in the first half of 2023, especially for commercial real estate. Euro area banks expect credit standards for loans to firms to tighten further in the third quarter of 2023.

Banks reported a further net tightening of credit standards for loans to households in the second quarter of 2023. Compared with the previous quarter, the net tightening was less pronounced for housing loans and more pronounced for consumer credit. For housing loans, it was broadly in line with banks' expectations in the previous quarter, while for consumer credit, it was substantially higher than expected. Higher risk perceptions related to the economic outlook and borrower-specific situations, lower risk tolerance, as well as the higher cost of funds, contributed to the tightening. For the third quarter of 2023 euro area banks expect credit standards for loans to households for house purchase to remain unchanged, while a further net tightening is expected for consumer credit and other loans to households, although to a lesser extent than in the second quarter.

Chart 20

Changes in credit standards and net demand for loans to NFCs and loans to households for house purchase

(net percentages of banks reporting a tightening of credit standards or an increase in loan demand)



Source: Euro area bank lending survey.
Notes: For survey questions on credit standards, "net percentages" are defined as the difference between the sum of the percentages of banks responding "tightened considerably" and "tightened somewhat" and the sum of the percentages of banks responding "eased somewhat" and "eased considerably". For survey questions on demand for loans, "net percentages" are defined as the difference between the sum of the percentages of banks responding "increased considerably" and "increased somewhat" and the sum of the percentages of banks responding "decreased somewhat" and "decreased considerably". The diamonds denote expectations reported by banks in the current round. The latest observations are for the second quarter of 2023.

Banks reported a strong decrease in loan demand from firms and households in the second quarter of 2023. The decline in loan demand from firms was the strongest observed since the start of the survey in 2003, while that in loan demand from households was smaller than the very large decrease in the previous two quarters. Banks reported that the general level of interest rates was the main driver of the reduced loan demand from firms, reflecting the dampening impact of rising interest rates on loan demand and economic growth. A decline in financing needs for fixed investment also had a strong dampening impact on loan demand, mirrored by a sharp decrease in demand for long-term loans. The drop in demand for housing loans was driven mainly by higher interest rates, weakening housing market prospects and low consumer confidence. For the third quarter of 2023 banks expect a further (net) decrease in loan demand from firms and in housing loan demand, albeit a much smaller one than in the second quarter.

According to the banks surveyed, access to funding deteriorated in most market segments, especially in retail funding, and increased concerns about non-performing loans (NPLs) also contributed to the tightening of bank lending conditions. The reported net deterioration in access to retail funding may reflect increased competition for retail deposits in the current environment of higher interest rates and outflows of overnight deposits. For the first half of 2023 banks reported a net tightening impact of NPL ratios on their credit standards for loans to enterprises and for consumer credit, and a broadly neutral impact on housing loans. As in the past, the main factors behind the contribution of NPL ratios to tightening lending conditions were banks' higher risk perceptions and lower risk tolerance.

The July 2023 survey questionnaire included a new annual ad hoc question aimed at gauging the impact of climate change on banks' lending to enterprises. Euro area banks indicated that firms' climate-related risks and their measures for dealing with climate change had had a net tightening impact on credit standards and terms and conditions for loans to brown firms (i.e. firms that contribute significantly to climate change and have not yet started the transition or have made little progress) over the past 12 months.[7] However, they had had a net easing impact on loans to green firms (i.e. firms that do not contribute or contribute little to climate change) and firms in transition (i.e. firms that contribute to climate change but are making considerable progress in the transition). Euro area banks also reported a net increase in demand for loans to firms owing to climate-related risks over the past 12 months, driven by firms in transition and green firms, while brown firms showed a net decrease in loan demand. The main drivers of loan demand related to climate risks were fixed investment and corporate restructuring, pointing to the investment needs of firms on the way to a more sustainable economy. Over the next 12 months, euro area banks expect a stronger net tightening impact owing to climate risks on credit standards for loans to brown firms, while a net easing impact is expected for green firms and firms in transition. In addition, euro area banks expect that the impact of climate risks on loan demand will become stronger in net terms.

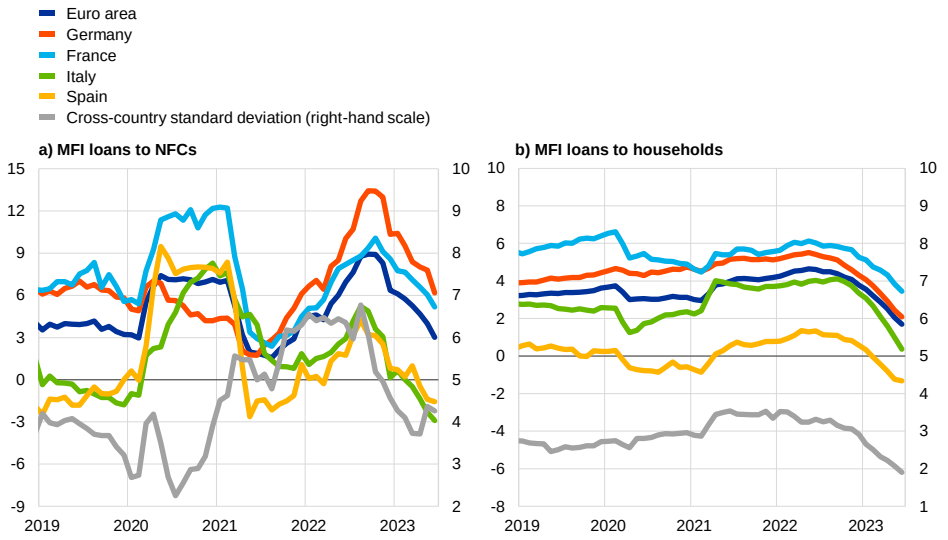
7 Firm-specific climate-related transition risks were the main drivers of the tightening impact on banks' lending policies, whereas physical risk, often related to the geographical location of the borrower, had on average a somewhat smaller net tightening impact, and climate-related fiscal support helped to ease loan approval.

Bank lending to firms and households continued to moderate in June amid higher lending rates, weaker loan demand and tighter credit standards. The annual growth rate of loans to NFCs declined to 3.0% in June, down from 4.0% in May (Chart 21, panel a). Monthly flows of loans to NFCs have been close to zero since November 2022. The slowdown was experienced across the largest euro area economies and reflects the strong decrease in loan demand, in part owing to higher borrowing rates and associated cuts in spending plans, as well as a further tightening of credit standards. The annual growth rate of loans to households declined from 2.1% in May to 1.7% in June (Chart 21, 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).

Chart 21

MFI loans in selected euro area countries

(annual percentage changes; standard deviation)



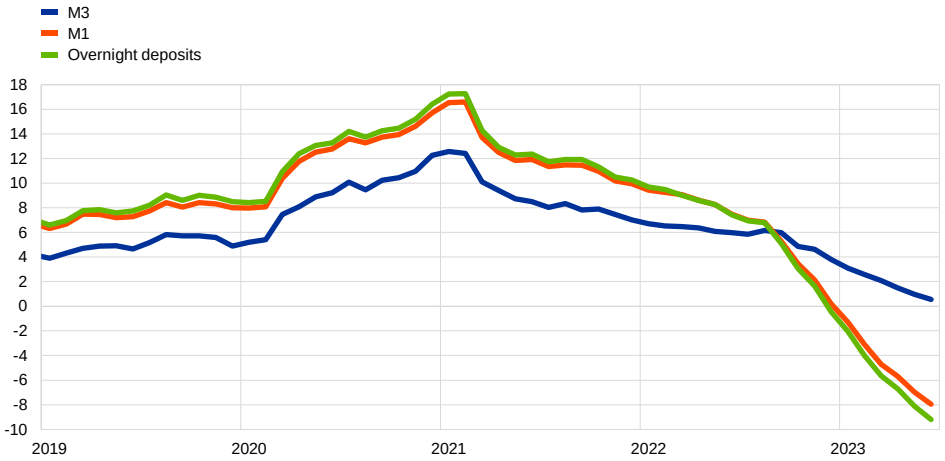
Source: ECB.
Notes: Loans from monetary financial institutions (MFIs) are adjusted for loan sales and securitisation; in the case of NFCs, loans are also adjusted for notional cash pooling. The cross-country standard deviation is calculated using a fixed sample of 12 euro area countries. The latest observations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

Overnight deposits contracted further in June, driven by the reallocation of funds to instruments with higher remuneration. After dropping by 8.1% year on year in May, the growth rate of overnight deposits fell further in June, bringing their annual growth rate to -9.2%, the strongest contraction since the start of Economic and Monetary Union (EMU) in 1999 (Chart 22). This was due mainly to households and firms continuing to shift their overnight and redeemable deposits to time deposits. The incentive behind the portfolio reallocation was the large spread between time and overnight deposits, reflecting the slower adjustment of interest rates on overnight deposits to policy rate changes compared with rates on time deposits. The fact that the ECB's policy tightening has been faster than in previous tightening cycles explains the extraordinary volumes being reallocated.

Chart 22

M3, M1 and overnight deposits

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



Source: ECB.
Note: The latest observations are for June 2023.

Monetary dynamics continued to weaken in June 2023, driven by their most liquid components, subdued credit growth and the reduction of the Eurosystem balance sheet. Annual broad money (M3) growth declined further from 1.0% in May to 0.6% in June (Chart 22), the lowest rate since July 2010. Month-on-month changes in broad money turned positive in June for the first time since November 2022, owing to purchases of euro area government bonds by banks and foreign investors. Narrow money (M1) contracted further, by 8.0% in June after 7.0% in May – the largest reduction by far in the history of EMU. The slowdown observed since March 2023, alongside the discontinuation of reinvestments of principal payments from maturing securities under the asset purchase programme in July 2023, has led to a reduction of the Eurosystem's asset portfolio, thus mechanically draining liquidity from the financial system. Lastly, TLTRO repayments are also contributing to the weakening monetary dynamics by giving banks an incentive to issue bonds with longer maturities that are not included in M3.

Boxes

1 Why has housing lost its lure? Evidence from the ECB's Consumer Expectations Survey

Prepared by Niccolò Battistini, Evangelos Charalampakis, Johannes Gareis and Desislava Rusinova

The deterioration in household perceptions of housing as a good investment preceded the recent decline in housing investment in the euro area.[1] In the ECB's Consumer Expectations Survey (CES), households are regularly asked whether they think buying a property in their neighbourhood today is a good or bad investment.[2] The proportion of positive responses to this question then may be used as a proxy of housing demand, which is an important driver of housing investment.[3] Indeed, household perceptions of housing as a good investment were a relatively good leading indicator of the weakness in housing investment that began in the second quarter of 2022, with household perceptions falling from their peak in the second quarter of 2021 to a low point in the first quarter of 2023 (Chart A). Since the turn of the year, these perceptions have recovered somewhat but remain at a low level. This box analyses the factors determining household perceptions of the attractiveness of housing as an investment using CES data on household characteristics and expectations, thereby shedding light on the reasons for the recent slowdown in housing investment.

1 For a discussion of the weakness of housing investment in the euro area in 2022 and a comparison with the United States, see the box entitled "Monetary policy and housing investment in the euro area and the United States", *Economic Bulletin*, Issue 3, ECB, 2023.

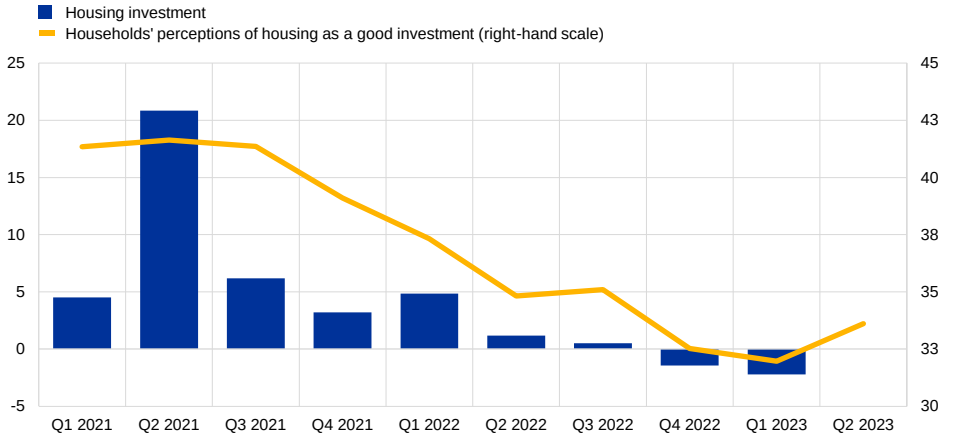
2 The study uses CES data from Belgium, Germany, Spain, France, Italy and the Netherlands.

3 The recovery in housing demand during the pandemic is discussed in the box entitled "The recovery of housing demand through the lens of the Consumer Expectations Survey", *Economic Bulletin*, Issue 7, ECB, 2021.

Chart A

Housing investment and households' perceptions of housing as an investment

(left-hand scale: year-on-year percentage changes; right-hand scale: percentages of respondents)



Sources: Eurostat, CES and ECB staff calculations.
Notes: Households' perceptions of housing as an investment measures the share of respondents who consider buying a property in their neighbourhood today to be a "good" or "very good" investment. Quarterly averages of monthly data. The value for Q2 2023 corresponds to the average of monthly data for April and May 2023.

Households perceive housing as an investment differently depending on their demographic and economic characteristics. Looking at the different characteristics of households surveyed in the CES, there are striking variations in the perceptions of the attractiveness of housing as an investment across specific groups (Chart B). On average, older consumers and males report a greater willingness to invest in housing than younger consumers and females. Owner-occupiers (particularly those with a mortgage) and those who claim to be more financially literate are also more likely to consider housing as a good investment than households that do not own a home, do not have a mortgage or do not consider themselves very financially literate.[4] While these characteristics could affect household perceptions of housing investment per se, differences in economic characteristics across household segments could also play an important role. Data on household income, working status, availability of sufficient liquidity, perceived financial situation and the tightness of credit access show that financially stronger households are typically more likely to believe that housing is a good investment.[5] This suggests that these households are either more able or more willing to risk such a large illiquid investment as housing.[6]

4 Financial literacy is measured in the CES using three basic questions to assess financial knowledge, together with a more knowledge-intensive mortgage borrowing question. For the precise wording, see, for instance, the appendix in 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, Frankfurt am Main, February 2023.

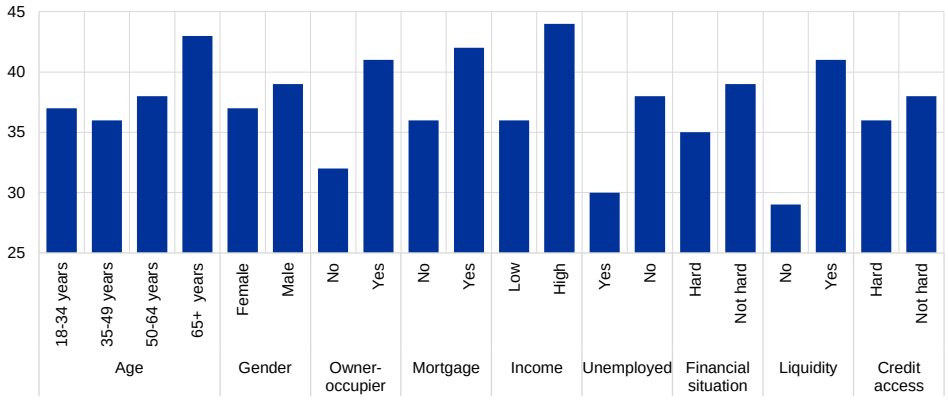
5 In the CES, the question about sufficient liquidity asks households if they have sufficient financial resources to meet an unexpected payment equal to one month of household income. The question about credit access asks if it is easier or harder for the household to obtain credit or loans today compared with 12 months ago and is measured on a five-point scale ranging from much harder to much easier. The CES also asks respondents if their financial situation is much worse, somewhat worse, about the same, somewhat better or much better compared with 12 months ago.

6 The differences in mean scores for the age, gender, owner-occupier, mortgage, income, unemployment, financial situation, liquidity and credit access groups are statistically different from zero at the 1% significance level.

Chart B

Household perceptions of housing as a good investment according to their demographic and economic characteristics

(percentages of respondents)



Sources: CES and ECB staff calculations.
Note: The chart shows average values for households' perceptions of housing as a good investment per household segment as a share of respondents who consider buying a property in their neighbourhood today to be a "good" or "very good" investment between April 2020 and May 2023.

Household expectations are an important factor in explaining household perceptions of housing as a good investment.[7] In addition to the different characteristics of households, their expectations also play an important role in their tendency to consider housing as a good investment. This is due to the fact that housing investment is associated with a long-term horizon for spending and borrowing decisions, so households need to form a view on future economic developments.

To formally assess the relationship between household perceptions of housing as a good investment and their expectations, we use a linear probability regression model that controls for the multiple factors at play. The model accounts for various expectations affecting the attractiveness of housing as an investment. These include household expectations of personal income growth, inflation, economic growth, house price growth and mortgage rates for the next 12 months, while controlling for household characteristics such as household income, working status, financial situation, liquidity availability, access to credit, and individual, wave and/or country-fixed effects.[8]

The model shows that higher expectations for economic growth, personal income growth and house price growth are associated with higher perceptions of housing as a good investment (Chart C). By contrast, higher inflation and mortgage rate expectations are associated with lower perceptions of housing as a good investment. This might be explained by the negative real income effects of higher inflation and the cash-flow effects of higher debt servicing costs, both of which

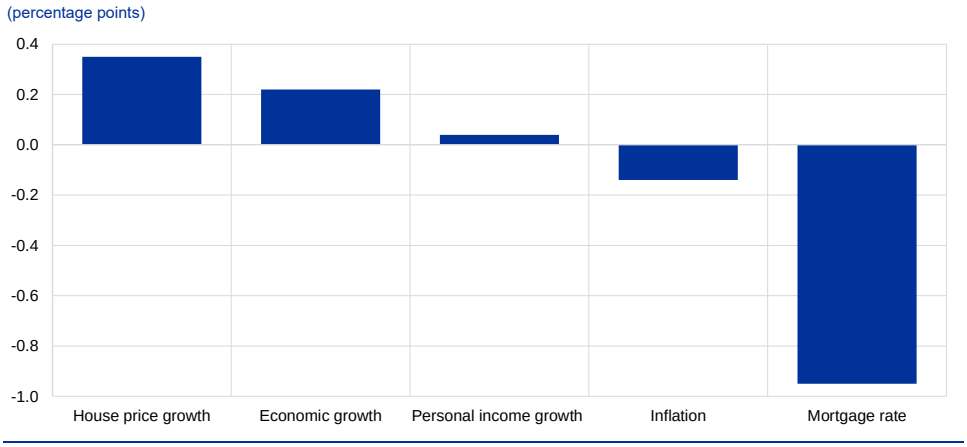
7 For a review of the recent literature on the determinants of survey-based housing market expectations, see Kuchler, T., Piazzesi, M. and Stroebel, J., "Housing market expectations", *NBER Working Paper*, No 29909, National Bureau of Economic Research, April 2022.

8 The choice of the specific variables for household expectations is motivated by macroeconomic studies that model housing demand, such as Kohlscheen, E., Mehrotra, A. and Mihaljek, D., "Residential Investment and Economic Activity: Evidence from the Past Five Decades", *International Journal of Central Banking*, Vol. 16, No 6, December 2020.

weigh on housing demand.[9] As for the control variables, liquidity availability and financial situation are statistically significant; ample liquidity has a positive association with households' perceptions of housing as an investment, while a difficult financial situation has a negative association.

Chart C

Estimated regression coefficients



Sources: CES and ECB staff calculations.
Notes: The chart shows the estimated coefficients for household expectations derived from a linear probability regression model in which a household's individual perception of housing as a good investment is regressed on its expectations for personal income growth, inflation, economic growth, house prices and mortgage rates for the next 12 months. The model also controls for household income, working status, financial situation, liquidity, access to credit, and individual, wave and/or country-fixed effects. A coefficient of 1 means that, for a 1 percentage point increase in households' expectations, the probability that respondents will consider housing a good investment increases by 1 percentage point. All estimated coefficients are statistically different from zero at the 1% level. The sample is for the period from April 2020 to May 2023.

Household expectations of higher mortgage rates, higher inflation and lower economic growth have weighed heavily on their perceptions of housing as a good investment since mid-2021 (Chart D). Using the estimated model parameters for household expectations of personal income growth, inflation, economic growth, house price growth and mortgage interest rates, as well as the average expectations of households surveyed in the CES at each point in time, we can derive an expectations-based indicator of household perceptions of housing as a good investment.[10] This indicator fell sharply in 2022, but it has stabilised since late

9 Overall, these results broadly correspond to those reported in Qian (2023) for the United States. In particular, the results on inflation expectations are in line with the supply-side interpretation of inflation stressed in Candia et al. (2020) and support the findings in Bachmann et al. (2015) for the United States. However, the results contradict the conclusions of Duca et al. (2018) for the euro area, who find that a higher expected change in inflation is associated with a higher probability that households will make major purchases. Moreover, the results reported in this box also point to the minor role of housing as a hedge against inflation, contrary to the findings in Malmendier and Steiny Wellsjo (2023), who focus on long-run inflation experiences rather than near-term inflation expectations. See Qian, W., "House price expectations and household consumption", *Journal of Economic Dynamics and Control*, Vol. 151, 104652, June 2023; Candia, B., Coibion, O. and Gorodnichenko, Y., "Communication and the Beliefs of Economic Agents", *NBER Working Paper*, No 27800, National Bureau of Economic Research, September 2020; Bachmann, R., Berg, T.O. and Sims, E.R., "Inflation expectations and Readiness to Spend: Cross-sectional evidence", *American Economic Journal: Economic Policy*, Vol. 7, No 1: pp. 1-35; Duca, I.A., Kenny G. and Reuter, A., "Inflation expectations, consumption and the lower bound: micro evidence from a large euro area survey", *Working Paper Series*, No 2196, ECB, Frankfurt am Main, November 2018; Malmendier, U., and Steiny Wellsjo, A., "Rent or Buy? Inflation Experiences and Homeownership within and across Countries", *Journal of Finance*, forthcoming, 2023.

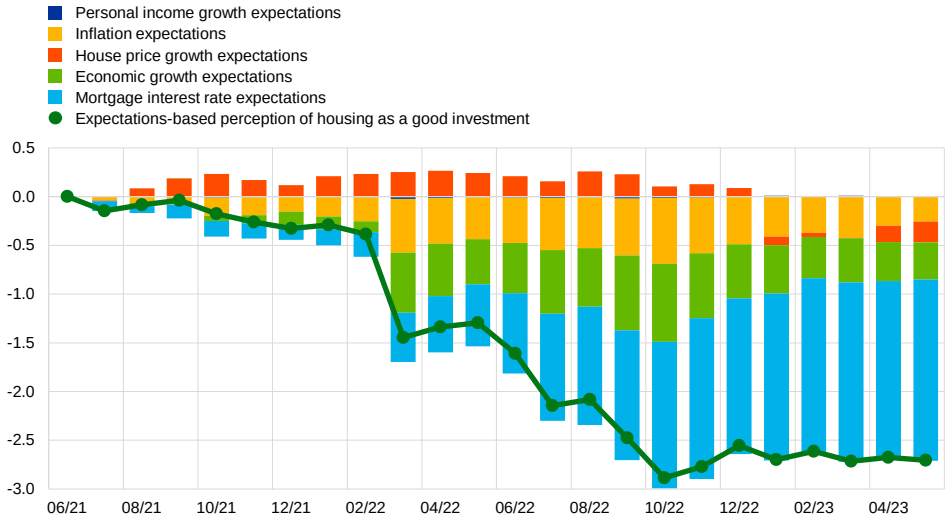
10 The expectations-based indicator measures changes in the likelihood that households will consider housing as a good investment, assuming there is no change in their demographic and economic characteristics. The expectations-based indicator explains about 80% of the volatility over time in households' perceptions of housing as an investment, as shown in Chart A.

2022, broadly in line with the actual share of households that consider housing a good investment. The decline in this expectations-based indicator was mainly due to rising mortgage interest rate expectations, which were exacerbated by rising short-term inflation expectations in early 2022, lower economic growth expectations, and falling house price growth expectations in late 2022. The dampening effect of mortgage interest rate expectations intensified in early 2023, together with deteriorating expectations for house price growth, while inflation expectations declined and thus had less of a restraining effect.[11] Overall, the expectations for higher mortgage rates led households to assess housing as being a significantly less attractive investment, reflecting the impact of tighter monetary policy and financial conditions in general.[12]

Chart D

Expectations-based indicator of households' perceptions of housing as an investment

(percentage point changes in the probability of households considering housing as a good investment since June 2021)



Sources: CES and ECB staff calculations.
Notes: The chart reports the change since June 2021 in the expectations-based indicator of households' perceptions of housing as a good investment. It combines the estimated coefficients of the linear probability regression model reported in Chart C with households' average expectations for personal income growth, inflation, economic growth, house price growth and mortgage interest rates, as surveyed in the CES at each point in time.

11 Despite their statistical significance, expectations for personal income growth do not appear to be quantitatively important drivers of the recent deterioration in the expectations-based indicator of housing as a good investment, as fluctuations in this variable since June 2021 have been relatively small.

12 For a discussion of housing as a component of the transmission of monetary policy to the economy, see the box entitled "The role of housing wealth in the transmission of monetary policy" in this issue of the Economic Bulletin.

2 Consumers' interest rate expectations in a monetary policy tightening cycle

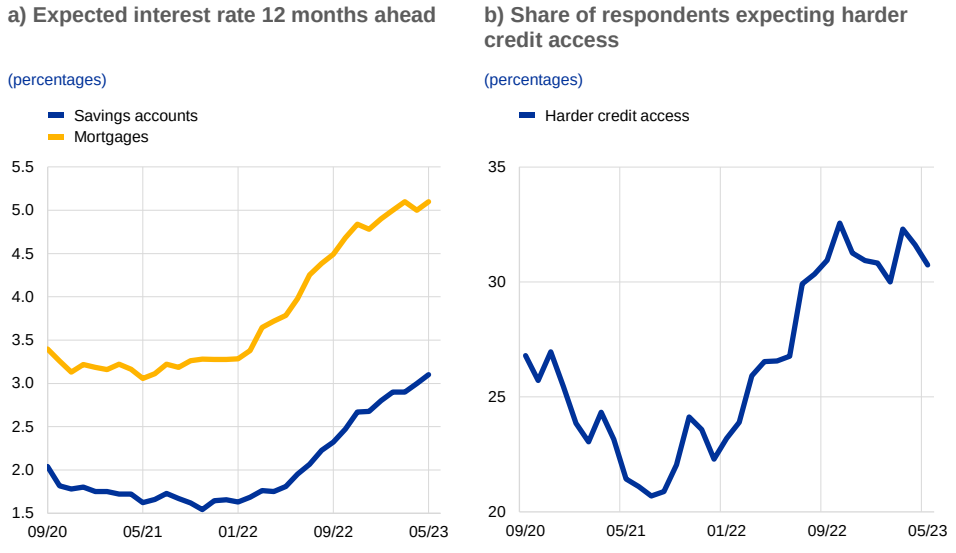
Prepared by Evangelos Charalampakis and Virginia Di Nino

Consumer expectations can be of help in making timely assessments of the transmission of monetary policy to economic activity. Using data from the ECB's Consumer Expectations Survey (CES), this box documents i) the extent to which consumer expectations about interest rates on mortgages and bank deposits have adjusted to the tighter policy stance; ii) how different groups of households perceive the tightening of monetary policy; and iii) to what extent these changes have affected households' expectations about their future spending.[1] These are important elements in the ongoing assessment of the transmission of tighter monetary policy to household spending.

In line with actual interest rate developments, consumers' expectations for interest rates have increased. Expectations for interest rates on mortgages and savings accounts in 12 months' time have increased by almost 2.0 percentage points and 1.5 percentage points respectively since the beginning of 2022 (Chart A, panel a). The share of respondents expecting that it will be harder to obtain credit (of any type) increased steadily from the beginning of 2022 until October 2022 and has hovered around 30% since then.

Chart A

Households' expectations about interest rates and credit access



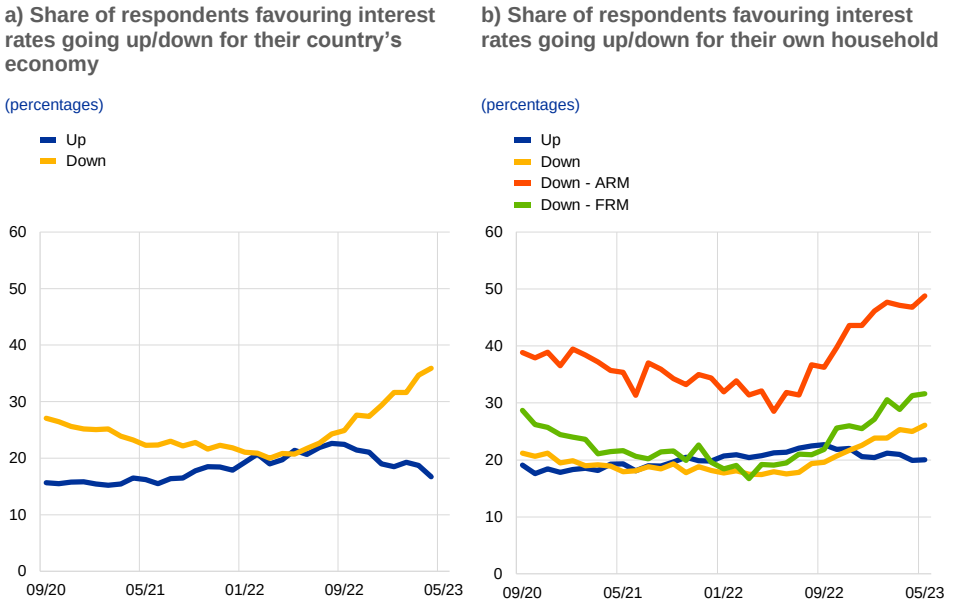
Source CES.
Note: The latest observations are for May 2023.

[1] The CES is a monthly survey with a rotating panel of approximately 14,000 respondents from the six largest euro area countries, i.e. Belgium, Germany, Spain, France, Italy and the Netherlands.

Since June 2022 an increasing share of respondents, particularly among those with an adjustable rate mortgage (ARM), has favoured lower interest rates. In June 2022 the share of respondents reporting that lower interest rates would be best for their country's economy had already exceeded the share favouring higher interest rates (Chart B, panel a).[2] Similarly, in the autumn of 2022 the share of consumers who thought lower interest rates would be best for their own household exceeded the share reporting that they preferred higher interest rates. The growing preference for lower interest rates is particularly visible among households with an ARM mortgage who are arguably more directly affected by the rise in interest rates. Conversely, households with a fixed rate mortgage (FRM), who are not as exposed – or at least not as immediately – to higher interest rates, have changed their attitudes toward interest rates by much less.

Chart B

Households' preferences as regards interest rate changes



Source CES.
Notes: Panel b) shows the results for all households in the survey, as well as for households with an ARM and households with an FRM. See also footnote 3 for further details. The latest observations are for May 2023.

There is considerable divergence between respondents with different types of mortgage in terms of their expectations about their household's financial situation. The share of households with an ARM reporting that they expect to have difficulties in meeting their mortgage payments in the next quarter has risen notably, especially in the first half of 2023. In contrast, expectations regarding difficulties in meeting future payments have remained broadly stable overall among households with an FRM.[3] In line with this divergence, the share of households with an ARM

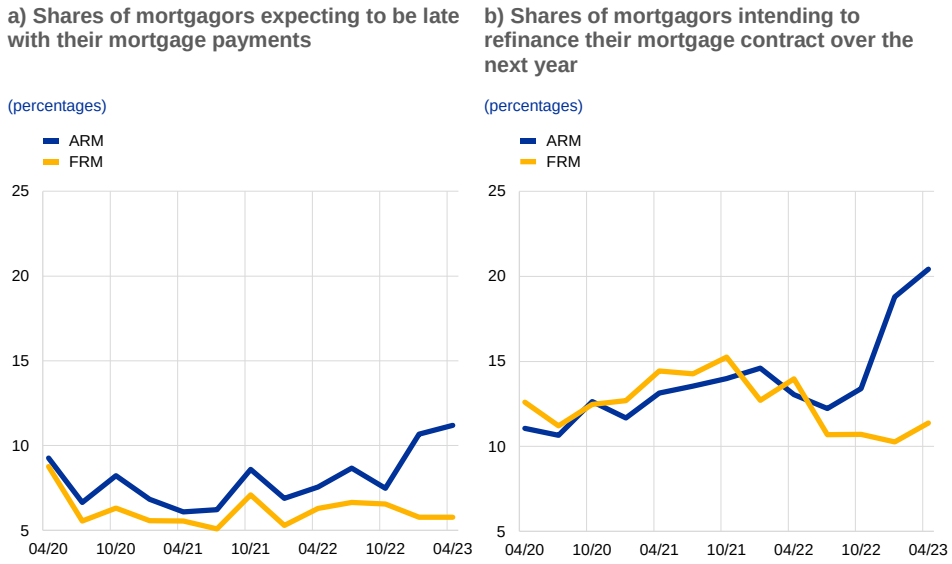
2 The CES asks survey participants to report their qualitative preferences in terms of the interest rate that they think would be best for the economy of the country they live in, and, similarly, best for their own household. They are asked to state whether they would prefer interest rates to go up, down, or stay the same, or whether they are indifferent to any movement in interest rates.

3 Using the available observations for our regression model, 12.6% of households have an FRM, and 7.3% have an ARM. The share of respondents who own their home outright and the share of those who rent their home are 43% and 37.1% respectively.

who intend to apply for mortgage refinancing over the next year increased in the first two quarters of 2023 (Chart C), while the analogous share of households with an FRM steadily declined over the same period.

Chart C

The burden of higher interest rates, by mortgage type



Source: CES.
Note: The latest observations are for April 2023.

Expectations for spending of households with an ARM are more sensitive to changes in expected interest rates. On average, respondents tend to reduce their expected real spending growth when they increase their expectations about future mortgage rates (with expected spending growth falling by -0.05 percentage points in response to a 1.0 percentage point increase in mortgage rate expectations). Distinguishing between renters, homeowners without a mortgage, those with an FRM, and those with an ARM, the empirical analysis shows that households in the latter group expect to reduce their consumption growth by three times as much as the average household in the population, in line with the higher interest rate exposure of households with an ARM. At the other extreme, the expected consumption growth of households with an FRM seems to be unaffected by an increase in interest rate expectations (Chart D).[4] Overall, the results of the CES suggest that over the past year consumers have been progressively incorporating the impact of higher interest rates into their spending decisions, which reflects the ongoing transmission of tighter monetary policy to economic activity.[5]

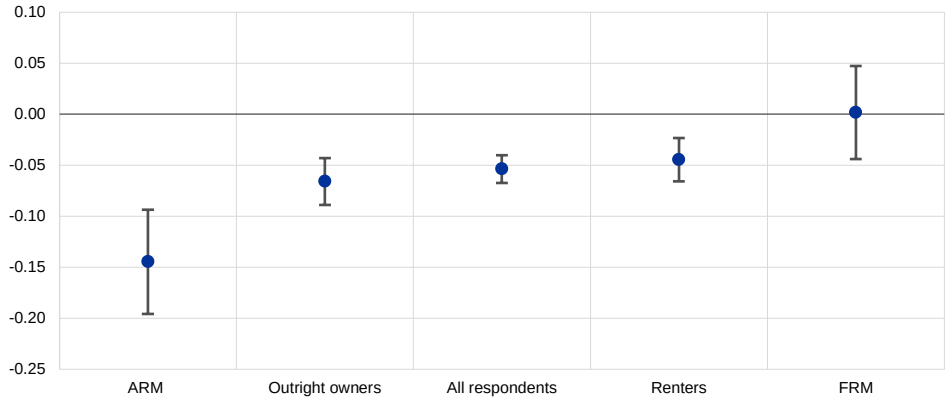
4 Homeowners with an FRM are, all else equal, less exposed to interest rate risk than outright owners, as they have matched a long-duration asset (i.e. housing) with a long-duration liability (i.e. a mortgage). See, for example, Auclert, A. (2019), "Monetary Policy and the Redistribution Channel", *American Economic Review*, Vol. 109(6), pp. 2333-2367.

5 For further analysis of the special role of households with mortgages in transmitting monetary policy to aggregate consumption, see the box entitled "The role of housing wealth in the transmission of monetary policy" in this issue of the Economic Bulletin.

Chart D

Impact of expected mortgage rates on expected consumption

(percentage points)



Sources: CES and ECB calculations.
Notes: The dots show the sensitivity of expected consumption to an expected change in mortgage interest rates by type of household. These parameters are estimated in a panel regression of the monthly change in expectations of household real consumption growth one year ahead (nominal consumption growth minus the expected inflation rate 12 months ahead) on the change in expectations of mortgage interest rates that also controls for the expected nominal income growth for the year ahead and unobserved heterogeneity across households. The 95% confidence intervals of the estimated parameters are shown by the vertical whiskers. The estimation period is from April 2020 to May 2023.

3 Main findings from the ECB's recent contacts with non-financial companies

Prepared by Catherine Elding, Johannes Gareis, Friderike Kuik and Richard Morris

This box summarises the findings of recent contacts between ECB staff and representatives of 73 leading non-financial companies operating in the euro area. The exchanges took place between 26 June and 5 July 2023.[1]

Contacts continued to describe a situation consistent with broadly stagnating activity overall, but with substantial variation both across and within sectors. In this respect, not much had changed since the start of the year. Contacts still largely saw business activity rising or falling in relation to how the ripple effects of past shocks (the COVID-19 pandemic and Russia's invasion of Ukraine) and ongoing structural changes (digitalisation and decarbonisation) affected supply and demand in their industry.

In the industrial sector, weakness was mainly concentrated in the construction and intermediate goods sectors, while developments in the consumer and capital goods sectors were more mixed. Orders and production in much of the intermediate goods sector (chemicals, steel, paper/packaging and electronic components) were reportedly falling due to both subdued final demand and continued de-stocking by customers as well as, in some cases, increased import competition. Demand for new residential and commercial construction was falling most sharply, followed by demand for industrial machinery and equipment. By contrast, infrastructure investment – and generally any investment related to decarbonisation – was proving resilient. Many capital goods manufacturers still had long order books to work through, which was sustaining production despite weak demand. Automotive production continued to recover as supply constraints eased, although there were reports of bottlenecks in logistics hindering the delivery of new vehicles to sales outlets, and demand for internal combustion vehicles was more robust than that for electric vehicles. In the consumer goods sector, the main source of weakness was still falling demand for household appliances and consumer electronics, reflecting the shift in spending from goods to services and the overall squeeze on household incomes (with higher nominal spending on food and energy crowding out spending on consumer durables).

Services sector output was boosted by strong demand for travel and leisure, some resilience in retail trade and growth in digital services, while activity in many other services was stable or contracting. Contacts in the travel and hospitality industries reported very strong growth in activity. Air passenger travel and hotel bookings had recovered or even exceeded their pre-pandemic levels in the second quarter, and bookings for the summer were at full or very high capacity, notwithstanding high prices. Some retailers were surprised by the resilience of

[1] For further information on the nature and purpose of these contacts, see the article entitled "The ECB's dialogue with non-financial companies", *Economic Bulletin*, Issue 1, ECB, 2021.

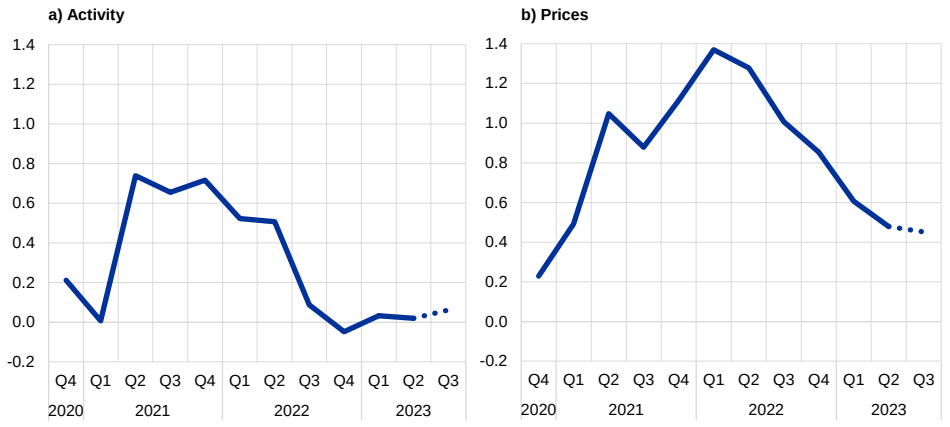
consumer spending. While there were still many reports of consumers “downtrading”, especially in relation to food and day-to-day products, clothes retailers mostly reported increasing sales and at least broadly stable volumes. Growth in sales of more expensive clothing brands and luxury items, such as cosmetics and jewellery, were particularly strong as higher income consumers continued to spend. These parts of the retail sector also benefited from the recovery in tourism. Growth in digital services benefited from a combination of structural and cyclical drivers, including the growth of data centres and cloud computing (related to artificial intelligence) and the recovery of roaming services (through tourism). By contrast, demand for transport (shipping and haulage) and logistics (warehousing) services continued to fall. Contacts in employment, security, advertising and business travel services reported broadly stable developments, although business travel still remained at a very low level.

Current trends in activity were likely to persist in the third quarter, with the balance of risks a few quarters ahead tilted mildly to the downside. In the manufacturing sector, some contacts anticipated a recovery in orders later in the year as the inventory cycle turned, but others anticipated reduced production if orders did not recover. There was concern about the weaker-than-expected recovery of the Chinese economy and what this would mean both for exports and for import competition. Capacity constraints would limit the potential for further growth in tourism services during the summer, and doubts were expressed about the sustainability of current levels of consumer spending. Against this background, many contacts thought that there was a very high risk of recession, albeit a mild one, in late 2023 or in 2024. At the same time, a clearer indication of inflation being under control, and hence the path of interest rates, would help reduce uncertainty and boost business confidence.

Chart A

Summary of views on activity and prices: developments and outlook

(averages of ECB staff scores)



Source: ECB.
Notes: The scores reflect the average of scores given by ECB staff in their assessment of what contacts said about quarter-on-quarter developments in activity (sales, production and orders) and prices. Scores range from -2 (significant decrease) to +2 (significant increase). A score of 0 would mean no change. The dotted line refers to expectations for the next quarter.

Developments in – and the near-term outlook for – employment largely mirrored those for activity and hence were fairly diverse but stable overall.

Contacts reported increasing, decreasing and stable employment levels in broadly equal shares with little change compared to the previous quarter. Companies that wanted to reduce headcount could generally achieve this through natural churn, although a small number pointed to expected layoffs later in the year. Reports from employment agencies were fairly varied and included an apparent shift away from permanent placements and towards temporary ones, which was interpreted as a reflection of the high level of business uncertainty. Many contacts continued to find recruitment challenging given shortages of various skills, but there were also a few signs of increasing slack in some parts of the labour market. When asked whether they observed reductions in working hours, these reductions were largely interpreted as part of a longer-term structural shift in preferences around work-life balance and flexible working conditions, especially among younger people.

Overall, selling price increases decelerated further in the second quarter. This aggregate picture nonetheless masked substantial variation. The moderation in price growth in recent quarters largely reflected the effect of past commodity price increases and their subsequent falls feeding through the value chain, while input prices were now increasingly influenced by the rising wages faced by suppliers. Overall, this was giving rise to fairly stable non-labour input costs (with input prices tending to fall at earlier stages of the value chain but still rise further down the chain). Along with the recent easing of non-labour input cost pressures, lower demand made it more difficult for manufacturers and retailers of consumer goods to increase their prices. Several said they had still increased prices and would continue to do so, but that they had to be more cautious and selective during this process, while others anticipated broadly stable prices going forward. Price growth in the services sector generally outpaced that in manufacturing, given the higher share of wage costs. Furthermore, exceptional price growth in the tourism and hospitality sectors, driven by strongly recovering post-pandemic demand, was showing no signs of abating. Overall, contacts therefore anticipated a slightly lower rate of price growth in the third quarter compared with the second quarter. There were also signs of further moderation coming later in the year or in 2024, with an increasing number of contacts expecting prices in their sectors to either stabilise or decline.

Wage expectations point to a slight moderation in wage growth next year. Taking a simple average of the mid-points of the quantitative indications provided, contacts expected wage growth to decelerate from around 5.5% this year to 4.7% in 2024. Around half of contacts expected wage growth in 2024 to be similar to 2023, while four in ten said they thought that wage increases would be lower next year.

4 Narrowing the climate data gap – climate change-related indicators

Prepared by Andrew Kanutin

In January 2023 the ECB published a set of climate-related statistical indicators on its website for the first time, covering sustainable finance, carbon emissions and physical risks. These climate-related indicators, which are still under different stages of development, aim to shed light on climate change risks facing the financial sector in the euro area and to support policymakers and investors in developing effective strategies to address these challenges. Climate change also has potential implications for central banks regarding their price stability mandates, financial stability aims and, in many cases, prudential supervision of banks. This box gives a brief overview of the climate-related indicators, including the rationale behind them and their caveats.

The ECB is firmly committed, within its mandate, to do its part in addressing climate change. In July 2021 the Governing Council set out an action plan for incorporating climate change considerations into its policy framework.[1] The increasing risks associated with climate change have highlighted the importance of better understanding the exposure of financial institutions to climate change-related developments as well as their role in channelling funds to the economy to better adapt to such risks. As part of the action plan, climate change indicators have been developed. These are intended to support the analysis of climate change issues in the financial sector. One area of interest is the carbon footprint of the financial portfolios of financial institutions: by tracking the greenhouse gas emissions of economic activities that have been directly or indirectly financed by financial institutions, it is possible to assess the progress made by those institutions in reducing the carbon footprints of the portfolios and in their role in the transition to a low-carbon economy. Furthermore, as the European climate agenda evolves and large polluters face increased regulation and restrictions, certain industries and assets may become obsolete or face significant devaluation, turning into so-called "stranded assets". It is important to assess the physical risks to assets – including assets used for production, shelter or as collateral to loans – as these can affect the stability of the financial system and the economy as a whole. The indicators for sustainable finance instruments facilitate the tracking of data on the aggregate details of issuers and holders of green and other sustainable debt securities, thereby increasing market transparency.

The indicators have been developed by the European System of Central Banks (ESCB). Source data for the calculations are typically produced by various international organisations and use ESCB microdata sources such as the Register of Institutions and Affiliates Data (RIAD), the analytical credit dataset (AnaCredit), the Centralised Securities Database (CSDB) and the Securities Holdings Statistics by

1 See "ECB presents action plan to include climate change considerations in its monetary policy strategy", *press release*, ECB, 8 July 2021.

Sector (SHSS) datasets. A methodological manual, which provides full details of the calculation of these indicators, has been made available on the ECB's website, but it is important to emphasise that there are still caveats associated with the statistics.[2] However, it is expected that many of these limitations will be dealt with as the data become more mature.

The sustainable finance dataset gives an overview of issuances and holdings of sustainable debt securities in the euro area. The indicators provide information on the proceeds raised to finance sustainable projects and, through this, on the progress of the transition to a net-zero economy.[3] In the context of sustainable finance, the definitions of what constitutes a "green" or "sustainable" investment may vary across market participants, as there is currently no universally accepted standard, even if some international standards are widely used, such as those of the International Capital Markets Association or the Climate Bonds Initiative. The lack of internationally accepted harmonised definitions of certain concepts may lead to limitations in the datasets, which have been designated as experimental by the ECB as a result.

Issuances of sustainable debt securities, which can be divided into four sustainability classifications (sustainability, sustainability-linked, green and social), have been significant in the last two years (Chart A), with the total outstanding amount more than doubling, albeit from a low base. This increase has been driven by the issuance of sustainable debt securities in the green and social classifications (Chart B), which account for the majority of the sustainable debt securities market. Nonetheless, it is still a nascent market, currently accounting for around 5% of the total euro area debt securities market. Government and monetary financial institutions are the leading sectors issuing green debt securities in the euro area and have very comparable market shares. Investment funds are the main investors in green debt securities, followed by euro area national central banks. Data from France and Germany show that they are the main issuers and holders of green debt securities in the euro area, while some euro area countries have only tentatively or not yet entered that market.

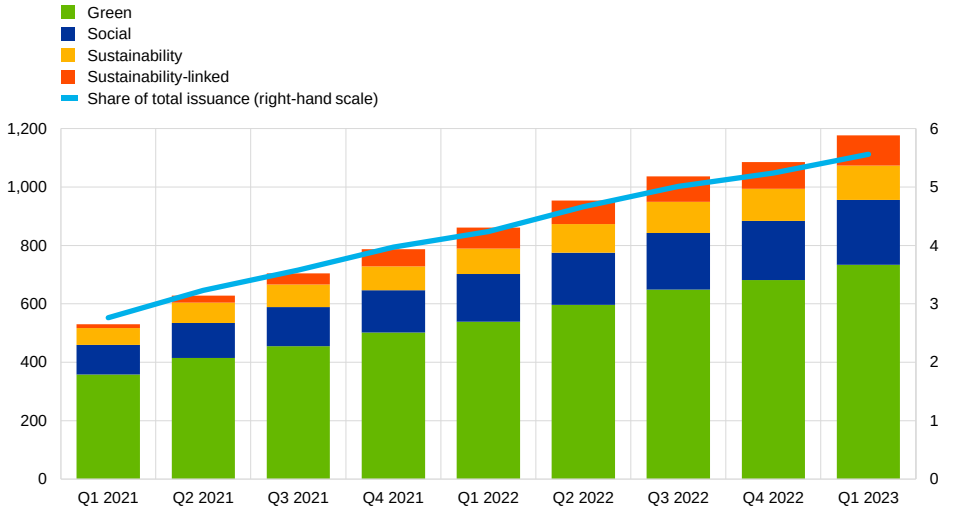
2 See "Towards climate-related statistical indicators", Statistics Committee of the ESCB, ECB, January 2023.

3 Transition risks are associated with the transition to a low-carbon economy and may result from the phasing-in of carbon taxes, pricing of emissions rights, changing behaviours and consumption patterns, and environmental regulations. Physical risks tend to be both acute and chronic.

Chart A

Euro area issuance of sustainable debt securities

(left-hand scale: EUR billions, outstanding amounts at face value; right-hand scale: percentages)

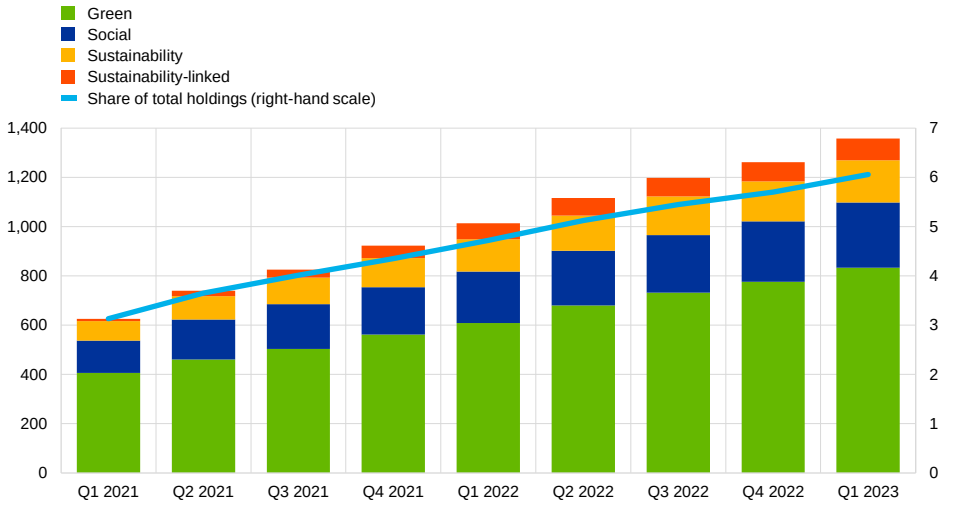


Source: CSDB.
Notes: The observed amounts are for the last day of the reference period. The share of total issuance represents the amount of all sustainable securities as a share of the outstanding amounts of all debt securities issued in the euro area.

Chart B

Euro area holdings of sustainable debt securities

(left-hand scale: EUR billions, outstanding amounts at face value; right-hand scale: percentages)



Sources: CSDB and SHSS.
Notes: The observed amounts are for the last day of the reference period. The share of total holdings represents the amount of all sustainable securities as a share of the holding amounts of all debt securities in the euro area.

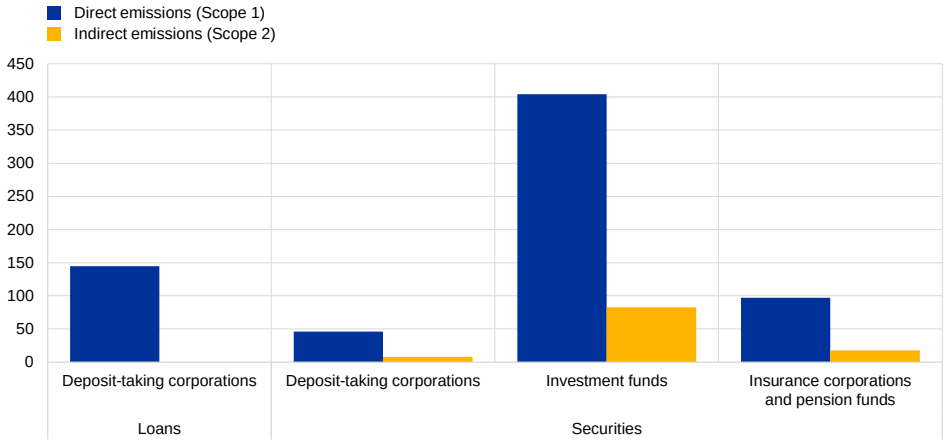
The indicators published by the ESCB provide data on the carbon emissions of non-financial corporations that have been financed by the financial sector's loan and securities portfolios. Carbon emissions, which are a major contributor to climate change, refer to the release of carbon dioxide and other greenhouse gases into the atmosphere, primarily from human activities such as burning fossil fuels.

In its current stage of development, the carbon emissions dataset is best suited to identifying high-level structural relationships across financial sectors, rather than looking at trends over time. The indicators suffer from time-varying coverage and are not adjusted for valuation effects. This is expected to change in the next data release. Chart C shows data on the direct and indirect emissions financed by the financial sector according to type of financial institution, using 2018-2021 averages to partially deal with the time variation. In absolute terms, investment funds are the largest group financing direct emissions, which mirrors their large portfolio size in the breakdown. Chart D, which standardises financed emissions by financed revenues to account for how efficiently emissions are used to produce goods and services, shows that deposit-taking corporations tend to have the largest exposure to the most carbon-intensive sectors. This is despite deposit-taking corporations financing a relatively small share of absolute direct emissions when compared with investment funds. Looking deeper into the underlying data, this relationship is driven primarily by their holdings of equities, as these account for the majority of the total Scope 1 emissions for the euro area.

Chart C

Direct and indirect emissions financed by the financial sector, broken down by type of financial institution

(euro area, million tonnes of CO2, 2018-2021 averages)

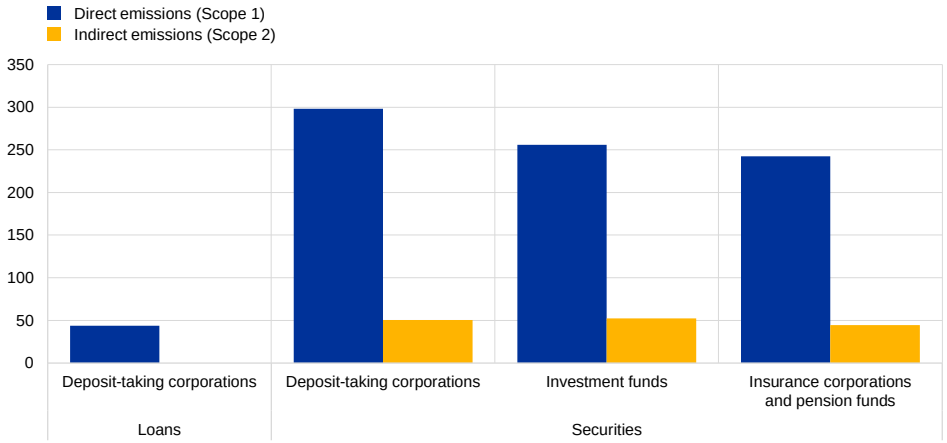


Sources: ESCB calculations based on data from AnaCredit, SHSS, Institutional Shareholder Services (ISS), Refinitiv, EU Emissions Trading System (EU ETS), Eurostat Air Emissions Accounts (AEA) and Orbis by Bureau van Dijk.
Notes: Loans are computed at the individual entity level. Securities include listed shares and debt securities and are computed at the group level. "Deposit-taking corporations" does not include central banks. "Direct emissions" and "Indirect emissions" refer to the covered financing volume only and will be higher once coverage is increased. Data accuracy is affected by composition, price and exchange rate effects.

Chart D

Intensity of direct and indirect emissions financed by the financial sector, broken down by type of financial institution

(euro area, tonnes of CO2 emissions per EUR million of revenue, 2018-2021 averages)



Sources: ESCB calculations based on data from AnaCredit, SHSS, ISS, Refinitiv, EU ETS, AEA and Orbis by Bureau van Dijk.
Notes: Loans are computed at the individual entity level. Securities include listed shares and debt securities and are computed at the group level. "Deposit-taking corporations" does not include central banks. Indirect emissions refer to the covered financing volume only and will be higher once coverage is increased. Data accuracy is affected by price and exchange rate effects.

Efforts are being made at the international level to harmonise definitions and establish common frameworks, such as the EU Taxonomy Regulation[4], which aims to provide a common language for sustainable activities. For the carbon emissions and physical risk indicators, issues relating to the availability and quality of data and variations in calculation methodologies are the main drivers of uncertainty. Issues such as future greenhouse gas emission pathways, natural climate variability and complex feedback mechanisms can also contribute to high uncertainty in climate projections. For these reasons, both sets of indicators are currently being classed as analytical.

Physical risk indicators measure the direct consequences of climate-related events such as extreme weather events, rising sea levels and changes in temperature patterns. The physical risk indicators that have been developed examine the susceptibility of various economic sectors financed by the financial sector to climate change impacts stemming from selected physical hazards. This currently covers coastal flooding, river flooding, wildfires, landslides, subsidence, windstorms and water stress. By analysing these indicators, the ECB aims to evaluate the vulnerability of economic activities to physical risks. In the first release of climate data, the ECB provided a set of indicators to measure and monitor these physical risks in the financial sector loan and securities portfolios.

One of the published set of indicators for physical risks is the normalised exposure at risk (NEAR) indicator. NEAR combines expected annual losses and financial exposure that companies have with financial institutions and relates them to the company's revenues or total assets. It is expressed as an annual amount of

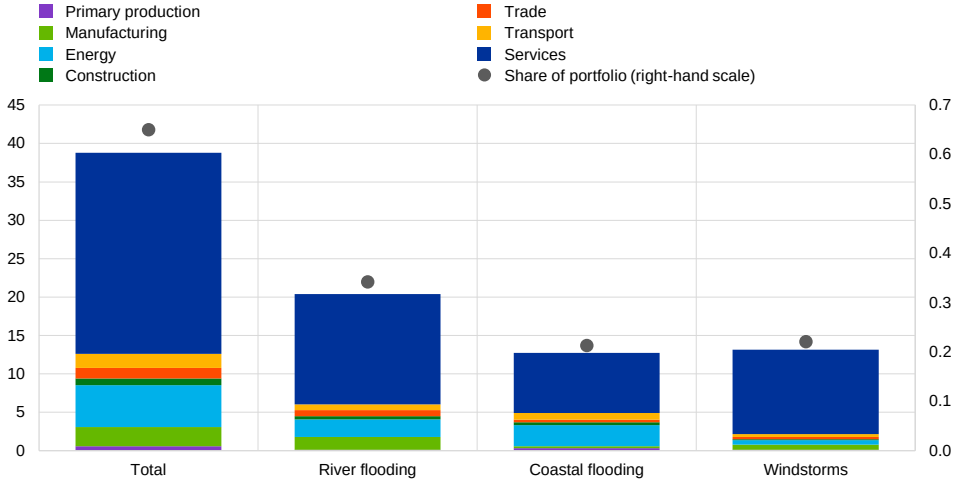
4 Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (OJ L 198, 22.6.2020, p. 13).

financial exposure at risk. As can be seen from Chart E, the distribution across sectors broadly reflects the share of each sector in terms of total financial assets, with services having the largest share, at around 67%. Compared with other sectors, the energy sector is proportionally more exposed to floods, which may be due to energy companies having relatively high levels of fixed assets that need to be located close to water sources. However, it should be emphasised that drawing conclusions of this nature requires caution, owing to the difficulty of obtaining accurate information as to the exact location of assets at risk.[5]

Chart E

Normalised exposure at risk (NEAR), broken down by sector

(euro area, left-hand scale: EUR billions; right-hand scale: percentage of loans and securities portfolios)



Sources: ESCB calculations based on data from AnaCredit, SHSS, Joint Research Centre, Copernicus and Orbis by Bureau van Dijk.
Notes: Information in this chart is based on expected annual damages caused to physical company assets by each hazard. Protection measures, insurance and collateral are not taken into account. AnaCredit and SHSS data are for December 2020.

The ECB's climate change indicators represent a step towards providing high quality tools to measure and monitor climate-related risks to the euro area economy. These statistics cover sustainable finance, carbon emissions and physical risks, allowing policymakers to make informed decisions and formulate effective policy strategies. By promoting the understanding and consideration of these risks, the ECB is contributing to the development of a more sustainable and resilient financial system in the face of the challenges posed by climate change. The indicators remain under development and the ESCB is actively seeking feedback from stakeholders on their construction and plausibility. Making an encompassing set of indicators available to analysts, policymakers and the public is a complex endeavour, requiring close interaction with the appropriate stakeholders and a heavy reliance on the availability of suitable, good-quality input data. Provision of the latter is expected to improve as a result of many initiatives at the EU and international levels, including the G20 Data Gaps Initiative[6] and work being undertaken by the Central Banks and Supervisors Network for Greening the Financial System[7], among

5 Available data tend to show where the parent company that took out the loan is located, rather than the location of the actual asset itself.

6 See the International Monetary Fund's website.

7 See the Network for Greening the Financial System's website.

others. The availability of these data in line with intended deadlines and level of quality is an important element in the further enhancement of the climate-change indicators.

5 Underlying inflation measures: an analytical guide for the euro area

Prepared by Marta Bańbura, Elena Bobeica, Katalin Bodnár, Bruno Fagandini, Peter Healy and Joan Paredes

Developments in underlying inflation are a key input for the ECB's monetary policy assessment. In making monetary policy decisions in an environment of elevated uncertainty, the ECB's Governing Council has stressed the need to pay particularly close attention to the implications of the incoming data for the inflation outlook, *developments in underlying inflation*, and the strength of monetary policy transmission.[1] Underlying inflation measures should capture more persistent and generalised developments across prices, abstracting from volatile or idiosyncratic relative price movements, and thereby provide an informative signal about where headline inflation will settle in the medium term. Ideally, such measures should have a sound theoretical grounding, economic interpretability and be easy to communicate to the public.

Practitioners and theorists apply different definitions to underlying inflation, so clarifications are warranted. Sometimes the term "underlying inflation" is used interchangeably with the notions of "core inflation" and "trend inflation". In the ECB's economic analysis, the concepts of underlying inflation and trend inflation are distinguished by the horizon over which shocks dissipate. Conceptually, underlying inflation reflects medium-term inflation developments linked to the business cycle, whereas trend inflation captures more persistent, longer-term components related to structural factors. At the ECB, core inflation refers to the Harmonised Index of Consumer Prices (HICP) excluding energy and food. As this excludes the volatile energy and food components that are subject to frequent transitory shocks, it is also considered to be a specific measure of underlying inflation.

Underlying inflation is unobservable, so the ECB hedges against this intrinsic uncertainty by monitoring a range of measures.[2] Underlying inflation is a theoretical concept and needs to be estimated. All the estimated measures seek to filter out the more transitory component of inflation and can be categorised into three broad estimation approaches. Permanent exclusion-based measures exclude certain fixed items that tend to be more volatile, such as energy or food. Temporary exclusion-based measures remove items that exhibit more volatile dynamics in certain months, on a time-varying basis. Model-based measures rely on economic relations to capture the persistent component of inflation in a theoretically more rigorous manner. Each of these approaches is included in the ECB's comprehensive

1 See Lane, P. R., "Underlying inflation", lecture at Trinity College Dublin, 6 March 2023 and Lagarde, C., "Monetary Policy Statement", 4 May 2023. For an introduction to the analysis of underlying inflation at the ECB, see the article entitled "Measures of underlying inflation for the euro area", *Economic Bulletin*, Issue 4, ECB, 2018. The importance of underlying inflation for monetary policy decision-making was highlighted in the ECB's 2021 monetary policy strategy review.

2 This box focuses on underlying inflation measures that are based on (disaggregated) HICP data. However, a large set of additional variables containing information about medium-term price pressures is also assessed regularly. These include wage, profit and inflation expectation indicators as well as high-frequency indicators such as wage trackers and surveys.

assessment of inflation. Table A lists some of the key measures that are monitored at the ECB and evaluated in this box.[3] The set of indicators is regularly reviewed and updated.

Table A

Definitions of key underlying inflation indicators at the ECB

Broad estimation method	Measure	Definition
Permanent exclusion-based measures	HICP excluding energy	All HICP items except energy
	HICP excluding unprocessed food and energy	All HICP items except unprocessed food and energy (processed food is included)
	HICPX (core)	HICP excluding energy and food
	HICPXX	HICP excluding energy, food, air travel-related items, clothing and footwear
Temporary exclusion-based measures	Domestic inflation	HICPX items for which the import intensity does not exceed 18%[1]
	Trimmed means	HICP excluding items with the highest and lowest year-on-year change in each month, representing 10% or 30% of the weight of HICP at the tails of the weighted distribution
	Weighted median	Keeps the item located at the mid-point of the weighted distribution each month
Model-based measures	Persistent and Common Component of Inflation (PCCI), PCCI excluding energy	The common and persistent component across HICP items from 12 euro area countries (around 1,000 series) extracted based on a dynamic factor model. For PCCI excluding energy, only common components of non-energy items are aggregated.[2]
	Supercore	Aggregates HICPX items sensitive to slack, as measured by their forecast performance in a reduced-form Phillips curve using the output gap[3]

Source: ECB.
1) See the box entitled "A new indicator of domestic inflation for the euro area", *Economic Bulletin*, Issue 4, ECB, 2022.
2) The PCCI captures the common and persistent components from the European classification of individual consumption according to purpose (ECOICOP) four-digit classes of HICP items from 12 euro area countries (around 1,000 series); for the PCCI excluding energy, only common components of non-energy items are aggregated. It uses a dynamic factor model to filter out idiosyncratic and transitory developments in individual HICP items and aggregates the resulting common components using HICP weights. See Bańbura, M. and Bobeica, E., "PCCI – a data-rich measure of underlying inflation in the euro area", *Statistics Paper Series*, No 38, ECB, October 2020.
3) See Box 2 in "Measures of underlying inflation for the euro area", op. cit.

Empirically, most measures of underlying inflation provide a useful signal for medium-term headline inflation developments in the euro area. Their desirable properties are usually assessed against a set of statistical criteria that test whether a measure is less volatile than headline inflation, is an unbiased estimator of it and has some out-of-sample predictive power for medium-term inflation.[4] All measures of underlying inflation are less volatile than headline inflation because they remove some of the noise affecting the headline rate (yellow bars in Chart A). For most of these measures, the long-term average is lower than that of headline inflation, meaning they are somewhat biased indicators (blue bars in Chart A). This is because, over the available sample period for the euro area, volatile components such as energy and food were mostly subject to upside shocks and grew faster than the other components. The current value of the underlying inflation measures provides, on average, a better medium-term forecast of the future headline rate than

3 For more details, see "Measures of underlying inflation for the euro area", *op. cit.* and Lane, P. R., "Inflation Diagnostics", *The ECB Blog*, 25 November 2022.

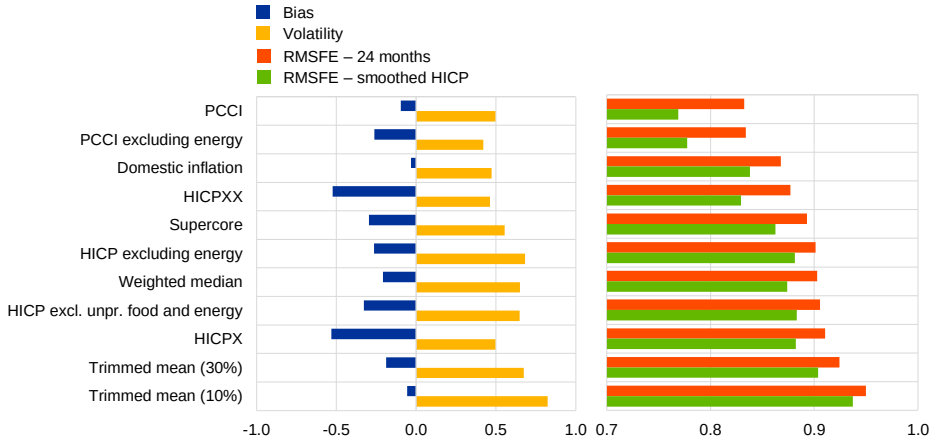
4 Headline inflation tends to lead most measures of underlying inflation (including core) as it captures energy shocks more directly, whereas underlying inflation measures do so with a delay owing to indirect effects. However, these measures can still be indicative of where inflation will settle in the medium term.

the current value of the headline rate itself.[5] This is indicated by the measures' root mean squared forecast error (RMSFE) with respect to future inflation 24 months ahead relative to that of headline itself (red bars in Chart A). The same holds when predicting a smoother version of headline inflation, proxied here by a centred two-year moving average (green bars in Chart A).[6] A few measures tend to perform well across the criteria, namely the PCCI measures, domestic inflation and HICPXX. These exhibit the lowest volatility and achieve the lowest RMSFE.[7]

Chart A

Properties of underlying inflation measures

(bias: percentage points; volatility: standard deviation; RMSFE: no units)



Sources: Eurostat and ECB calculations.
Notes: The bias is the average contemporaneous difference vis-à-vis headline inflation. Volatility is the standard deviation of each measure divided by the standard deviation of headline inflation. RMSFE 24 months and RMSFE smoothed HICP are the root mean squared forecast errors of each measure with respect to headline inflation 24 months ahead and the two-year centred moving average of inflation covering two-years of future data, respectively, divided by the RMSFE of headline inflation. A number lower than one indicates that the measure performs better than headline inflation. The sample covers the period from April 2001 to June 2023. For definitions of the indicators, see Table A.

The relative forecasting performance of the different measures varies over time, but the PCCI measures, domestic inflation and HICPXX tend to perform better. This is confirmed when employing a forecast combination algorithm designed to minimise the two-year ahead RMSFE. Over time, the algorithm tends to pick one or more of these measures (Chart B). At the same time, certain permanent exclusion-based indicators and trimmed indicators are consistently absent from the optimal forecast combination, suggesting that these do not provide useful signals over and above those provided by other measures. It is worth noting that while HICPXX scores well in terms of RMSFE, it does have a rather large negative bias, as shown in Chart A.

5 This corresponds to a "random walk forecast", i.e. the forecast is the same as the current value.

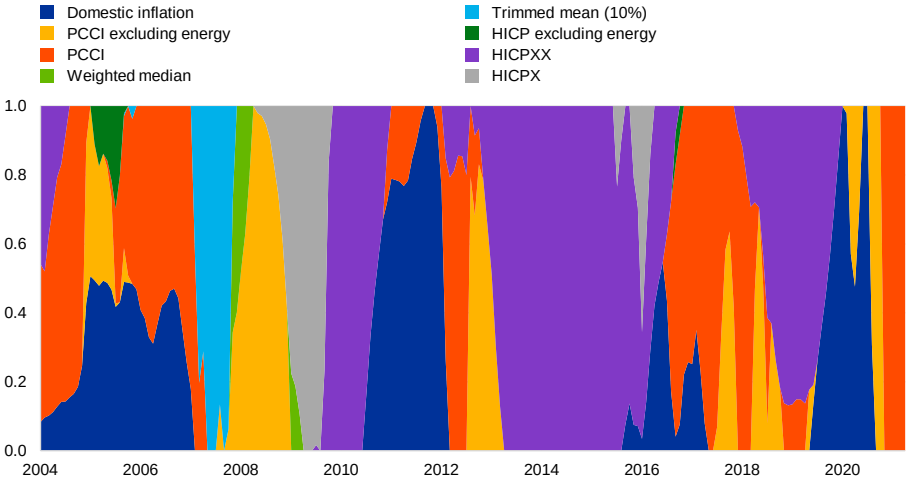
6 The last evaluation of the underlying inflation indicators was carried out as part of the monetary policy strategy review in 2021. See "Inflation measurement and its assessment in the ECB's monetary policy strategy review", *Occasional Paper Series*, No 265, ECB, September 2021.

7 It should be noted that data revisions are not taken into account in the analysis. This is particularly relevant for the PCCI. As a model-based measure, it is revised as new data become available and the model parameters are re-estimated, but the direction is generally robustly estimated. In a real-time setting, the performance of the PCCI deteriorates, but it remains competitive compared with other measures of underlying inflation.

Chart B

Underlying inflation measures selected in an optimal forecast combination

(weight assigned to minimise the RMSFE 24 months ahead over a three-year rolling window)



Source: ECB staff calculations.
Notes: Optimal weights for combining the 11 underlying inflation measures described in Table A to forecast headline inflation 24 months ahead. The latest observations are for June 2021 (corresponding to the forecast for the June 2023 HICP).

As a result of recent major economic dislocations, a sizeable and possibly more slowly reverting transitory element is now embedded in underlying inflation measures, rendering them less informative for the medium term. The surge in inflation since the middle of 2021 has been the product of extraordinary relative price shocks related to the post-pandemic recovery, supply bottlenecks and the rise in energy prices linked in part to Russia's war against Ukraine. These shocks turned out to be larger and their effects possibly more persistent than in the past. In this context, standard measures of underlying inflation may contain a sizeable "reverting" component that can be expected to fade out over the medium term.[8] One way to adjust for the impact of these exceptional shocks is to use a model to assess their impact on inflation over the last few years. Chart C shows a counterfactual underlying inflation range based on such a model when energy shocks (oil supply, oil-specific demand and gas price shocks) and shocks linked to global supply chain disruptions are filtered out as far as possible.[9] This indicative filtering-out of the energy and supply bottleneck shocks shifts down and narrows the range of underlying inflation measures, reflecting the sizeable contribution of these shocks in the current measures. Eliminating other transitory shocks – such as reopening effects and the shocks driving a significant part of the recent rise in food prices – or allowing for possible non-linear effects would shift the range even lower. Similarly, if

8 See Lane, P. R., "Underlying inflation", op. cit.

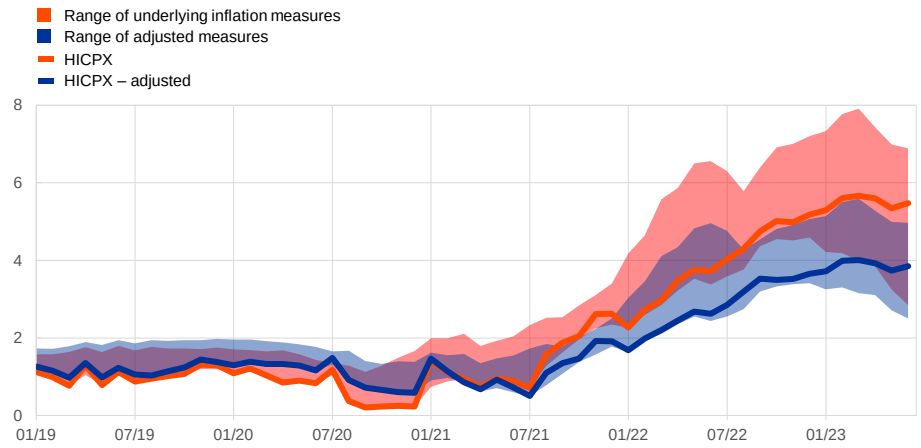
9 A large Bayesian vector autoregressive (BVAR) model identified with zero and sign restrictions is used to decompose the underlying inflation measures into contributions from various shocks following the methodology of Korobilis and estimated from January 1995 to June 2023. See Korobilis, D., "A new algorithm for structural restrictions in Bayesian vector autoregressions", *European Economic Review*, Vol. 148, September 2022; and Bańbura, M., Bobeica, E. and Martínez Hernández, C. "What drives core inflation? The role of supply shocks" (forthcoming). In the counterfactual scenario, the contribution of the oil supply, oil-specific demand, gas price and supply bottleneck shocks is set to zero. One caveat to this in the present context is that the impact of these shocks may also include persistent elements that also remain over the medium term. The counterfactual range is based only on those underlying inflation measures for which a seasonally adjusted index was available; trimmed means are not considered.

part of the energy and supply bottleneck shocks also generated medium-term inflation pressures, this would shift the range upwards.

Chart C

Range of underlying inflation measures and measures adjusted for impact of supply bottleneck and energy shocks

(annual percentage growth)



Sources: Eurostat and ECB staff calculations.
Notes: Adjustments based on Bańbura, M., Bobeica, E. and Martínez Hernández, C., "What drives core inflation? The role of supply shocks" (forthcoming) using a large BVAR model accounting for many drivers of inflation (17 variables), identified with zero and sign restrictions and estimated from January 1995 to June 2023. The latest observations are for June 2023.

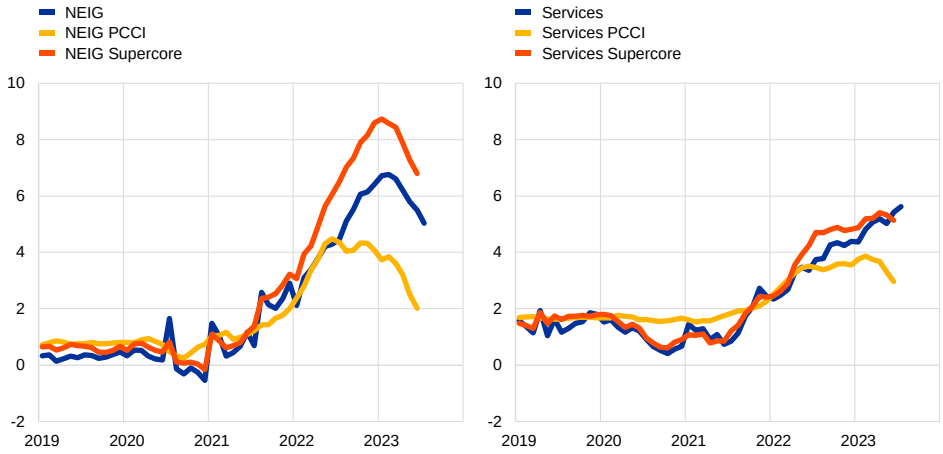
Domestic inflationary forces are becoming more prominent, while external pressures are to a large extent softening. Distinguishing between services and goods inflation can help to gauge the persistent component in inflation, particularly following the pandemic. Goods were more affected by supply bottlenecks and were subject to relatively higher demand during the pandemic. As a result, non-energy industrial goods (NEIG) inflation, which accounted for around 20% of HICPX before the pandemic, contributed around half of it at the beginning of 2023. With the supply bottlenecks and the pandemic-related surge in goods demand fading out, goods inflation is less likely to be persistent, whereas the dynamics of services inflation may determine the overall persistence of headline inflation.[10] PCCI and Supercore calculated separately for NEIG and services also confirm that the recent easing of core inflation is mainly driven by the NEIG component rather than services. However, the PCCI, which is, by construction, better at capturing the momentum of a series, appears to have started to decline for services too (Chart D).

[10] Other major central banks have also been focusing on services inflation recently. In the United States, the services category is further broken down into housing services and core services other than housing. The latter "may be the most important category for understanding the future evolution of core inflation". See Powell, J. H., "Inflation and the Labor Market", speech at the Hutchins Center on Fiscal and Monetary Policy, Brookings Institution, Washington, D.C., 30 November 2022.

Chart D

Goods and services inflation

(annual percentage growth; PCCI: three-month moving average of annualised month-on-month growth rates)



Sources: Eurostat and ECB calculations.
Note: The latest observations are for June 2023 for PCCI and Supercore and July 2023 for NEIG and services inflation.

Although most measures are showing signs of easing, underlying inflation remains high overall. The indicators stood between 2.9% (PCCI) and 6.9% (HICP excluding energy) in June. The measures that have ranked highly against the set of criteria for signalling medium-term headline inflation developments (PCCI measures, HICPXX and domestic inflation) lie in the lower half of the range (darker shaded area in Chart E). Median and mean underlying inflation measures suggest that underlying inflation likely peaked in the first half of 2023, particularly when looking through the upward base effect caused by the introduction of the 9 euro ticket in Germany in June 2022.[11] The estimates of the adjusted indicators, which ranged from 2.5% to 5.0% in June, also show some signs of easing. However, the range of the underlying inflation measures remains much wider than before 2022, which suggests there is still a high degree of uncertainty as to the level of underlying inflation. At the same time, the easing of underlying inflation comes with an ongoing shift in inflationary forces from external to domestic sources. This is notably reflected in the divergent dynamics of the PCCI, which is falling fast – in part due to its sensitivity to the rapid fall in energy prices – and the domestic inflation indicator, which has not yet shown any sign of deceleration.[12]

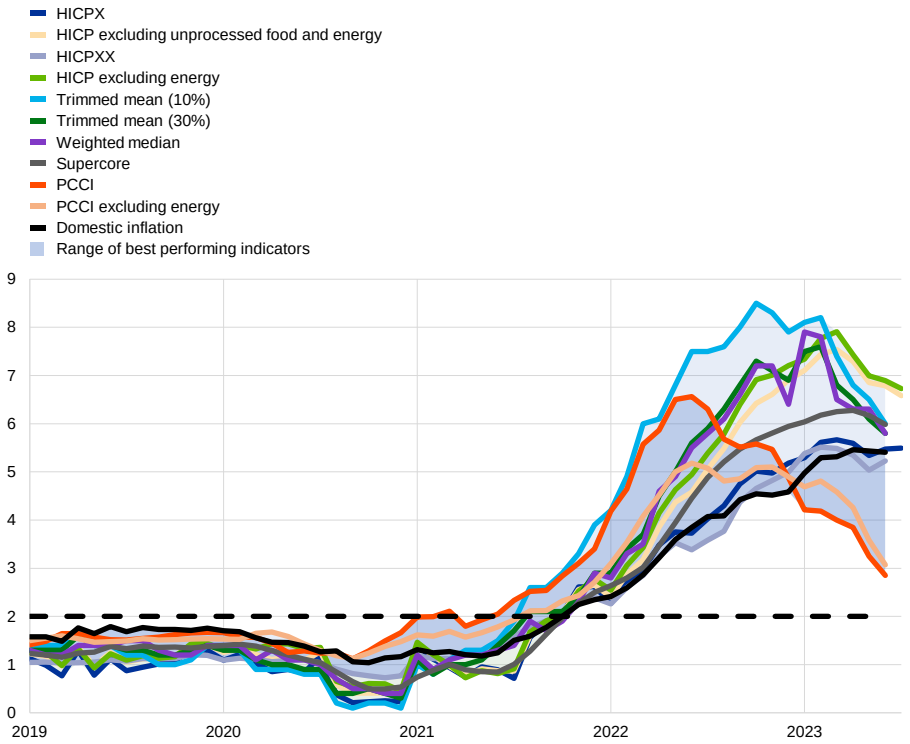
11 This had a downward impact on travel services prices between June 2022 and September 2022 and increased the year-on-year growth rate of these items in June 2023. Several measures, in particular those at the higher end of the range and the permanent exclusion-based measures, are distorted by this base effect.

12 Unlike most other measures of underlying inflation, the PCCI does not a priori exclude energy, just its estimated transitory component. The PCCI measures are estimated based on the more timely month-on-month rate of change of prices, whereas the other measures are expressed as year-on-year growth rates and tend to lag somewhat. This timeliness makes the PCCI better placed to capture the momentum of inflationary pressures.

Chart E

Indicators of underlying inflation and the best performing indicators

(annual percentage growth; PCCI and PCCI excluding energy: three-month moving average of annualised month-on-month growth rates)



Sources: Eurostat and ECB calculations
Notes: The darker shaded area covers the PCCI measures, HICPXX and domestic inflation. The latest observations are for July 2023 for HICPX, HICP excluding unprocessed food and energy and HICP excluding energy and June 2023 for the rest.

Underlying inflation measures are updated with each HICP release and developments need to be carefully assessed against the inflation outlook on a regular basis. Along with underlying inflation and indicators of monetary policy transmission, incoming data – also in the form of projection errors and special factors, such as base effects – can provide valuable information on the risks to medium-term inflation. In this respect, the additional data point provided by the flash estimate for HICP inflation in July confirms the assessment of underlying inflation developments (Chart E). In particular, HICPX, which stands at 5.5%, remained broadly unchanged rather than declining. This was expected given the distorting base effects mentioned above.

Continuously monitoring underlying inflation can help in assessing whether the latest Eurosystem/ECB staff macroeconomic projections are on track, especially in an environment of elevated uncertainty. In the current situation, the mostly stable or decreasing path of underlying inflation indicators from their high levels is broadly in line with the inflation outlook in the latest Eurosystem staff macroeconomic projections. The disinflationary path in these projections is consistent with the fading-out of the reverting component – connected to the last year's surge in energy prices and pandemic-related supply bottlenecks – that had contributed to the sharp increases in underlying inflation measures. The differences across the range of underlying inflation measures are also in line with the

assessment in the June projections that the external drivers of inflation should fade out, with the dynamics of domestic components of inflation determining the overall persistence of the inflation process. This assessment underlines the value of complementing the tracking of underlying inflation measures with close monitoring of the factors that are likely to determine domestic price pressures over the medium term, notably the incoming data on wages, profits and inflation expectations.

6 Changes in the investor base for euro area non-financial corporate bonds and implications for market pricing

Prepared by Taneli Mäkinen and Lia Vaz Cruz

The non-financial corporate bond market in the euro area has grown substantially over the past decade as issuance responded to strong private and public sector demand. This became particularly pronounced following the introduction of the ECB's corporate sector purchase programme (CSPP) in 2016.[1] Owing to sustained positive net issuance, the amount of CSPP-eligible bonds outstanding doubled between 2016 and 2022 to a total of €1.5 trillion. Net of Eurosystem holdings, it grew by around 50% to reach €1.1 trillion in 2022.[2] Despite the substantial growth in this segment, there was no upward trend in swap spreads on eligible bonds over the period, suggesting that new issuances were met by strong demand (Chart A).[3] While demand for CSPP-eligible securities rose across all private sector investor groups, their holdings grew at markedly different rates, implying a change in relative holdings between 2016 and 2022. This heterogeneity sheds light on how private sector investors absorb increases in supply.[4]

1 For a description of the growth of the CSPP universe and eligibility, see, for example, the article entitled "The impact of the corporate sector purchase programme on corporate bond markets and the financing of euro area non-financial corporations", *Economic Bulletin*, Issue 3, ECB, 2018.

2 The analysis confines itself to the CSPP-eligible universe, as this allows private sector demand to be disentangled from public sector demand. The CSPP universe includes bonds issued by non-bank financial institutions, but it is mostly composed of investment-grade bonds of non-financial corporations and therefore serves as a good proxy for the euro area non-financial corporate bond market.

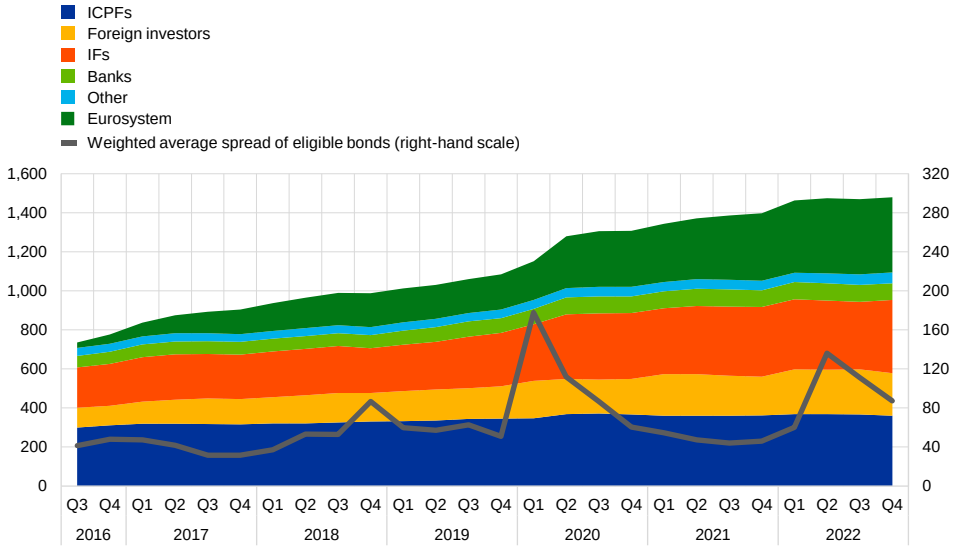
3 While the average share of bonds in debt financing has increased over time, loans remain the dominant source of financing for euro area firms. One factor that has contributed to the decrease in the relative importance of loans in the capital structure is the reduction in the cost of financing via debt securities compared with bank loans, which can in part be attributed to the introduction of the CSPP. For more details on these developments, see, for example, Work stream on non-bank financial intermediation, "Non-bank financial intermediation in the euro area: implications for monetary policy transmission and key vulnerabilities", *Occasional Paper Series*, No 270, ECB, September 2021.

4 For complementary analyses of the Eurosystem holdings of corporate bonds and their market implications, see Zaghini, A., "The CSPP at work: Yield heterogeneity and the portfolio rebalancing channel", *Journal of Corporate Finance*, Vol. 56, June 2019, pp. 282-297; Todorov, K. "Quantify the quantitative easing: Impact on bonds and corporate debt issuance", *Journal of Financial Economics*, Vol. 135, February 2020, pp. 340-358; Arce, Ó, Mayordomo, S. and Gimeno, R., "Making Room for the Needy: The Credit-Reallocation Effects of the ECB's Corporate QE", *Review of Finance*, Vol. 25, February 2021, pp. 43-84; and Zaghini, A. and De Santis, R.A., "Unconventional monetary policy and corporate bond issuance", *European Economic Review*, Vol. 135, June 2021.

Chart A

Holdings of CSPP-eligible securities across sectors

(left-hand scale: EUR billions; right-hand scale: basis points)



Sources: ECB, Intercontinental Exchange and ECB calculations.
Notes: "Eurosystem" refers to the holdings of CSPP-eligible securities under the CSPP and the pandemic emergency purchase programme (PEPP). The spread is based on the option-adjusted swap spread of CSPP-eligible bonds, weighted by the bonds' nominal value.

The distribution of CSPP-eligible bonds across the private sector changed significantly from 2016 onward, with a decline in the relative presence of insurance corporations and pension funds (ICPFs). In 2016, euro area ICPFs were the largest holders of CSPP-eligible bonds, with a market share of 41% (Chart B). Thereafter, the market share of ICPFs steadily declined, falling to 24% by the end of 2022.[5] The decrease is attributable not only to the increase in the Eurosystem's CSPP holdings but also to investment funds (IFs) and foreign investors increasing their holdings at a faster pace than ICPFs.[6] As a result, the private sector investor base became less concentrated, with the holdings of IFs recently becoming larger than those of ICPFs.

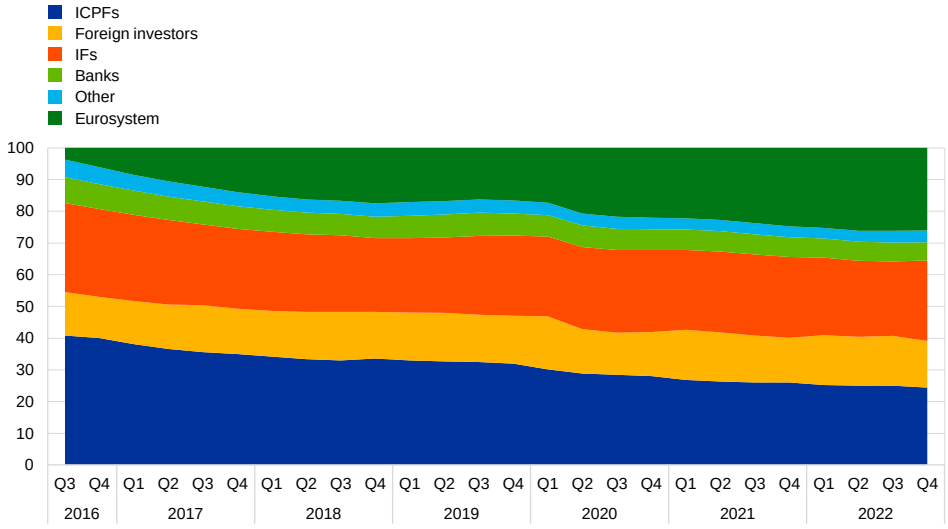
5 Excluding the holdings of the Eurosystem, the market share of ICPFs decreased from 43% in 2016 to 33% in 2022.

6 The holdings of ICPFs grew less partly because their assets under management did not grow as significantly as those of other large investor groups over the period.

Chart B

Distribution of CSPP-eligible securities holdings across sectors

(percentages)



Sources: ECB and ECB calculations.
Notes: The chart shows the holdings of each institutional sector as a percentage of the total.

The changes in the distribution of bond holdings implies, under low market stress, a stronger response of private sector demand for euro area non-financial corporate bonds to increases in spreads. Total private sector demand, obtained by aggregating the demands of the constituent investor groups weighted by their holdings, is found to respond positively to a contemporaneous increase in bond spreads. However, this aggregate response masks heterogeneity across investor groups: while ICPFs are estimated[7] to display a negative elasticity of corporate bond demand with respect to spreads (i.e. they reduce their holdings of CSPP-eligible securities when spreads rise), IFs, foreign investors and banks tend to increase their CSPP-eligible holdings when spreads rise (Chart C, panel a).[8] Therefore, the reduction in the market share of ICPFs serves to make the aggregate elasticity of demand with respect to spreads more positive. These empirical relations can,

7 The corporate bond demand of each investor group is estimated using the framework in Koijen, R.S.J. and Yogo, M., "A Demand System Approach to Asset Pricing", *Journal of Political Economy*, Vol. 127, No 4, 2019, pp. 1475-1515. To limit the possible influence of the CSPP on the demand elasticity of each investor group, the sample period excludes quarters in which Eurosystem purchases were particularly elevated. For related evidence of demand elasticities across the private sector, see the box entitled "The Eurosystem's asset purchase programme, risk-taking and portfolio rebalancing", *Financial Stability Review*, ECB, May 2019.

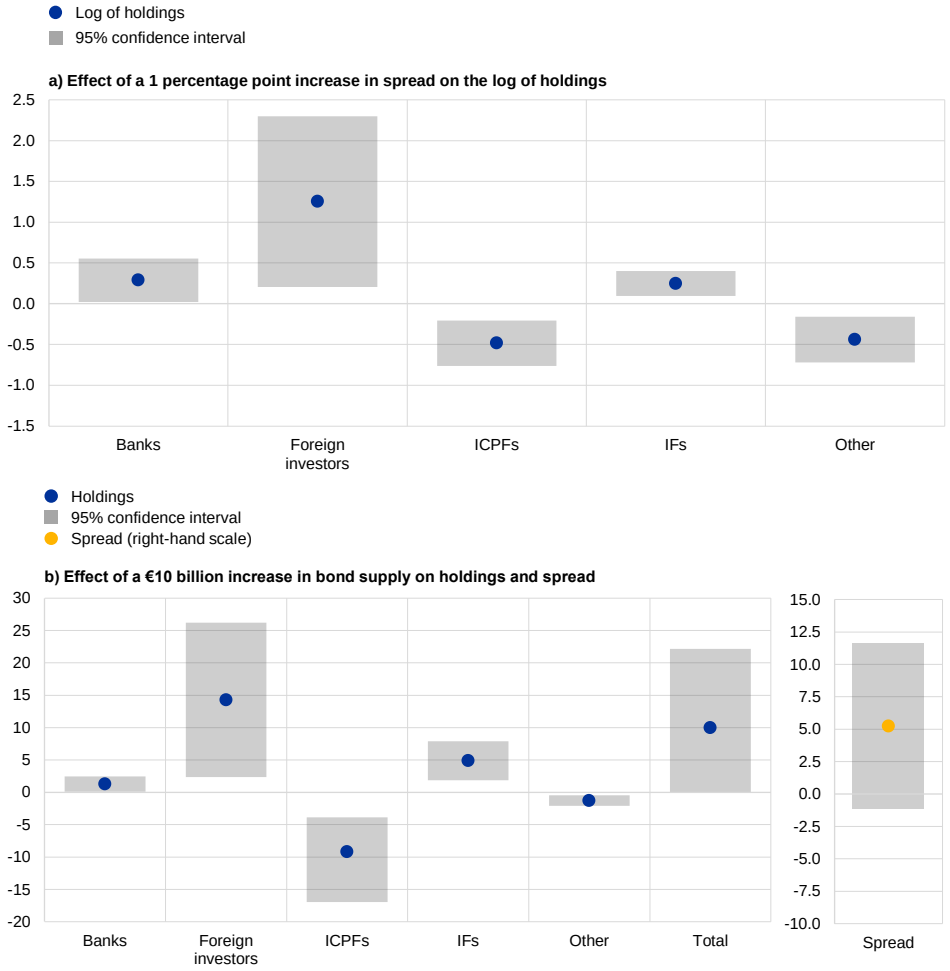
8 Euro area private sector investors other than banks, IFs and ICPFs also moderate the positive response, but only marginally as their holdings of CSPP-eligible bonds are relatively small. The negative elasticity of demand to spreads of this investor group is entirely attributable to the behaviour of households. For related evidence on the asset demands of the household sector, see Gabaix, X., Koijen, R.S.J., Mainardi, F., Oh, S.S. and Yogo, M., "Asset Demand of U.S. Households", *mimeo*, 2022.

however, reflect the specific sample period characterised by low interest rates and may change in the future.[9]

Chart C

Private sector demand for CSPP-eligible securities

(panel a: log EUR billions; panel b: left-hand scale: EUR billions; right-hand scale: basis points)



Sources: ECB, Intercontinental Exchange and ECB calculations.
Notes: Panel a) shows the estimated effects of 1 percentage point increase in the spread of CSPP-eligible bonds on the logarithm of the holdings of each sector. Panel b) shows the effect of an unexpected €10 billion increase in the supply of CSPP-eligible bonds on the holdings of each sector and total private sector holdings (both in EUR billions) and on the equilibrium spread (in basis points). The effects are estimated over the periods Q2 2017 to Q3 2019 and Q1 2022 to Q4 2022 using instrumental variables and, for the IF sector, are obtained after excluding the holdings of IFs in Luxembourg and Ireland.

The higher responsiveness of private sector demand to spreads suggests an attenuated impact of increases in bond supply on spreads (Chart C, panel b). The observations of recent years indicate that ICPFs can amplify upward pressures on spreads originating from increases in bond supply, as they tend to sell bonds when spreads rise. Other private sector investors are left to absorb the increased

[9] For instance, using lagged returns (rather than contemporaneous spreads) and an earlier sample from 2004 to 2014, Timmer, Y., "Cyclical investment behavior across financial institutions", *Journal of Financial Economics*, Vol. 129, No 2, August 2018, pp. 268-286, finds that ICPFs act countercyclically, i.e. increase their holdings when holding period returns have been low. At the same time, he acknowledges the mixed empirical evidence in the literature, indicating both pro- and countercyclical behaviour of ICPFs, and asserts in particular that a low-interest rate environment may weaken the countercyclical behaviour.

supply as well as the bonds sold by ICPFs, implying a further increase in spreads to induce them to do so (when compared to a hypothetical situation in which ICPF holdings remain unchanged).[10] When ICPFs hold a lower share of the corporate bond market, this amplification can be proportionately weaker. For this reason, under low market stress, the decrease in the market share of ICPFs has moderated the effects of changes in bond supply on spreads compared to when ICPFs were the largest holders of CSPP-eligible bonds. This moderating effect could, however, weaken over time if the demand elasticities or the private sector investor base change, for example as a reaction to the Eurosystem reducing its holdings of euro area non-financial corporate bonds.[11]

[10] The amplification is analogous to that observed in the government bond market, where ICPFs respond to higher yields by decreasing their holdings, thereby exerting further upward pressure on yields. Such behaviour is due to the duration of the liabilities of ICPFs being more responsive to long-term interest rates than the duration of their assets. This implies that when government bond yields rise, the duration gap between the assets and liabilities of ICPFs decreases, which allows them to sell longer-term bonds. See Domanski, D., Shin, H.S. and Sushko, V., "The hunt for duration: Not waving but drowning?", *IMF Economic Review*, Vol. 65, International Monetary Fund, March 2017, pp. 113-153; the box entitled "Investment strategies of euro area insurers and pension funds: procyclical or countercyclical?", *Financial Stability Review*, ECB, November 2017; Koijen, R.S.J., Koulischer, F., Nguyen, B. and Yogo, M., "Inspecting the mechanism of quantitative easing in the euro area", *Journal of Financial Economics*, Vol. 140, 2021, pp. 1-20; and Carboni, G. and Ellison, M., "Preferred habitat and monetary policy through the looking-glass", *Working Paper Series*, No 2697, ECB, August 2022.

[11] In June 2023 the Governing Council decided to discontinue the reinvestments under the asset purchase programme as of July 2023.

7 The role of housing wealth in the transmission of monetary policy

Prepared by Paola Di Casola

House price growth is slowing across advanced economies as monetary policy is tightened around the world and the rapid rises observed during the coronavirus (COVID-19) pandemic tail off. Over recent years, many advanced economies experienced a significant rise in real house prices that became even more marked during the pandemic. Statistical tests point to strong house price growth in many countries during the pandemic, with some seeing annual increases in excess of 10% (Chart A).[1] Several forces were at play. First, the low interest rate environment of the last decade gave rise to search-for-yield behaviour that pushed up house prices. Second, fiscal support boosting household net worth, especially during the main period of the pandemic, made it possible for house price growth to remain elevated. And third, stronger demand for certain types of housing stemming in part from a shift in living preferences – in connection with the new working from home requirements and reduced need for commuting, among other things – also contributed.[2] This pattern in house prices went into reverse in 2022 as monetary policy began tightening around the world, with some countries starting to see smaller increases or even decreases in real house prices (Chart A).[3]

1 A modified unit root test following the approach in Pavlidis, E. et al., "Episodes of Exuberance in Housing Markets: In Search of the Smoking Gun", *The Journal of Real Estate Finance and Economics*, Vol. 53, Issue 4, 2016, pp. 419-449, is one possible test of exuberance in real house price growth. Updated estimates are provided by the Federal Reserve Bank of Dallas.

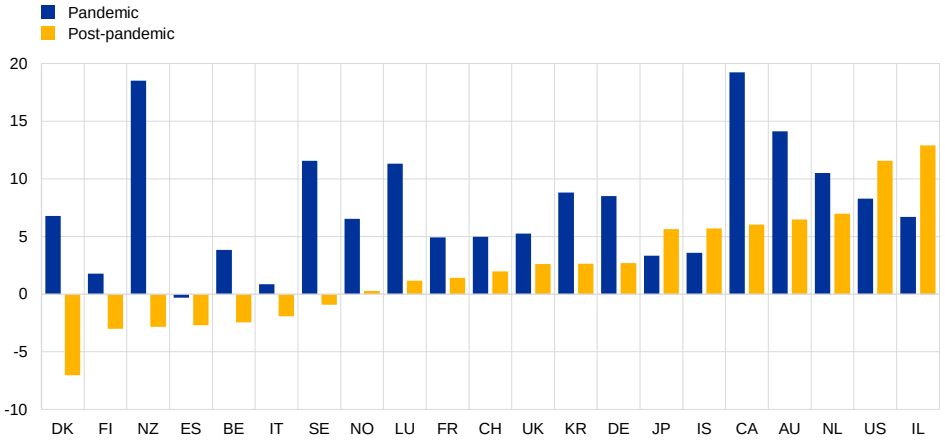
2 Based on analysis published in the box entitled "Drivers of rising house prices and the risk of reversals", *Financial Stability Review*, ECB, May 2022, using similar data and models.

3 For an overview of the global monetary policy stance, see the CFR Global Monetary Policy Tracker. For an analysis on how euro area households' perceptions of housing as a good investment have dropped recently, driven mainly by expectations of higher mortgage interest rates, see the box entitled "Why has housing lost its lure? Evidence from the ECB's Consumer Expectations Survey", *Economic Bulletin*, Issue 5, ECB, 2023.

Chart A

Real house price developments in advanced economies

(year-on-year percentage changes)



Sources: Federal Reserve Bank of Dallas and ECB calculations.
Note: "Pandemic" refers to the period from the first quarter of 2020 to the first quarter of 2022; "Post-pandemic" refers to the period from the second quarter of 2022 to the third quarter of 2022.

Housing is an important element in the transmission of monetary policy to the economy. Seminal academic papers have found a close link between housing and monetary policy transmission in DSGE models, for example.[4] In such models, the presence of borrowing-constrained home buyers strengthens monetary policy transmission through additional channels beyond the standard intertemporal substitution channel. One is the cash-flow channel, under which rising interest rates, for instance, increase the cost of mortgage repayments, thus reducing resources left for consumption; the second is the collateral channel, under which rising interest rates dampen the house prices that underpin collateral for mortgages, thus making constraints more binding.[5] The intensity of these channels is affected by specific features of a given country's mortgage market, such as the share of adjustable-rate mortgages (ARMs) or the level of household debt. Academic research has pointed towards a positive correlation between the share of ARMs and the strength of monetary policy transmission.[6] As for the level of household debt, there is some evidence to suggest a relationship with a stronger effect of monetary policy on GDP.[7]

4 See Iacoviello, M., "House Prices, Borrowing Constraints, and Monetary Policy in the Business Cycle", *American Economic Review*, Vol. 95, No 3, 2005, pp. 739-764; Iacoviello, M. and Neri, S., "Housing Market Spillovers: Evidence from an Estimated DSGE Model", *American Economic Journal: Macroeconomics*, Vol. 2, No 2, 2010, pp. 125-164; Gerali, A., Neri, S., Sessa, S. and Signoretti, F.M., "Credit and Banking in a DSGE Model of the Euro Area", *Journal of Money, Credit and Banking*, Vol. 42, Issue s1, 2010, pp. 107-141.

5 The intertemporal substitution channel means that, for example, rising interest rates incentivise agents to shift resources available today into savings, in order to increase consumption tomorrow.

6 See Corsetti, G., Duarte, J.B. and Mann, S., "One Money, Many Markets", *Journal of the European Economic Association*, Vol. 20, Issue 1, 2022, pp. 513-548; Calza, A., Monacelli, T. and Stracca, L., "Housing finance and monetary policy", *Journal of the European Economic Association*, Vol. 11, Issue s1, 2013, pp. 101-122.

7 See Gelos, R.G., Mancini Griffoli, T., Narita, M., Grinberg, F., Rawat, U. and Khan, S., "Has Higher Household Indebtedness Weakened Monetary Policy Transmission?", *IMF Working Papers*, No 2019/011, International Monetary Fund, 2019. For an analysis of Swedish data, see Di Casola, P. and Iversen, J., "Monetary policy with high household debt and low interest rates", *Staff Memo*, Sveriges Riksbank, October 2019, and Stockhammar, P., Strid, I. and Tornese, T., "How has the impact of the policy rate on consumption changed when the debt-to-income ratio has risen?", *Economic Commentary*, No 9, Sveriges Riksbank, 2022.

Thus, structural changes in the mortgage market and levels of household debt in the euro area are possible factors making the current tightening cycle different from previous ones. Given the limited time dimension available to study these questions empirically, this box presents evidence from a cross-country analysis.

The analysis relies on structural empirical models, building on recent literature and using comparable house price data and shadow rates to account for unconventional monetary policy as well. We estimate structural BVAR models for 19 advanced economies from the first quarter of 1995 to the first quarter of 2022; the analysis can be updated whenever new data become available. The sample includes most advanced economies for which comparable house price data are available, eight of which are members of the euro area.[8] In fact, euro area countries turn out to be rather dissimilar in terms of the effects of monetary policy on the economy because of factors that may be linked to the housing market. A cross-country analysis encompassing other advanced economies helps to rationalise these differences. The model includes the following variables: private consumption, consumer prices, credit to households, real house prices, an interest rate and the real effective exchange rate.[9] Regarding the interest rate, we use the policy rate or the shadow rate computed by Krippner (see footnote), since this is available for many countries where asset purchases were conducted by the respective central banks.[10] We also include a block of foreign variables to control for global developments.[11] The identification approach extends the methodology used in other

8 House price data are taken from the database constructed by the Federal Reserve Bank of Dallas. For a description of the dataset, see Mack, A. and Martínez-García, E., "A Cross-Country Quarterly Database of Real House Prices: A Methodological Note", *Working Paper Series*, No 99, Globalization and Monetary Policy Institute, Federal Reserve Bank of Dallas, 2011. We selected all the advanced economies in the database apart from Switzerland, due to shorter data availability, and Luxembourg, due to its special nature.

9 Data on consumption and consumer prices are from the OECD. Data on credit to households and real effective exchange rate are from the BIS. The shadow rate is a measure of the monetary policy stance when interest rates are near the zero lower bound. Krippner's shadow rate is based on a term structure model; see Krippner, L., "Measuring the stance of monetary policy in zero lower bound environments", *Economics Letters*, Vol. 118, Issue 1, 2013, pp. 135-138.

10 Where not available, we use the short-term government bond rate (for Sweden).

11 For all the countries except the United States, we also include a foreign variable block as block exogenous, in order to capture the influence of foreign factors for small open economies. For the foreign block, we consider an average of US and euro area variables or alternatively only US data, depending on the trade relationships of each small open economy. In addition, for the large euro area countries (Germany, Spain, France and Italy), we include the aggregate euro area GDP and consumer prices as an endogenous block to take into account the role of large euro area countries for the aggregate, reflecting Ciccarelli, M., Kuik, F. and Martínez Hernández, C, "The asymmetric effects of weather shocks on euro area inflation", *Working Paper Series*, No 2798, ECB, 2023. The importance of accounting for the foreign block in VAR models of small open economies is shown, among others, in Corbo, V. and Di Casola, P., "Drivers of consumer prices and exchange rates in small open economies", *Journal of International Money and Finance*, Vol. 122, 2022.

studies to identify housing demand, monetary policy and mortgage supply shocks separately from aggregate demand and aggregate supply shocks.[12]

The peak effect of monetary policy shocks on house prices and consumption varies greatly across advanced economies. The effect of monetary policy tightening on house prices is negative and stronger in countries with higher levels of household debt. Monetary policy shocks have a more negative effect on consumption where there are a higher share of homeowners with mortgages and a higher level of household debt (Chart B). A 1% increase in the (shadow) interest rate has a negligible effect on private consumption in Germany and Italy, where the share of homeowners with mortgages is low or very low, while reducing private consumption by around 2.5% in Denmark and Norway. However, up to the end of the sample period, there is only weak evidence that a higher share of ARMs implies that monetary policy shocks have a stronger impact on consumption.[13]

[12] For shock identification, we use zero and sign short-run restrictions and the Max Forecast Error Variance (FEV) approach, extending the methodology set out in Calza, A. et al., op. cit. and Nocera, A. and Roma, M., "House prices and monetary policy in the euro area: evidence from structural VARs", *Working Paper Series*, No 2073, ECB, 2017. The Max FEV approach was originally proposed in Uhlig, H., "What moves real GNP?", mimeo, 2003. Both the housing demand shock and the mortgage supply shock are assumed to affect consumption, consumer prices and the interest rate with a lag. While the mortgage supply shock is assumed to generate co-movement between house prices and credit to households, the housing demand shock is assumed to be the shock that explains most of the forecast error variance decomposition (FEVD) of house prices at short horizons. The monetary policy shock is assumed to affect consumption and consumer prices with a lag. Moreover, a rise in interest rates is assumed to generate a drop in real house prices and credit to households and to strengthen the local currency.

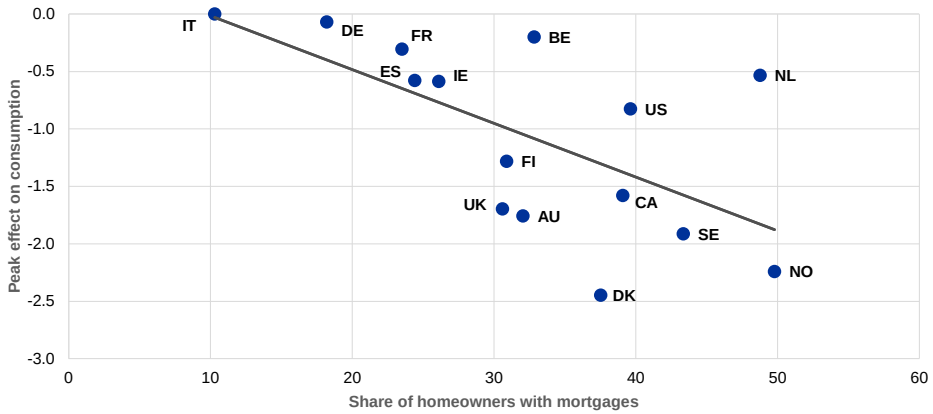
[13] Data are based on new mortgages, based on Badarinza, C., Campbell, J.Y. and Ramadorai, T., "What Calls to ARMs? International Evidence on Interest Rates and the Choice of Adjustable-Rate Mortgages", *Management Science*, Vol. 64, No 5, 2018, pp. 1975-2471. For evidence on the drivers of the share of ARMs in the euro area, see Albertazzi, U., Fringuellotti, F. and Ongena, S., "Fixed Rate versus Adjustable Rate Mortgages: Evidence from Euro Area Banks", *Research Paper Series*, No 20-99, Swiss Finance Institute, 2023. For further analysis on how the share of ARMs and the debt burden affect consumer expectations in times of monetary policy tightening, see also the box entitled "Consumers' interest rate expectations in a monetary policy tightening cycle", *Economic Bulletin*, Issue 5, ECB, 2023.

Chart B

Peak effect of 1% rate monetary policy shock on consumption depending on the share of homeowners with mortgages and levels of household debt

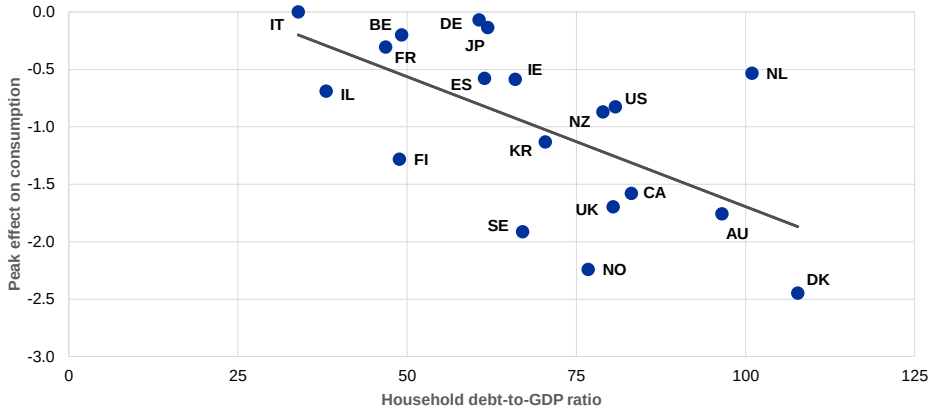
a) Share of homeowners with mortgages

(percentages)



b) Level of household debt

(percentages)



Sources: OECD, BIS and ECB calculations.
Notes: The set of countries depends on data availability. The latest observations for the effects on consumption refer to the first quarter of 2022. Panel a: the latest observations for the share of homeowners with mortgages are for 2020 or earlier. Panel b: the latest observations for household debt-to-GDP ratios are for the first quarter of 2022.

The collateral and cash-flow channels are key elements explaining cross-country differences in the strength of the housing channel of monetary policy transmission. Some of the cross-country differences in the impact of monetary policy shocks could be attributable to their differing effects on house price levels. In order to disentangle how much of this heterogeneity is due to the collateral channel – reflecting the fact that the value of housing collateral is affected differently across countries – we look at the peak effect on consumption, normalised by the peak effect on house prices. The results show that, after such normalisation, it is still the case that monetary policy has a stronger impact on consumption in countries with a higher share of homeowners with mortgages (Chart C, panel a). Thus, the main channel at work seems to be the cash-flow channel. A higher household debt-to-GDP ratio implies a stronger impact on consumption, but the relationship is weaker after conditioning on the peak effect on house prices. Finally, in countries with a higher share of ARMs, the peak effect on consumption is larger (and happens earlier), after

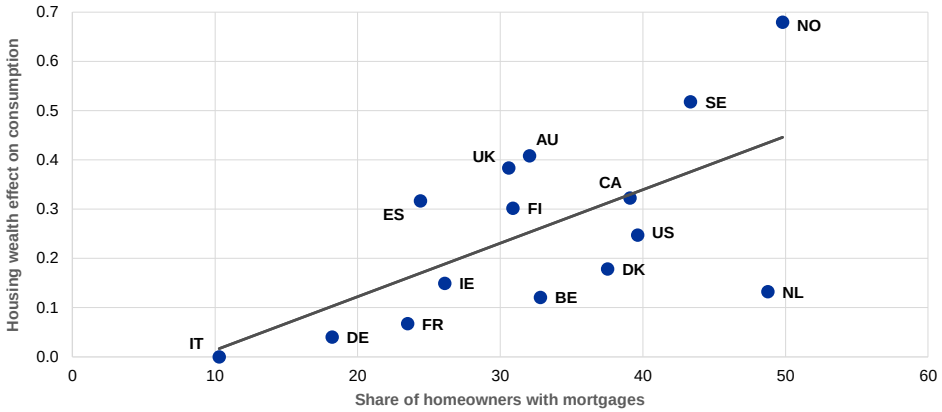
normalising for the peak effect on house prices (Chart C, panel b). This further supports the notion of the cash-flow channel driving the relationship, although there are other structural differences in the mortgage markets of European countries that may play a role in explaining some of the cross-country differences.

Chart C

Peak effect of housing wealth on consumption depending on the share of homeowners with mortgages and the share of ARMs

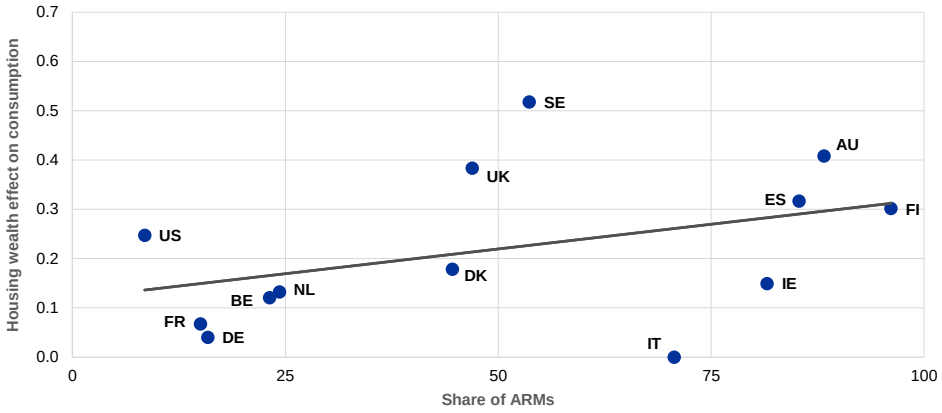
a) Share of homeowners with mortgages

(percentages)



b) Share of ARMs

(percentages)



Sources: OECD, Badarinza et al.*), Corsetti et al.**) and ECB calculations.
Notes: The peak effect on consumption is normalised by the peak effect on house prices. The latest observations for the housing wealth effects are for the first quarter of 2022. The set of countries depends on data availability. Panel a: the latest observations for share of homeowners with mortgages are for 2020 or earlier. Panel b: the latest observations for the share of ARMs are for 2013.
*) Badarinza, C., Campbell, J.Y. and Ramadorai, T., "What Calls to ARMs? International Evidence on Interest Rates and the Choice of Adjustable-Rate Mortgages", *Management Science*, Vol. 64, No 5, 2018, pp. 1975-2471.
**) Corsetti, G., Duarte, J.B. and Mann, S., "One Money, Many Markets", *Journal of the European Economic Association*, Vol. 20, Issue 1, 2022, pp. 513-548.

Compared with previous hiking cycles, the collateral and cash-flow channels may amplify the transmission of monetary policy in the euro area via the housing market. Overall, these findings contribute to the ongoing discussion about the transmission of monetary policy by highlighting the crucial role of the collateral

and cash-flow channels.[14] In relative terms, the larger euro area countries lie at the lower end of the distribution in terms of the shares of homeowners with mortgages and levels of household debt (Chart C), thus signalling a weaker housing wealth channel coming from indebted households. Looking at the patterns across time, the share of ARMs in the euro area has declined in the last decade, especially in countries with high such shares.[15] At the same time, the shares of homeowners with mortgages and the levels of household debt are higher now than during previous hiking cycles in many countries. In aggregate, the increase is modest, and countries have increasingly come to resemble each other (Chart D). Thus, monetary policy transmission through the housing channel might be somewhat stronger and more even across countries than in past hiking cycles. This finding is also in line with analysis of the effect of monetary policy shocks on housing investment in the United States and the euro area, pointing to a stronger effect in jurisdictions with higher levels of household debt.[16]

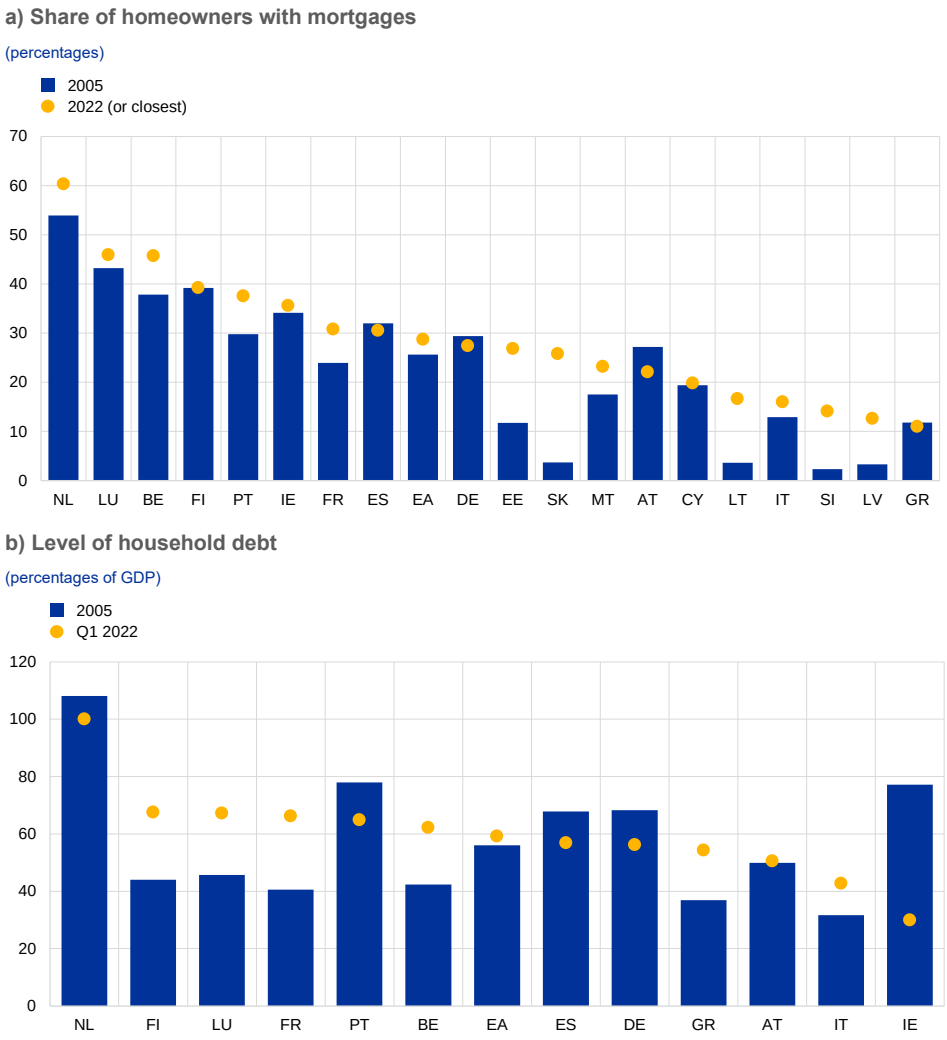
[14] For example, Sveriges Riksbank used the presence of higher levels of household debt in its monetary policy communication in September 2022 to argue that less monetary policy tightening is needed than in the past to achieve the same effect on the economy. By contrast, in June 2023 the Bank of England used the argument of the greater share of fixed-rate mortgages in the United Kingdom to explain why the full impact of the increase in the Bank Rate to date would not be felt for some time.

[15] See Lane, P.R., "The euro area hiking cycle: an interim assessment", Dow Lecture at the National Institute of Economic and Social Research, 16 February 2023.

[16] See the box entitled "Monetary policy and housing investment in the euro area and the United States", *Economic Bulletin*, Issue 3, ECB, 2023.

Chart D

Changes in shares of homeowners with mortgages and levels of household debt in the euro area



Sources: European Union Statistics on Income and Living Conditions and BIS.
Notes: The set of countries depends on data availability. Panel a: the latest observations are for 2022, or 2021 where 2022 not available. Panel b: the latest observations are for the first quarter of 2022. Data source chosen for consistency with analysis reported in Charts B and C.

8 Inflation and the response of public wages in the euro area

Prepared by Cristina Checherita-Westphal and Aurelian Vlad

In the context of elevated inflation in the euro area (despite recent declines), it is useful to look at the response of public wages to gauge further pressures on private sector wages and core inflation. While the public sector accounts for only about one-fifth of the economy-wide compensation of employees in the euro area, it can provide a relevant signal for wage negotiations in the private sector. Public wage growth can thus have a bearing on inflation through both a direct channel (aggregate demand) and an indirect channel (as a signal for changes in private sector compensation). This box provides an update on previous analyses of public wage projections for the euro area, including as regards the institutional features that govern public wage-setting across euro area countries.[1] It is based on the June 2023 Eurosystem staff projections and is underpinned by a questionnaire completed by members of the Working Group on Public Finance (WGPF) of the European System of Central Banks.[2]

After having generally grown at rates above inflation since the inception of the euro, public wages took a deep cut in real terms in 2022, but they are expected to partly recover over the projection horizon 2023-25 (Chart A). In the period 2001-21, euro area public wages and compensation per employee grew on average at an annual rate of 2.3%. This was slightly higher than private wage growth (2.0%) and above HICP inflation (1.7%), albeit with differences across periods, especially during crisis episodes. For instance, public wages grew faster than inflation and private wages before and during the global financial crisis and more slowly during the sovereign debt crisis. In 2020, when the coronavirus (COVID-19) crisis hit, public wages continued to grow steadily, reflecting, among other things, bonuses in the health sector.[3] In 2022 euro area public wage growth declined in real terms – by 4.3 percentage points – but a partial catch-up is projected over the period 2023-25, with an average nominal growth rate of 4.1%. Cumulatively over the period 2022-25, nominal public wage growth is still projected to lag inflation by about 2.5 percentage

1 See, for instance, Checherita-Westphal, C. (ed.), "Public wage and pension indexation in the euro area: an overview", *Occasional Paper Series*, No 299, ECB, August 2022. That paper also contains an analysis of the role of public wages in driving private wage dynamics. Based on a review of empirical literature, it concludes that panel studies focusing on euro area countries generally find evidence of a positive relationship between public and private wages, including bi-directional causation. The evidence at individual country level, in particular with regard to causality, is less clear-cut across various studies. Based on various samples of euro area countries, the paper finds a close positive relationship between public and private wages, with the causation going in both directions. Notably, panel regression results point to an increase in average private wage growth of between 0.3 and 0.5 percentage points for a 1 percentage point increase in public wage growth, while controlling for other determinants of private wages.

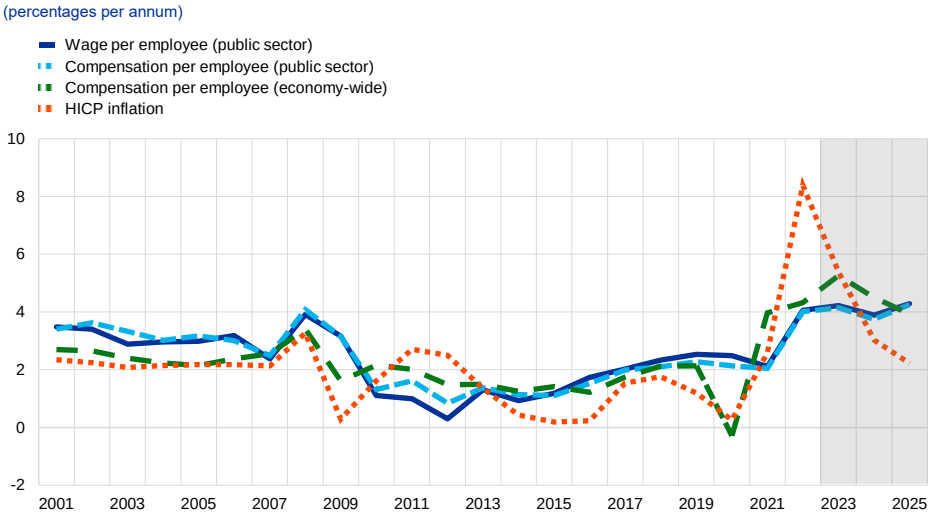
2 See the June 2023 Eurosystem staff projections for more details on developments in economy-wide compensation per employee and inflation.

3 It should be noted that the decline in economy-wide wages in 2020 and their partial rebound in 2021 are distorted by the impact of job retention schemes, which were financed by governments to safeguard private sector employment and do not allow for an accurate comparison with public wage growth.

points (with the difference narrowing to below 1 percentage point for the period 2020-25, which includes the impact of the COVID-19 crisis).

Chart A

Euro area public wage growth compared with inflation and other employee compensation indicators



Sources: June 2023 Eurosystem staff macroeconomic projections database and ECB calculations.
Notes: The data on wages and compensation shown in the chart represent annual growth rates. These three euro area aggregates are GDP-weighted averages of country-specific data. Data on the wage per employee in the public sector (also referred to in this box as "average public wages") are computed at country level by dividing expenditure recorded under "Wages and salaries" in the Government Finance Statistics database (also referred to in this box as the "public wage bill") by the number of government employees. Employee compensation reported in government statistics usually includes employers' social security contributions in addition to wages and salaries.

In terms of institutional arrangements, automatic price indexation of public wages remains relatively limited in the euro area (covering about one-fifth of the total public wage bill), but there are indications that inflation is increasingly being used as a reference in wage-setting. Updated information based on the WGPF questionnaire indicates that full or partial price indexation continues to be reported in only five countries, representing 19% of the euro area public wage bill in 2022. In two of these countries (Belgium and Luxembourg, covering 5% of the euro area public wage bill), public wages are fully indexed to prices with a backward-looking index automatically linked to the cost of living. In Cyprus and Malta, similar but limited indexation is in place. In Italy, which accounts for the largest share in this group (13% of the euro area public wage bill in 2022), agreements are renewed on the basis of three-year negotiation rounds (with the latest ones being for the periods 2019-21 and 2022-24) and expected inflation excluding energy is used as the reference indicator in wage negotiations, with ex post inflation compensation applied to existing contracts. While in other euro area countries, inflation does not play a formal role in public wage-setting, there are

indications that it is increasingly being used as a reference in the process, including in wage negotiations.[4]

In most cases, public wages are set via formal collective public wage agreements, which typically last between one and three years, and are updated in negotiation rounds. Five countries (France, Greece, Latvia, Portugal and Spain), representing close to 40% of the euro area wage bill in 2022, do not have horizontal statutory agreements that apply to the entire government or to specific government sub-sectors. In these cases, public wages are usually updated in the context of budget discussions. Where collective agreements exist, their statutory or customary length varies across countries: one year in Austria, Lithuania and Slovakia; slightly more than one year in Ireland and Slovenia; around two years in Estonia, Finland, Germany, Luxembourg and the Netherlands; two to three years in Cyprus; three years in Italy; and over three years in Croatia and Malta.[5]

Taking into account the above-mentioned wage-setting schemes and other relevant factors, public wages in the euro area as a whole and in most euro area countries are expected to grow at rates that are cumulatively higher than inflation over the projection horizon (Chart B). At the level of the euro area as a whole and in most euro area countries (16 countries, representing 60% of the euro area wage bill in 2022), average public wages (per employee) are projected to grow at rates above inflation (well above that level in some countries) cumulatively over the period 2023-25. This reflects backward-looking indexation schemes or partial compensation for the cut in real wages in 2022.[6] The euro area's total public wage bill, which also reflects developments in the number of public employees, is projected to rise at somewhat higher rates (14.3% cumulatively over the period 2023-25, compared with 12.4% for average public wages), albeit somewhat below the nominal GDP growth rate (Chart B, panel a).

Public wage projections reflect substantial heterogeneity at country level, mainly mirroring inflation differentials, but also other factors, such as fiscal positions.[7] In terms of the annual profile, the euro area aggregate hides differences across countries, with several smaller economies with high inflation (for example, the

4 For instance, in Germany the new wage agreement concluded in April 2023 for the federal and municipal levels of government includes temporary inflation compensation premia of €3,000 per employee, payable from June 2023 to February 2024 (exempt from wage tax and social contributions). The end of these premia in 2024 leads to somewhat lower gross wage increases in 2025. Overall, the agreement provides for pay increases of above 7% in 2023 and almost 5% in 2024. For federal civil servants, it results in pay increases of around 5.5% in 2023 and 4% in 2024.

5 In the Netherlands, the duration varies across different collective agreements, but is usually between one and two years. In Estonia, the collective wage agreement covers about 15% of public sector employees, as it only applies to the health sector. In Finland, there is no "statutory" length, i.e. the legislation leaves the length of collective agreements open. In practice, agreements often last two years, although there are exceptions. In Malta, collective wage agreements within central government have a much longer duration than in other countries (averaging 5.3 years, with the current civil service agreement running from 2017 to 2024 and covering about 7.5 years). Other entities within Malta's general government sector have separate collective agreements, which typically cover about three years.

6 Looking at the remaining countries, the average public wage is projected to grow broadly in line with inflation in Ireland and France, and somewhat below inflation in Greece (as public wages are still frozen in 2023) and Italy (reflecting, among other things, the benchmark indicator used as a reference, namely inflation net of energy).

7 The Eurosystem's fiscal projections at country level are, as a general rule, confidential and are therefore not shown in this box.

Baltic countries) and those with automatic indexation recording above-average wage growth in 2023. In general, public wage growth is expected to decline in the last year of the projection horizon (2025), reflecting cooling inflation and the fading impact of temporary bonuses in some countries. In a few cases, including where agreements are renewed with a significant lag, as in Italy, wage growth in 2025 is projected to be more substantial than in the preceding years. A simple correlation exercise at country level shows that average public wage growth over the projection period tends to be stronger in countries with higher inflation in 2022 relative to other euro area countries, reflecting backward-looking (partial) inflation compensation (Chart B, panel b, first sub-panel). In terms of grouping by indexation type, projected public wage growth is actually higher on average in countries without automatic price indexation (Chart B, panel b, second sub-panel). This may indicate (i) that countries in this category (particularly the Baltic countries and other more open economies) were more exposed to the inflation shock in 2022 and (ii) that, at high levels, inflation is increasingly being reflected in nominal wage-setting, even in institutional arrangements where this is not a formal requirement. In terms of grouping by fiscal fundamentals, countries with high levels of government debt seem to be more restrained in granting public wage increases (Chart B, panel b, third sub-panel).[8] Lastly, looking at the fiscal support measures implemented by euro area governments to compensate for the high energy prices and inflation over the period 2021-23, projected public wage growth for the period 2023-25 is somewhat more restrained in countries with higher levels of such support (Chart B, panel b, fourth sub-panel).

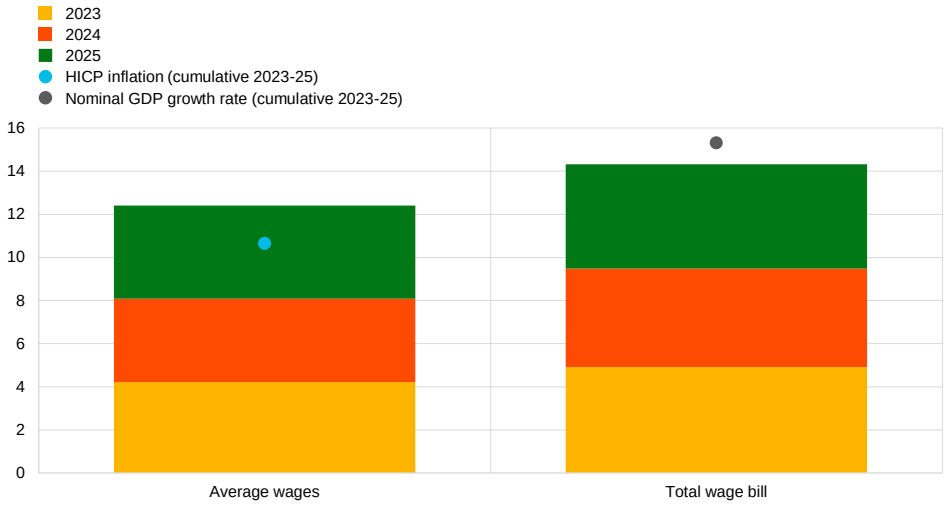
[8] This correlation holds when the five countries with automatic public wage indexation are excluded from the sample (with the difference between the low-debt group and the high-debt group even increasing). A similar picture (with a somewhat lower correlation coefficient) can be seen when the threshold variable used is the ratio of the budget balance to GDP in 2022.

Chart B

Projections of public wages in the euro area for the period 2023-25

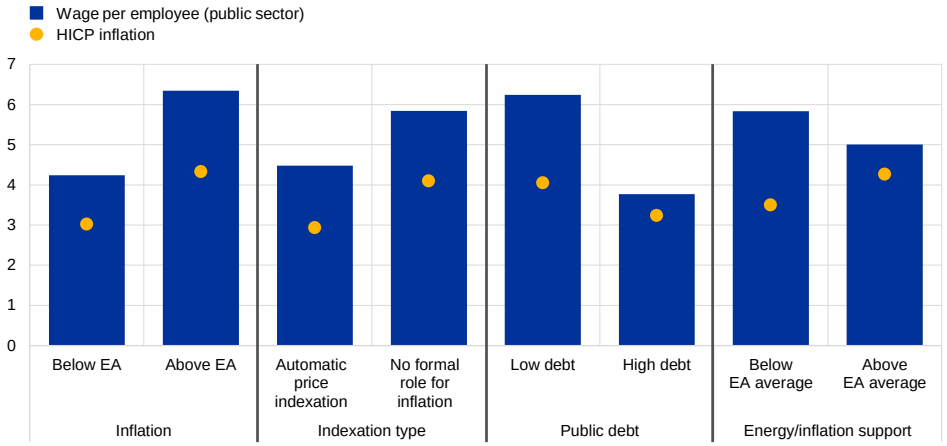
a) Growth rates of public wage indicators for the euro area over the period 2023-25

(percentages)



b) Average growth rates of public wages for groups of euro area countries over the period 2023-25

(percentages)



Sources: June 2023 Eurosystem staff macroeconomic projections database and ECB calculations.
Notes: In panel a, the category "Average wages" is the same as that used in Chart A and Chart B, panel b. It includes agreed wages and the wage drift. Agreed wages refer mostly to public wage increases resulting from negotiated wage agreements, where such agreements exist, or similar basic wage increase frameworks. The wage drift is usually calculated as a residual, which conceptually should reflect factors such as: (i) employee career development/promotion scales; (ii) the impact of structural changes and part-time work; and (iii) wages and bonuses outside negotiated wage agreements. Data are shown at the euro area aggregate level (GDP-weighted averages of country-specific data). In panel b, the data represent simple averages (not weighted by GDP) across countries in the respective groups. In the "Inflation" sub-panel, the "Above EA" ("Below EA") group comprises countries with an HICP inflation rate that was higher (lower) in 2022 than the euro area (EA) aggregate. In the "Indexation type" sub-panel, Belgium, Cyprus, Italy, Luxembourg and Malta are in the automatic (full or partial) indexation group, with all other euro area countries in the "No formal role for inflation" group. In the "Public debt" sub-panel, countries with government debt above 90% of GDP in 2022 (namely, Belgium, France, Greece, Italy, Portugal and Spain) are in the high-debt group, with the remainder of the euro area countries in the low-debt group. The "Energy/inflation support" sub-panel shows countries in which the cumulative gross fiscal costs of such measures over the period 2021-23, as estimated by the Eurosystem, are above/below the simple euro area average across countries.

Looking ahead, public wages, while not expected to lead to significant second-round effects, should continue to be monitored closely. At the euro area aggregate level, wage growth in the public sector is projected to remain below that of the private sector over the period 2023-24, but stand somewhat above it in 2025 (for which projections are also surrounded by a higher degree of uncertainty). At the country level, due attention should also be paid over the medium term to the fiscal

consequences of increases in public wages by properly balancing macroeconomic stabilisation and fiscal sustainability objectives, especially in countries with high levels of debt and high ageing-related costs.

Article

1 The macroeconomic implications of the transition to a low-carbon economy

Prepared by Claus Brand, Günter Coenen, John Hutchinson and Arthur Saint Guilhem[1]

1 Introduction

To help avert severe economic damage from climate change, the European Union (EU) has taken measures aimed at reducing greenhouse gas (GHG) emissions to net zero by 2050. The EU's net-zero goal is set out in the European Green Deal, and comprehensive measures are outlined in the EU's Fit for 55 package.[2] These aim to reduce GHG emissions by 55% by 2030 (compared to 1990 levels). The Fit for 55 package includes carbon price increases and regulatory measures and foresees massive green investments.

Among the measures aimed at reducing GHG emissions, carbon price increases are generally considered to be an effective instrument. Carbon prices factor the external social costs of carbon emissions into economic transactions. They are directly targeted at the carbon content of production and increase the price of carbon-intensive production relative to less carbon-intensive production. Carbon price increases thus provide an incentive to reduce carbon emissions.[3] In the euro area, the EU emissions trading system (ETS), national carbon taxes and other national environmental taxes, such as excise taxes on fossil fuels, put – directly or indirectly – a price on carbon emissions.

The economic impact of carbon price increases depends on multiple factors. Carbon prices affect economic activity and inflation primarily via higher energy prices. The effectiveness and impact of carbon price increases crucially depend on whether these are implemented in a credible manner and can be factored into the investment and consumption decisions of firms and households. The impact of carbon price increases on the economy also depends on distributional effects, particularly for households, as the regressive nature of higher carbon prices affects

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1 Prepared in liaison with Alina Bobasu, Kai Christoffel, Alistair Dieppe, Michael Dobrew, Marien Ferdinandusse, Alessandro Ferrari, Thaïs Massei, Romanos Priftis, Angela Torres Noblejas and Aurelian Vlad.

2 For more information on the European Green Deal and the EU's Fit for 55 package, see "A European Green Deal – Striving to be the first climate-neutral continent" and "Fit for 55" on the European Commission and European Council websites respectively.

3 For a comprehensive review of the literature on carbon pricing, see Timilsina, G.R., "Carbon taxes", *Journal of Economic Literature*, Vol. 60(4), December 2022, pp. 1456-1502. For a discussion of complementarities between different carbon transition policy instruments, see Blanchard, O.J., Gollier, C. and Tirole, J., "The portfolio of economic policies needed to fight climate change", *Working Papers*, No 22-18, Peterson Institute for International Economics, November 2022.

low-income households more than higher-income households.[4] Fiscal policies that funnel revenues from higher carbon prices back to lower-income households can mitigate some of these distributional effects and support their acceptance by the public. Alternatively, these revenues can be used to subsidise green investments. As carbon price increases give rise to an output/inflation trade-off, their impact is also influenced by the response of monetary policy. Finally, their effectiveness and impact hinge on transition policies adopted at the global level.

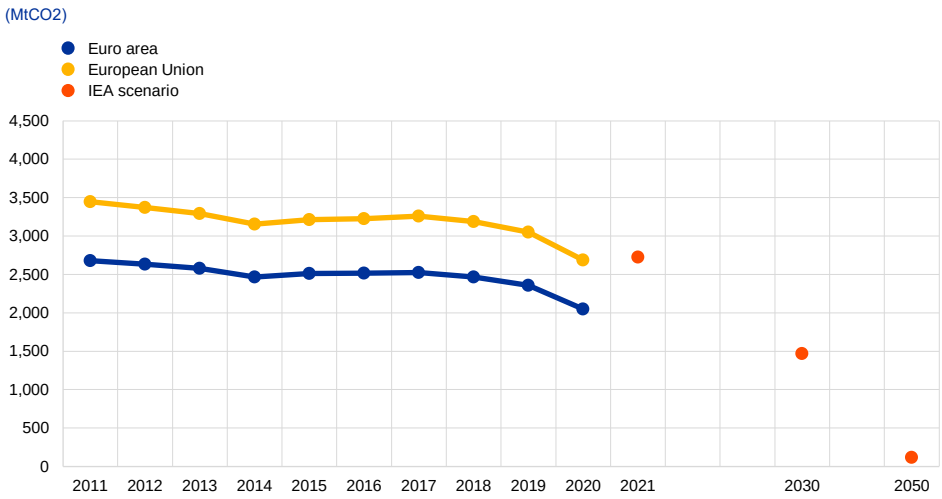
This article provides a model-based assessment of the macroeconomic impact of a higher carbon price path that supports the transition to a low-carbon economy, with a focus on the euro area. To address the high level of uncertainty in gauging the impact of carbon price increases, the assessment is based on a suite of macroeconomic models. In line with the ECB's climate-change roadmap, this suite includes newly developed models as well as models that have been sourced externally. Section 2 outlines where the euro area presently stands in relation to its commitment to transitioning to net zero; Section 3 presents the propagation channels of higher carbon emission prices to the economy and provides an overview of the models used; Section 4 outlines the carbon price scenario; Section 5 discusses the macroeconomic results; and Section 6 concludes.

2 Where we stand in the transition to net zero in the euro area

Achieving net-zero GHG emissions in line with the EU's target will require an acceleration of the pace of carbon-emission reductions over the current decade. While a 29% reduction in carbon emissions has been achieved since 1990, as shown in Chart 1, attaining the EU's intermediate target of a 55% reduction in GHG emissions by 2030 (compared to 1990 levels) will require a sizeable further reduction in carbon emissions. Assuming that non-carbon GHG emissions fall proportionately, attaining these targets will require a further 46% reduction in carbon emissions by 2030 compared to 2021 levels. This is faster than the pace of emission reductions seen since 1990.

4 For a discussion of distributional effects of carbon pricing on consumption across different income groups, see the article entitled "Fiscal policies to mitigate climate change in the euro area", *Economic Bulletin*, Issue 6, ECB, 2022.

Chart 1
CO2 emissions in the EU and the euro area



Source: Eurostat and World Energy Outlook (WEO) 2022 of the International Energy Agency (IEA).
Note: The red dots represent announced EU pledges in the IEA WEO 2022.

The targeted reduction of emissions in the euro area is unlikely to be achieved through carbon pricing alone. Indeed, alongside increases in carbon pricing through a more stringent emissions trading system (ETS) with broader applicability across sectors, the Fit for 55 package also includes regulatory measures and support for green investments. Furthermore, the package is complemented by a number of European policy initiatives, such as REPowerEU and the EU's hydrogen strategy.[5]

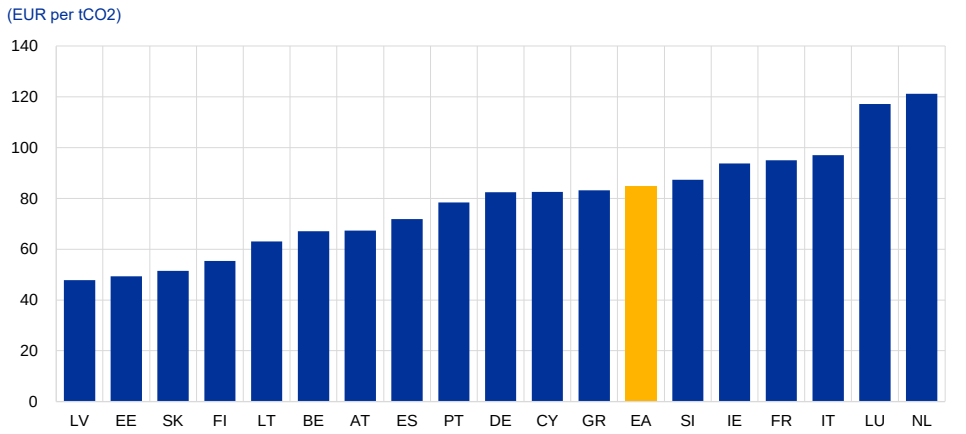
According to the Organisation for Economic Co-operation and Development's (OECD's) (net) average effective carbon rates (ECRs), the fraction of carbon emissions being taxed is low, and carbon rate levels are widely dispersed across euro area countries. Based on 2021 data, the OECD estimates that carbon taxation in EU countries is too low and too fragmented to achieve the EU's net-zero targets.[6] The OECD provides a harmonised composite measure of the price of carbon emissions across a wide range of countries by estimating (net) average ECRs. The measure comprises fuel and energy excise taxes, direct carbon taxes and emission trading schemes at the country level for six economic sectors (road transport, off-road transport, industry, agriculture and fishing, residential and commercial real estate, and electricity). ECRs are highly dispersed across euro area countries, as shown in Chart 2, with the level in the Netherlands nearly three times that in Latvia. According to the latest available data (for 2021), the average ECR for the euro area stands at €85/tCO2. The future euro area ECR path captures the direct and indirect carbon price effects resulting from the implementation of the Fit for 55 package and other policy initiatives.

5 See "A European Green Deal – Striving to be the first climate-neutral continent" on the European Commission's website and the references therein.

6 See Avgousti, A. et al., "The climate change challenge and fiscal instruments and policies in the EU", *Occasional Paper Series*, No 315, ECB, April 2023.

Chart 2

Average effective carbon rates in euro area countries in 2021 (all sectors)



Source: OECD.
Notes: Data for Croatia and Malta are not available. Countries are ordered by ECR net of subsidies for fossil fuels.

3 Propagation channels of higher carbon emission prices

The purpose of a carbon tax is to reduce emissions by factoring the social costs of releasing carbon into private transactions and thereby incentivising more environmentally sustainable production and use of energy. Carbon emissions are a textbook example of a negative externality, as the social costs of carbon emissions are far greater than the private costs incurred by the emitter. Carbon taxes aim to transfer these social costs to the emitters by raising the price of burning fossil fuels in proportion to the amount of emitted carbon. A higher carbon tax thus increases the cost of carbon-intensive production relative to less carbon-intensive production. It incentivises a transition to using less carbon-intensive energy sources and innovation in greener technologies.[7]

In contrast to other mitigation measures, such as subsidies, a carbon tax generates government revenues, at least during the transition phase. A carbon tax generates significant tax revenues for as long as the carbon tax base still remains significant.[8] By contrast, other mitigation measures are either budget-neutral (e.g. regulation) or have the potential to strain public finances (e.g. subsidising green technology).

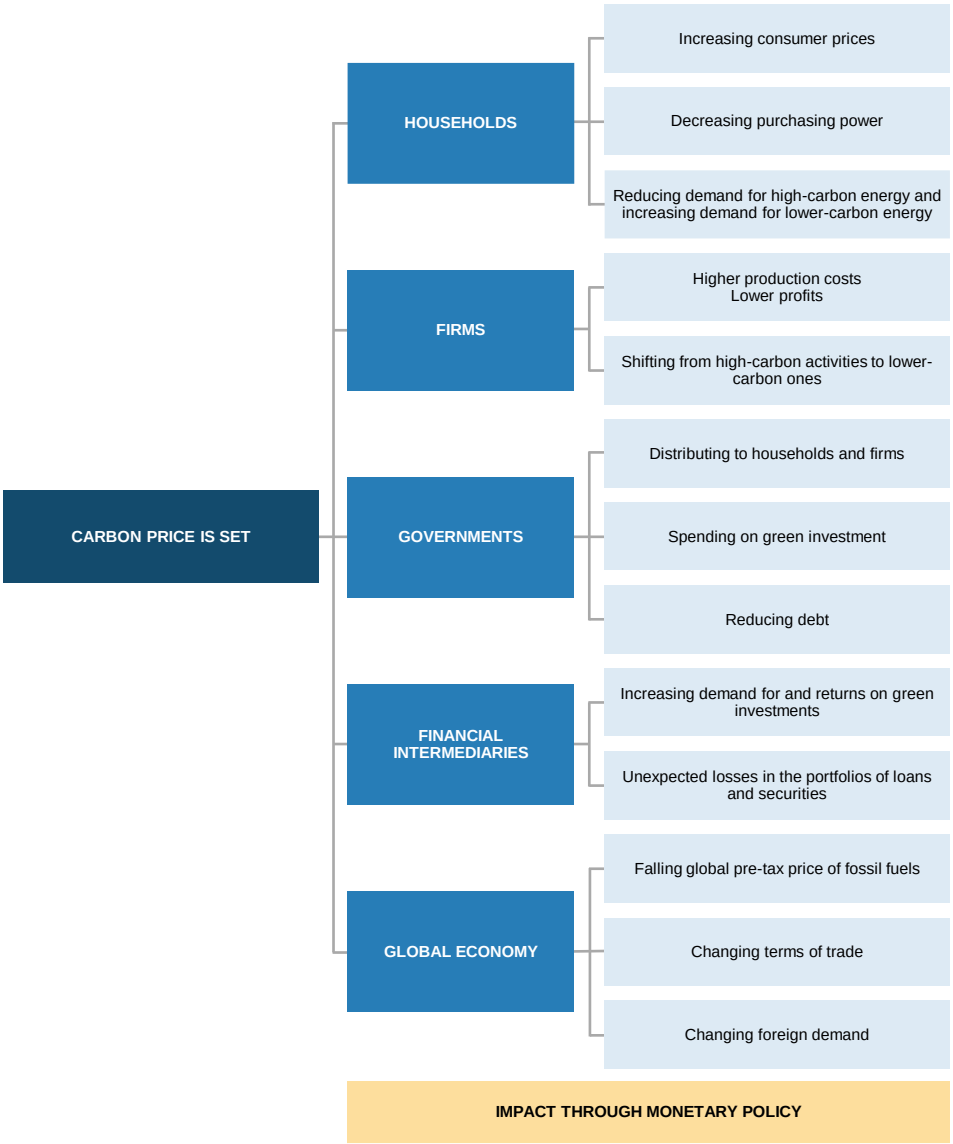
A higher carbon pricing policy propagates across domestic sectors of the economy (Figure 1). By pushing up energy prices, carbon taxes lower real household incomes and corporate profits and dampen domestic demand. This impact works either directly through consumer prices or indirectly through production costs. Distributional effects may strengthen this impact and point to an important role for fiscal policy. In particular, fiscal policy can mitigate adverse demand effects by

7 See Aghion, P., Dechezleprêtre, A., Hémous, D., Martin, R. and Van Reenen, J., "Carbon taxes, path dependency, and directed technical change: Evidence from the auto industry", *Journal of Political Economy*, Vol. 124(1), February 2016, pp. 1-51.

8 See the article entitled "Fiscal policies to mitigate climate change in the euro area", op. cit.

funnelling the carbon tax revenues back to lower-income households, thereby sustaining household consumption and supporting public acceptance of the tax. The main shortcoming is that the impact on energy consumption may be mitigated, which would weaken the effectiveness of the tax in reducing emissions. Alternatively, the revenues could be used to finance green transition projects, thereby mitigating output losses from carbon tax increases in a more potent way than other spending measures.[9]

Figure 1
Carbon price propagation channels



Source: ECB.

A policy of higher carbon prices is primarily aimed at supporting the transition to a lower carbon economy. By ensuring that production cost increases are

[9] See Batini, N., Di Serio, M., Fragetta, M., Melina, G. and Waldron, A., "Building Back Better: How Big Are Green Spending Multipliers?", *IMF Working Papers*, No 2021/087, International Monetary Fund, March 2021, which suggests that the fiscal multiplier of green investment is slightly larger than one.

concentrated in carbon-intensive sectors, a higher carbon price incentivises a shift to using renewable energy and adopting green production technologies. How well this adjustment works will depend on the pace and size of sectoral reallocation, technological adaptation and the ability of financial intermediaries to support the reallocation of capital.

The conduct of monetary policy also plays a role in how a higher carbon price policy propagates to the economy. Given that there are various channels at play that affect demand and supply, it is unclear from the outset which of the channels of adjustment to carbon taxes will dominate. The response of monetary policy will depend on whether adverse supply-side or demand-side effects dominate. Carbon price increases drive an energy price-induced wedge between headline inflation and core inflation. If a central bank can "look through" this headline inflation hump, it will be able to mitigate the negative impact of energy price increases on demand.

In addition, the impact of a higher carbon price policy in the euro area will also depend on the path of the energy transition at the global level. Relative carbon price adjustments at the global level affect the terms of trade for energy goods importers and exporters, foreign demand and competitiveness.[10] Importantly, the more carbon prices are raised in the rest of the world (RoW), the more effective these will be in reducing global emissions.

To sum up, carbon taxes affect the economy in a multifaceted way and modelling their impact is subject to considerable uncertainty. Box 1 outlines the suite of models used for the impact assessment to address this uncertainty.

Box 1
Main features of the suite of models

Prepared by Romanos Priftis

To deal with the uncertainty associated with the multifaceted way in which carbon taxes affect the economy, the impact assessment is based on a suite of six macroeconomic models currently available to the ECB. The models used in the analysis all feature a set of environmental elements and fall into two classes: (i) three newly developed internal dynamic stochastic general equilibrium (DSGE) models and (ii) three large-scale commercial models (Table A). The DSGE models are two-country models of the euro area and the rest of the world (RoW) or closed-economy models of the euro area. The commercial models are multi-country models that can be used to examine the global dimension of carbon transition policies. These models are part of ongoing efforts by ECB staff to include climate change considerations in the ECB's macroeconomic modelling portfolio in line with the climate roadmap of the ECB's monetary policy strategy review and the ECB-wide agenda on climate change.

[10] On the effects of differing carbon pricing policies on the export of carbon-intensive production, i.e. carbon leakage, see Böning, J., Di Nino, V. and Folger, T., "Stop carbon leakage at the border", *The ECB Blog*, ECB, 1 June 2023.

Table A

Main features of the suite of models

	NAWM-E	E-DSGE I (RR)	E-DSGE II (FNL)	G-Cubed	NiGEM	Oxford
Type	DSGE	DSGE	DSGE	Hybrid	Semi-structural	Semi-structural
Country coverage	Two-country: euro area and RoW	Euro area	Euro area	Multi-country: global	Multi-country: global	Multi-country: global
Sectoral coverage	Limited	Limited	Limited	High	Limited	Limited
Energy sector	Disaggregated: two types of energy for consumption and production	Disaggregated: two types of energy for production	Disaggregated: two types of energy for production with emission abatement	Disaggregated: several types of energy for production	Aggregated: several types of energy for production	Aggregated: several types of energy for production
Carbon tax transmission	Direct and indirect	Indirect (incl. via banking sector)	Indirect	Indirect	Indirect	Direct and indirect
Forward-looking	Yes	Yes	Yes	Mix	Mix	Mix
Household heterogeneity	Yes	No	Yes	Yes	No	No
Fiscal assumption	Carbon tax revenues transferred to households			Carbon tax revenues reduce government debt		
Monetary policy	Model-specific interest rate rule					

Source: ECB.
Notes: NAWM-E: see Coenen, G., Lozej, M. and Priftis, R., "Macroeconomic effects of carbon transition policies: an assessment based on the ECB's New Area-Wide Model with a disaggregated energy sector", *Working Paper Series*, No 2819, ECB, May 2023; E-DSGE I: see Priftis, R. and Schoenle, R., "Energy shocks through the banking sector and the fiscal-monetary policy mix", ECB, forthcoming; E-DSGE II: see Ferrari, A. and Nispi Landi, V., "Toward a green economy: the role of central bank's asset purchases", *International Journal of Central Banking*, Vol. 19(4), forthcoming; G-Cubed: see McKibbin, W.J. and Wilcoxen, P.J., "The theoretical and empirical structure of the G-Cubed model", *Economic Modelling*, Vol. 16(1), January 1998, pp. 123-148; NiGEM: see Hantzsche, A., Lopresto, M. and Young, G., "Using NiGEM in uncertain times: Introduction and overview of NiGEM", *National Institute Economic Review*, Vol. 244, May 2018, pp. 1-14; Oxford Economics: see "Global Economic Model" on the Oxford Economics website.

The models in the suite feature the necessary environmental and macroeconomic elements to allow for the transmission of carbon taxes through the energy sector, while differing in terms of sectoral granularity. The DSGE models distinguish between "dirty" and "clean" energy inputs for consumption or production purposes, or both, while the commercial models differentiate between energy inputs like electricity, gas, oil, coal and renewables for energy production. To the extent that the energy sector is disaggregated rather than aggregated, the models allow for the substitution of carbon-intensive energy inputs induced by shifts in their relative prices following increases in carbon taxes. Because of this reallocation, carbon emissions – which are a by-product of production in the dirty energy sector – decline accordingly.

The macroeconomic effects of carbon tax increases across models depend on the nature and relative importance of specific transmission channels, including on how well households or firms factor future carbon price increases into their current spending or price-setting decisions. On the nominal side, carbon taxes affect inflation primarily through energy prices – directly via expenditures on energy consumption and indirectly through the production costs of firms. On the real side, carbon tax-induced increases in energy prices dampen domestic demand by lowering real household incomes and corporate profits. The more these effects are anticipated via forward-looking expectations, the more these will lead to a frontloaded fall in consumption and investment. Similarly, these may lead to a frontloaded increase in prices set by firms in anticipation of higher energy costs. The impact of carbon taxes, especially on investment, also depends on the presence of financial amplification effects. Cost-driven declines in corporate profits may result in a fall in asset prices, which would restrict the access of firms to bank financing.

Another distinguishing feature is the presence of household heterogeneity, as carbon taxes are regressive and have distributional effects. Increases in carbon taxes affect low-income households

more than higher-income households, strengthening the adverse impact on aggregate demand. This distributional channel points to an important role for fiscal policy. In particular, redistributing carbon tax revenues to lower-income households through targeted transfers can mitigate the adverse demand impact. Since comparing the alternative design of fiscal policy in reducing adverse demand effects is beyond the scope of this exercise, scenario assumptions have been calibrated to ensure that fiscal policy remains sufficiently passive without giving rise to secondary demand effects (e.g. carbon tax revenues are assumed to be paid back to households as a lump sum or used to reduce public debt, depending on the model).

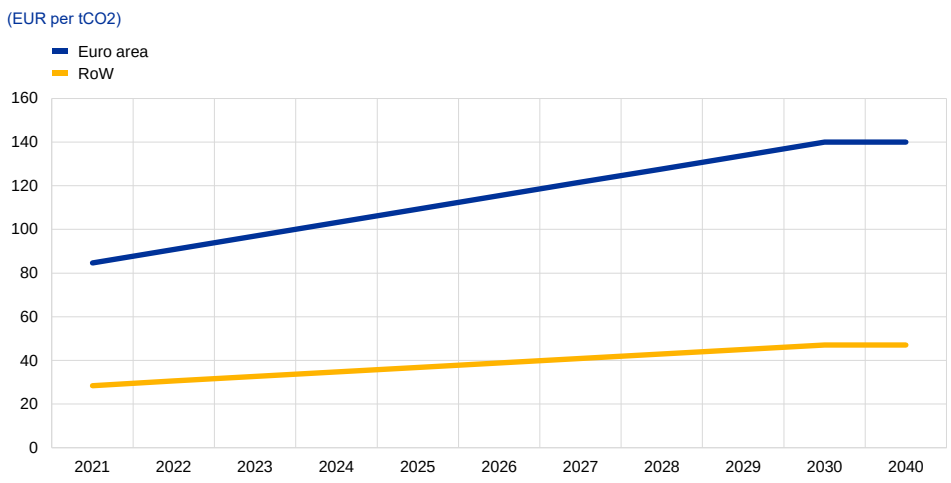
The models employed also feature an explicit role for monetary policy, which influences the overall near to medium-term macroeconomic impact of carbon taxes. All models use Taylor-type policy rules, whereby the interest rate responds to a measure of inflation and activity, albeit to different degrees across models. The precise policy impact depends on the specification of the rule used in each model and the relative strengths of the various transmission channels of the carbon tax.

4 The carbon tax scenario

The initial carbon prices in the scenario are anchored in the OECD's ECR estimates for 2021 and the IEA's net-zero scenario. In the scenario, the average ECR in the euro area is assumed to increase linearly from €85/tCO2 in 2021 to €140/tCO2 in 2030, in line with the interim carbon price target for advanced economies with net-zero pledges, as considered in the net-zero scenario in the IEA's WEO 2022. For the RoW, the scenario assumes a proportionate increase from lower levels (Chart 3). Whether these ECR paths are ambitious enough is uncertain, with carbon price target estimates differing widely across institutions. As carbon prices enter the models as a tax, the scenario is referred to interchangeably as a carbon price scenario or a carbon tax scenario.

Chart 3

Carbon price path in the scenario



Source: OECD and ECB staff calculations.

The impact of the carbon tax scenario is compared to a baseline which assumes that there is no change in the carbon tax and that no climate events occur that adversely affect the economy over the simulation horizon. This approach reflects the fact that, while economic damage from climate change on account of the existing concentration of GHG in the atmosphere is materialising, it is challenging to quantify the timing and magnitude of this damage. It also implies that the carbon tax scenario does not materially lower the likelihood and incidence of climate-related physical risks over the coming years. Clearly, the assumption of no climate damage as a result of not raising carbon taxes is unrealistic in the long run.

The scenario has a narrower scope than either the International Monetary Fund (IMF) or the Network for Greening the Financial System (NGFS) climate scenarios. The scenario assumes that fiscal policy is neutral to the extent possible and that monetary policy responds according to a model-specific rule (see Box 1). By contrast, the IMF analysis looks at alternative fiscal policy assumptions, while the simpler set-up in this article reflects a conscious choice to keep the analysis tractable in view of the rather complex and diverse model portfolio used.[11] The NGFS climate scenarios consider a range of alternative physical risk and transition pathways up to 2100 in combination with different climate policies that are calibrated to meet certain end-of-century temperature targets.[12]

5 The effects of the carbon tax scenario

The overall impact of the carbon tax scenario on real GDP is rather contained (Chart 4, panel a). There is a relatively gradual build-up of the GDP effect over the scenario horizon, with a permanent effect on the level of GDP by 2030. Specifically, GDP falls to between 0.5% and 1.2% below the baseline in 2030, translating into an average annual GDP growth roughly 0.1 percentage point lower over the scenario horizon. In general, the results are quite dispersed across models, being driven by differing impacts on private consumption and, in particular, on investment. Dynamic stochastic general equilibrium (DSGE) models which incorporate financial frictions exhibit the most pronounced decline in GDP.

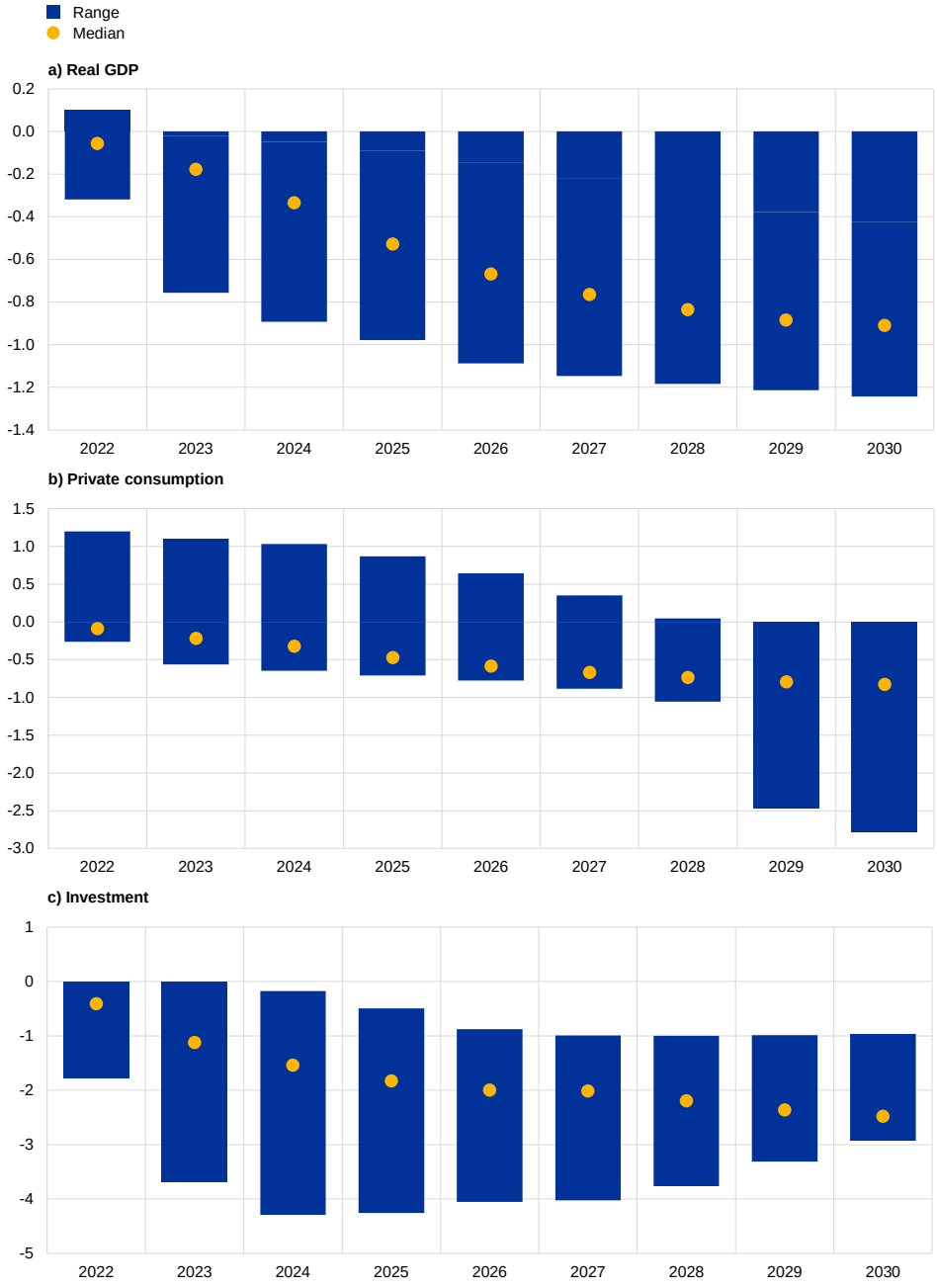
11 See “Near-Term Macroeconomic Impact of Decarbonization Policies”, World Economic Outlook, IMF, October 2022, Chapter 3.

12 Further information can be accessed via the NGFS Scenarios Portal.

Chart 4

Impact of carbon tax policy on GDP and selected components

(percentage deviations from baseline)



Sources: NAWM-E, E-DSGE I + II, G-Cubed, NiGEM and Oxford Economics.
Note: The chart displays the impacts (range and median) of the carbon tax scenario on euro area real GDP, private consumption and business investment between 2022 and 2030.

Private consumption is dampened across all models as higher energy prices reduce household income (Chart 4, panel b). Due to income losses, households cut back consumption. They frontload these spending cuts to the extent that they factor future income losses from energy price increases into their current spending decisions. This is the case in models featuring forward-looking households. By contrast, in models in which households are more backward-looking, the decline in

consumption is primarily due to a fall in current disposable income, so the impact builds up only gradually over time. Another factor driving differences in consumption responses across different models is fiscal policy. Alternative model-specific designs of the fiscal-policy response to the carbon tax increase generate differences in the impact on income and private consumption. For example, in some models, budget neutrality is implemented via lump-sum transfers of tax revenues to households, which in turn act as a buffer to limit the negative impact on income and consumption.[13]

Investment declines, albeit to different degrees across models, as higher energy prices squeeze corporate profits (Chart 4, panel c). Falling profits for firms weigh on investment. This impact is reinforced as declining profits depress the value of the physical assets of firms (i.e. the shadow price of capital, especially in the fossil fuel sectors) and tighten financing conditions. This channel is more pronounced in the DSGE models than in the large-scale commercial models where investment responses are based on the user cost of capital. The aggregate investment path can mask significant sectoral re-allocation of capital, characterised by robust investment growth in the renewable energy sector being overcompensated by very large capital losses in the fossil fuel sectors.

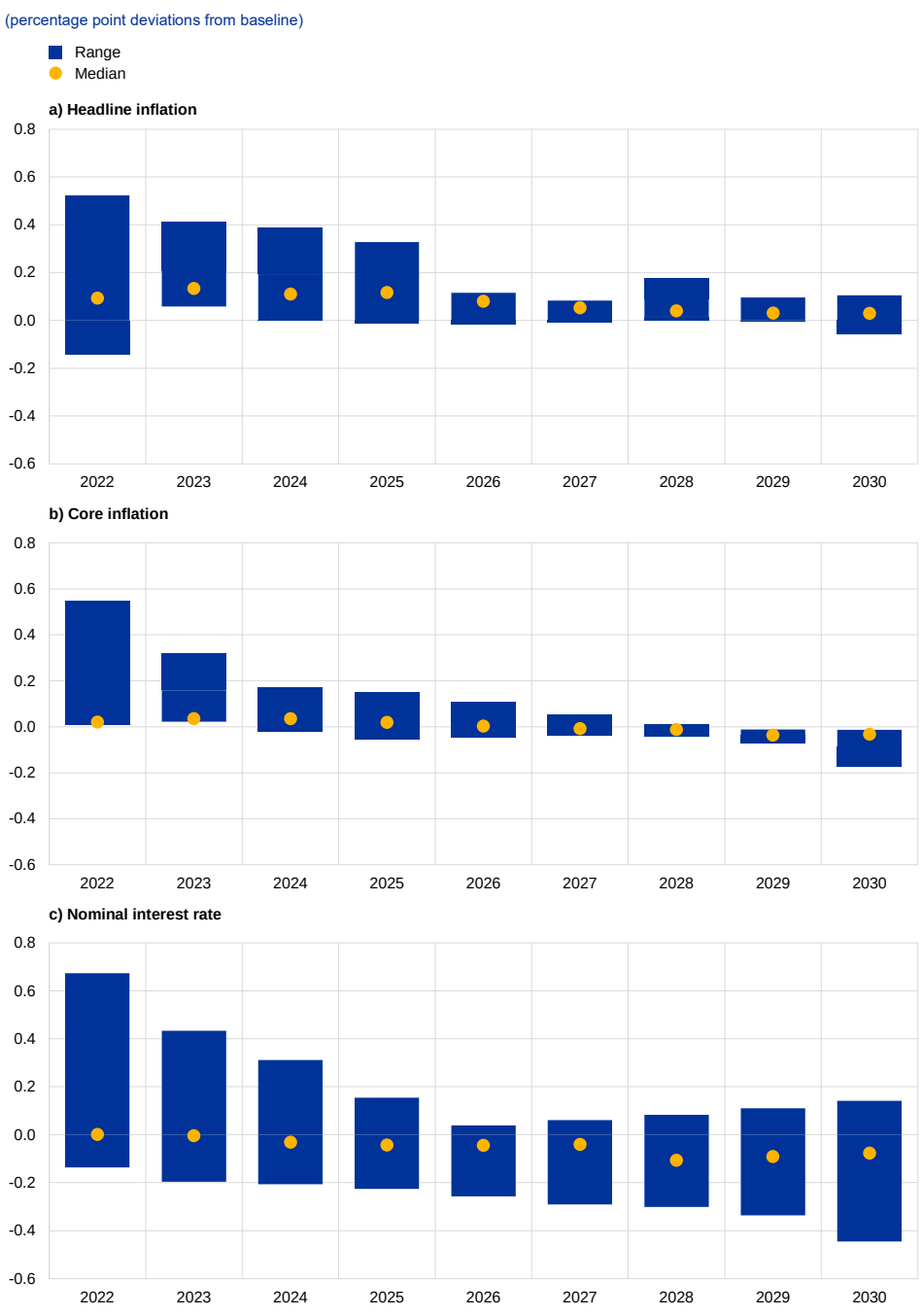
While the impact on inflation is also modest and gradually diminishes towards the end of the scenario horizon, there are some differences in near-term inflation dynamics (Chart 5, panels a and b). In some models, the impact is more frontloaded, with firms setting their prices in a more forward-looking manner, also factoring in energy price increases in the future. In other models with more backward-looking price-setting behaviour of firms, the inflation impact is more gradual. Core inflation (measured in terms of inflation excluding the direct energy price impact) is barely affected at all. Overall, the impact on inflation tends towards zero by the end of the scenario horizon in all models, but the price level will have permanently shifted to a higher level by 2030.

The monetary policy trade-off created by the carbon tax scenario appears limited (Chart 5, panel c). Measured in terms of the response in short-term nominal interest rates, monetary policy reacts modestly across models. Interest rates evolve within a narrow range, increasing in models that emphasise supply-side effects (primarily on inflation) and declining in those that emphasise demand-side effects. Overall, in balancing the demand and supply-side effects, the monetary policy stance is somewhat loosened, as is evident from the fact that the interest rate in real terms declines across all models.

[13] Sensitivity analysis based on NAWM-E shows that the regressive effects of a carbon tax increase on low-income households can be addressed by means of targeted transfers of the tax revenues. See Coenen et al., op. cit.

Chart 5

Impact of carbon tax policy on inflation measures and monetary policy response



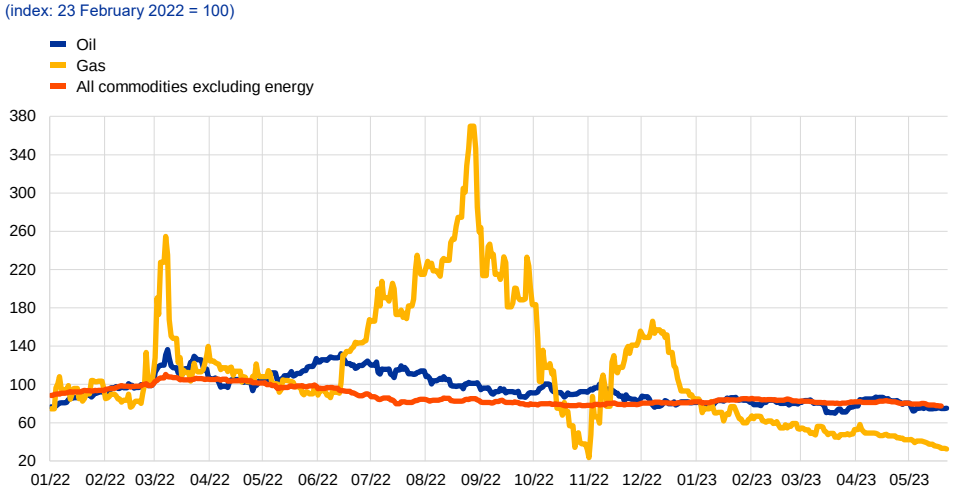
Sources: NAWM-E, E-DSGE I + II, G-Cubed, NiGEM and Oxford Economics.
Notes: The chart displays the impacts (range and median) of the carbon tax scenario on euro area headline inflation, core inflation and the short-term nominal interest rate between 2022 and 2030. Core inflation measures are only displayed for NAWM-E, G-Cubed and Oxford Economics.

The small size of the impact of the carbon tax increase on inflation also highlights its different economic nature when compared to an energy supply shock. The small size of the inflation impact can be compared with that of an energy supply shock to highlight its specific nature. The assumed carbon price increase is implemented in a gradual but persistent and predictable manner, thereby allowing

the economy time to adjust. Moreover, it affects goods prices and production costs in proportion to their carbon content. By contrast, an energy supply shock is typically not anticipated, much larger and more temporary. It affects energy prices indiscriminately or not in proportion to their carbon content. These aspects are evidenced in the evolution of gas prices since the invasion of Ukraine by Russia (Chart 6). At the onset of the invasion and in the subsequent months, gas prices increased sharply, but they have declined markedly in recent months. Over the same period, oil prices have also fluctuated significantly, but their fluctuations have been much more limited than the extreme fluctuations in gas prices given fears of possible disruptions of gas supply in the euro area during 2022.

Chart 6

Commodity price developments

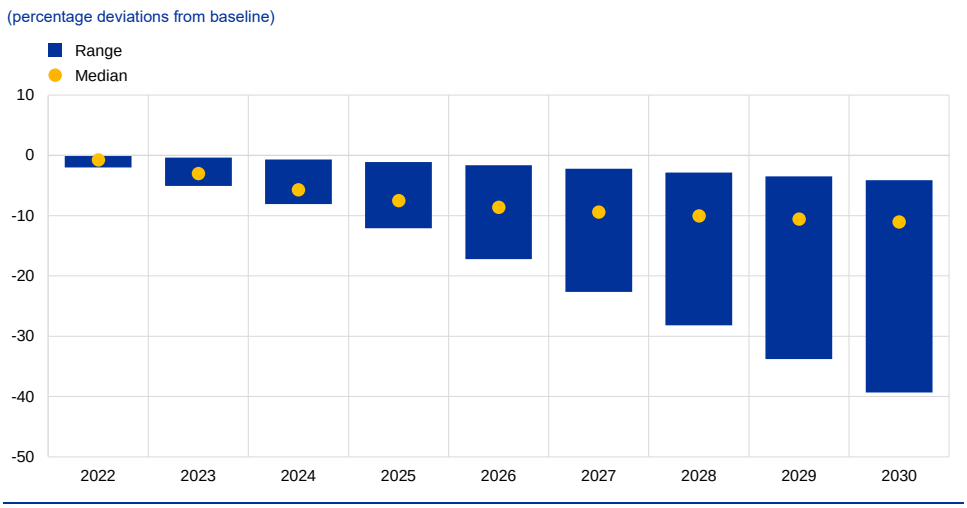


Sources: Refinitiv, HWWI and ECB calculations.
Notes: Gas refers to the Dutch TTF gas price. The data are indexed to the values prevailing on the day prior to the start of the Russian invasion of Ukraine on 24 February 2023. The latest observations are for 22 May 2023 for oil and gas and 19 May 2023 for commodities excluding energy.

Model simulations suggest that adjustments to carbon prices alone might be insufficient to reach the EU's ambitious emission targets (Chart 7). The dispersion of estimated carbon emission reductions achieved with the carbon price increase is very large across models. Models with low elasticities of substitution between carbon-intensive and renewable energy technologies, high capital adjustment costs and less responsive renewable energy supply typically show lower carbon emission reductions for a given impact on output. Overall, the median of the widely dispersed estimates points to a reduction of carbon emissions of about 11% by 2030. This is only a limited contribution to reaching the EU's interim target of a 46% reduction in emissions between 2021 and 2030. The shortfall and its dispersion across models reflect model-specific propagation channels, particularly in relation to the elasticity of substitution between high-carbon and low-carbon fuels. In addition, the IEA's net-zero scenario is more comprehensive and entails a broad set of policy measures beyond carbon prices. The global dimension of implementing a carbon tax and its implications are further discussed in Box 2.

Chart 7

Impact on carbon emissions



Sources: NAWM-E, E-DSGE I + II, G-Cubed, NiGEM and Oxford Economics.
Note: The chart displays the impact (range and median) of the carbon tax scenario on euro area carbon emissions between 2022 and 2030.

A combination of increased green energy supply and technological efficiency gains, complementing a sufficiently high carbon price, will support the closing of the emissions reduction gap. For instance, simulations using NAWM-E indicate that a 10% increase in the supply of renewable resources or in the efficiency of green energy production would reduce carbon emissions by an additional 2 percentage points (see Coenen et al., op. cit.). In these cases, there is a greater reduction in carbon emissions even though the fall in GDP is smaller. Similarly, policies that foster a higher elasticity of substitution between carbon-intensive energy and green energy would also help reduce emissions. Based on NAWM-E, a higher elasticity than assumed in the model would also lead to an additional reduction in emissions by about 3.5 percentage points, provided that the supply of green energy adjusts.

The carbon tax scenario generates additional revenues that could be used to finance green investments. The gradual increase in the carbon tax generates average annual revenues ranging between 0.3% and 1.1% of GDP in 2030. While no exact breakdown of overall investments is available, according to European Commission estimates, about €1,000 billion (6% of GDP) of private and public investments will be required per year over the period 2021-2030 to reach the Fit for 55 target, suggesting that it is unlikely that the public share in these investments can be funded solely by carbon tax revenues as generated under the scenario.[14]

The findings from the carbon tax scenario are broadly consistent with those of the IMF (Chart 8). Benchmarking the carbon tax scenario against a comparable analysis undertaken by the IMF in the October 2022 World Economic Outlook indicates that, for a similar-sized carbon tax increase, the impact on GDP, inflation

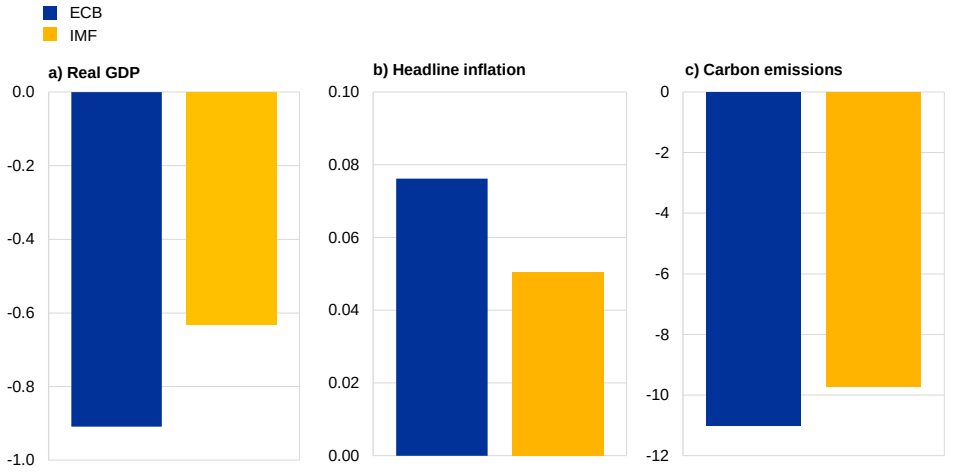
14 See "The EU economy after COVID-19: implications for economic governance", European Commission, October 2021.

and carbon emissions is within the same range.[15] In order to make a meaningful comparison between the two analyses, the euro area carbon tax increase in the IMF analysis is normalised to the carbon tax increase used in the scenario in this article. The carbon tax increases by $135/tCO2 in the IMF's main scenario, which compares to €55/tCO2 in the benchmark scenario in this article.

Chart 8

Comparing the model-based findings with IMF estimates

(panel a: percentage deviations from baseline in 2030; panel b: percentage point deviations from baseline, annual average over 2022-2030; panel c: percentage deviations from baseline in 2030)



Sources: NAWM-E, E-DSGE I + II, G-Cubed, NiGEM, Oxford Economics and the IMF's GMMET model.
Notes: Panel a) displays the impact of the carbon tax scenario on real GDP in 2030; panel b) shows the average scenario impact on headline inflation between 2022 and 2030; and panel c) displays the scenario impact on CO2 emissions in 2030. For the ECB models, median effects are reported. The IMF's estimated effects have been rescaled to reflect an equally sized increase in carbon taxes.

Box 2

The global dimension of a carbon tax: some sensitivity analysis

Prepared by Alina Bobasu, Alistair Dieppe, John Hutchinson, Arthur Saint-Guilhem and Aurelian Vlad

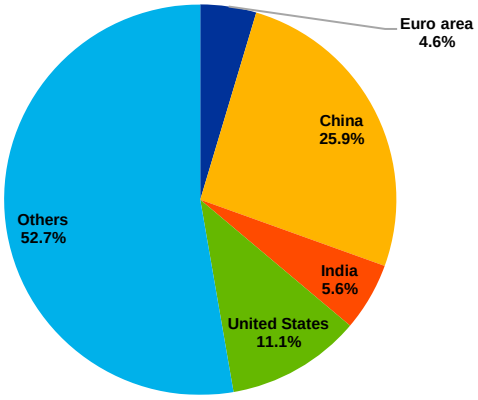
As the euro area contributed about 5% to global CO2 emissions in 2021 (Chart A), any potential carbon tax policy implemented in the rest of the world (RoW) would have potentially significant macroeconomic consequences, including for the euro area, and implications for global carbon emission reductions, competitiveness and terms of trade. This box presents some sensitivity analysis of the impact of alternative carbon tax assumptions for the RoW on the euro area economy and on global CO2 emissions using the Oxford Economics and NiGEM global models. It transpires that the more uniform and ambitious the scope of the global carbon tax is, the larger the reduction in global demand for fossil fuels and CO2 emissions and the greater the adverse impact on the euro area economy would be. Overall, the results underscore the importance of synchronised international cooperation on climate policy.

[15] The IMF analysis considers alternative policy packages regarding the use of the fiscal revenues accruing from the carbon tax increase. See "Near-Term Macroeconomic Impact of Decarbonization Policies", World Economic Outlook, IMF, October 2022, Chapter 3. The benchmarking is carried out for the case where the tax revenues are transferred to households, which is fiscally the most neutral case and consistent with the approach followed for the DSGE model-based analysis presented in this article.

Chart A

World carbon emissions

(percentages)



Source: "Global Energy Review: CO2 Emissions in 2021", IEA, 2022.
Note: The chart displays contributions by region to world annual CO2 emissions based on IEA analysis.

Two scenarios are considered, which differ from the benchmark scenario as regards the RoW carbon tax assumption: (i) "high RoW", where the RoW reaches the same carbon tax price as the euro area by 2030; and (ii) "no RoW", where no carbon tax is implemented in the RoW. Scenarios (i) and (ii) can be viewed as upper and lower bounds to the benchmark scenario as presented in the main body of the text.[16]

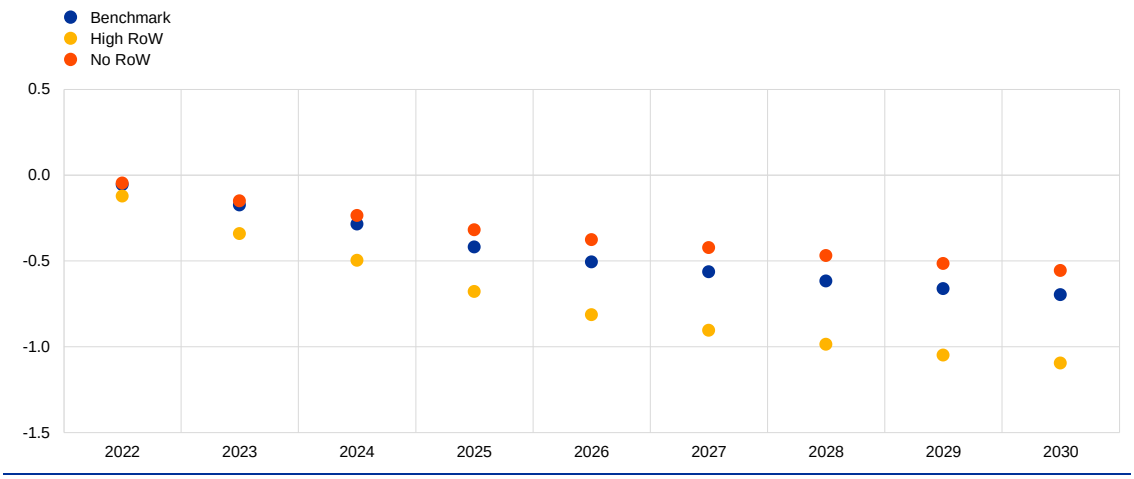
While euro area GDP steadily declines in all three scenarios, the decline is most pronounced in the high RoW carbon tax scenario (Chart B). In this scenario, the higher carbon tax implemented in the RoW dampens euro area foreign demand, which in turn has a negative effect on euro area GDP. In the no RoW scenario, the impact on euro area GDP is smaller than in the benchmark scenario on account of the weaker drag from euro area foreign demand.

16 Both scenarios are conducted under the assumption of fixed exchange rates.

Chart B

Impact on euro area real GDP

(percentage deviations from baseline, annual averages)



Sources: NiGEM, Oxford Economics and ECB staff calculations.
Notes: The chart displays the average impact on euro area real GDP in the Oxford Economics and NiGEM models for three different carbon tax scenarios with different assumptions about the carbon tax increase in the RoW between 2022 and 2030.

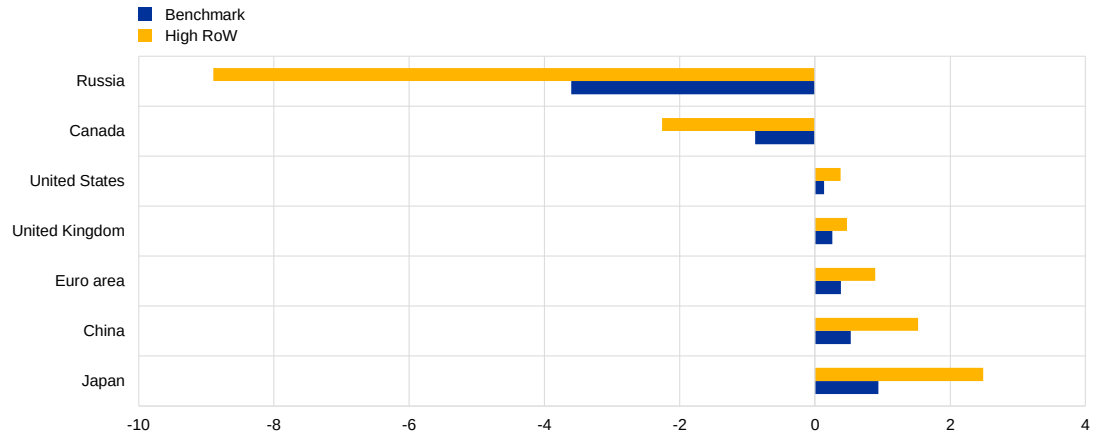
In line with the global transmission channels outlined in Section 3, the carbon tax increase leads to an improvement in the terms of trade (the amount of goods a country can purchase for a certain amount of exported goods) for energy-importing countries and a deterioration for commodity exporters (Chart C, panel a). Commodity exporters experience a worsening of their terms of trade because both world demand for and (pre-tax) prices of fossil fuels decline by the end of the scenario horizon owing to carbon price increases. This effect is different to that of an energy supply shock where the increase in the price of fossil fuels benefits the terms of trade of commodity exporters. For the euro area, in the long run the terms of trade improve overall, particularly in the high RoW scenario, as the relative increase in export prices eventually exceeds that of import prices.

Chart C

Impact on terms of trade and fossil fuel energy intensity

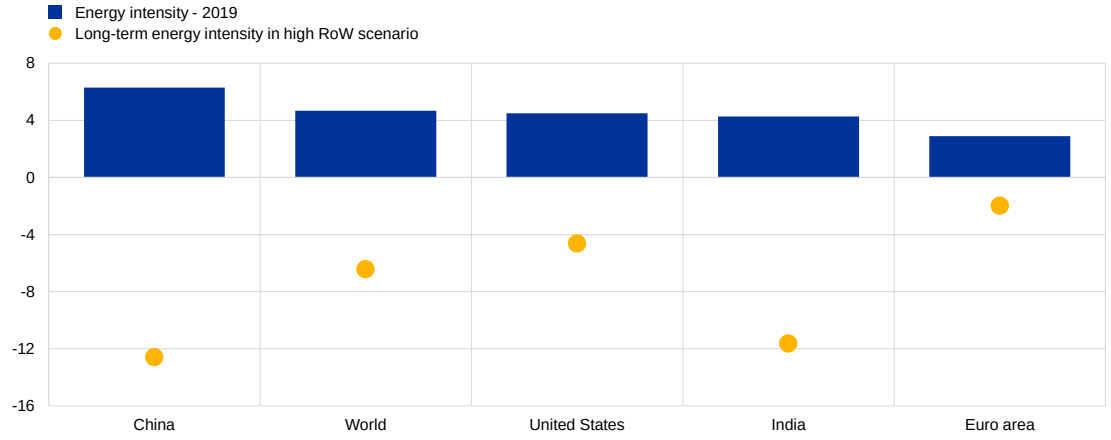
a) Terms of trade

(percentage deviations from baseline)



b) Fossil fuel energy intensity: historical and model-based results

(MJ per USD GDP in 2017 US dollar terms at purchasing power parity; percentage deviations from baseline)



Sources: NiGEM and Oxford Economics global models and ECB staff calculations.
Notes: Panel a) displays changes in the long-term terms of trade for the benchmark and high RoW carbon tax scenarios. Panel b) shows the changes in energy intensity in the high RoW carbon tax scenario. The results are based on the average of the Oxford Economics and NiGEM models.

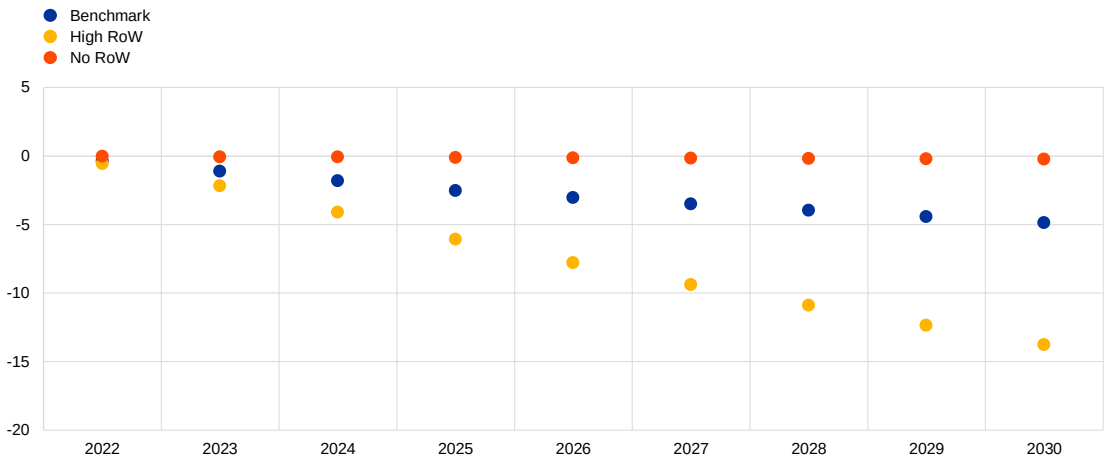
The exercise also illustrates that, for a given carbon price increase, the reduction in carbon emissions and the implied macroeconomic effects vary across countries depending on how much they rely on fossil fuels. In particular, countries that are more reliant on fossil fuels, such as China, would experience the largest reduction in fossil fuel energy intensity by implementing a carbon tax policy (Chart C, panel b). On the other hand, countries that are less reliant on fossil fuels experience a smaller reduction. This illustrates that the marginal gains from carbon pricing in terms of reducing fossil fuel intensity should come primarily from carbon-intensive economies. Moreover, these gains can be expected to decline over time as the policy is implemented.

The more uniform and ambitious the global carbon tax policy is, the larger the reductions in CO2 emissions would be, albeit still falling short of global climate commitments (Chart D). Overall, global CO2 emissions in 2030 are reduced by about 15% in the high RoW carbon tax scenario, which is about three times more than in the benchmark scenario. These developments stand in stark

contrast to the no RoW carbon tax scenario, in which the euro area implements a carbon tax policy unilaterally. In that case there is only an insignificant reduction in global CO2 emissions.

Chart D
Global CO2 emissions

(percentage deviations from baseline)



Sources: NiGEM and Oxford Economics models.
Note: The chart displays the average impacts on world carbon emissions across the Oxford Economics and NiGEM models for three different carbon tax scenarios with different assumptions about the carbon tax increase in the RoW between 2022 and 2030.

Overall, these illustrative scenarios highlight the importance of international cooperation on climate policy, the need for a sufficiently high carbon price and the importance of using a broad portfolio of carbon policy instruments tailored to the structure of individual countries.

A central bank with a preference for "looking through" the direct carbon tax-induced inflation effects to mitigate output losses would have to tolerate higher headline inflation for a protracted period (Chart 9). To examine the output/inflation trade-off that the central bank is faced with, additional sensitivity analysis was carried out using NAWM-E. The illustrative analysis assumes that the central bank follows a simple Taylor-type rule and either opts to lean against the direct inflationary effects of the carbon tax-induced increase in energy prices by focusing on the stabilisation of headline inflation or, conversely, chooses to look through these direct effects and focus on core inflation, i.e. inflation excluding energy.[17] According to the model, the carbon tax increase lowers output and pushes up inflation in both cases, but to different degrees. If the central bank wants to mitigate the output losses from leaning against the direct inflationary impact of the induced energy price increase, it may look through the energy price impact and focus on stabilising core inflation. Adopting such a look-through approach would result in a stronger easing of the monetary policy stance, as can be seen from the stronger fall in the real interest rate, and thereby limit output losses, but at the cost of higher headline inflation. At the same time, as a look-through approach generates a

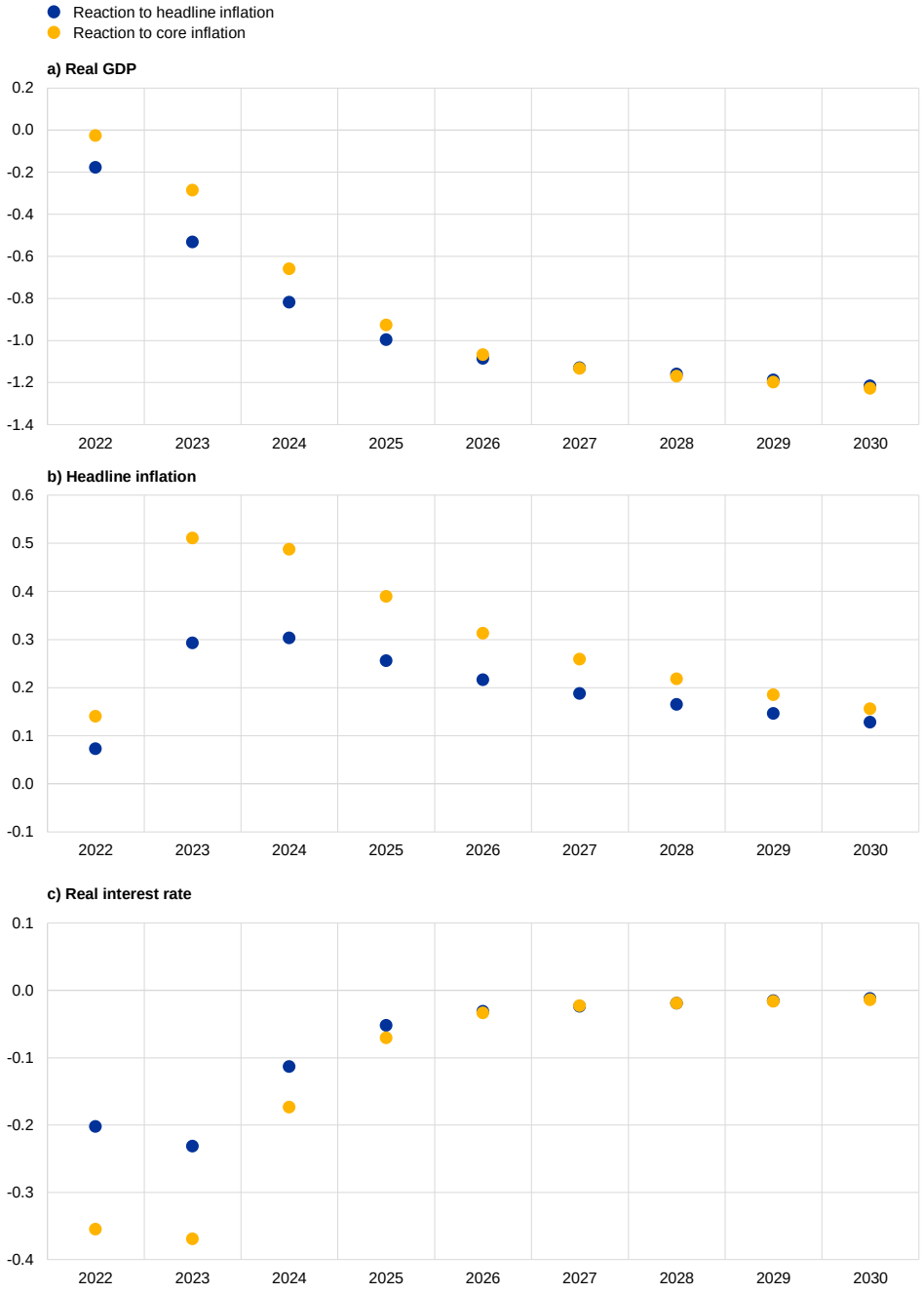
17 For a normative analysis of the reaction of monetary policy to a carbon tax shock within a stylised New Keynesian model, see Olovsson, C. and Vestin, D., "Greenflation?", *Working Paper Series*, No 420, Sveriges Riksbank, May 2023. The analysis suggests that it is optimal for monetary policy to look through the increase in energy prices due to the carbon tax and focus on core inflation.

significantly more protracted deviation of headline inflation from its target than the approach of stabilising headline inflation, it may entail a loss of credibility for monetary policy and increase the risk of a de-anchoring of inflation expectations. In such circumstances, monetary policy would have to correct its look-through approach and act forcefully as it faces higher costs in terms of stabilising output and inflation. However, a very forceful reaction could also push core inflation persistently below the inflation target.

Chart 9

Monetary policy and the output/inflation trade-off: sensitivity analysis

(percentage point deviations from baseline)



Source: NAWM-E.
Notes: The chart displays the impacts of the carbon tax scenario on euro area real GDP, headline inflation and the short-term real interest rate between 2022 and 2030. In the underlying simulations, monetary policy follows a Taylor-type interest-rate rule with a reaction to either headline inflation or core inflation, along with a reaction to the output gap. In contrast, the model's default interest-rate rule features reactions to core inflation and the output growth gap.

6 Conclusions

Model-based estimates of the impact of a plausible carbon tax path for the rest of this decade suggest limited effects on output and inflation, but also only a limited contribution to reaching the EU's carbon emission reduction goals. Carbon price increases affect output and inflation primarily via energy price increases, but the impacts also depend on distributional effects, global transition policies, fiscal and monetary policy, and the ability of financial intermediaries to support the reallocation of capital. Carbon price increases consistent with the IEA's net-zero scenario in 2050 suggest a moderate impact on euro area GDP and inflation over the current decade, with a modest output/inflation trade-off for monetary policy as it seeks to preserve price stability in the medium-term. At the same time the estimated carbon emission reductions are limited, being equal to around one-quarter of the EU's intermediate goal. Achieving greater cuts in emissions through higher carbon prices would have a bigger impact on inflation and GDP, with a more sizeable trade-off for monetary policy. In any event, reaching the EU's climate goals will require a mixture of ambitious carbon emission pricing, additional regulatory action and technological innovation, as set out in the Fit for 55 package.

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This Bulletin was produced under the responsibility of the Executive Board of the ECB. Translations are prepared and published by the national central banks.

The cut-off date for the statistics included in this issue was 26 July 2023.

For specific terminology please refer to the ECB glossary (available in English only).

PDF ISSN 2363-3417, QB-BP-23-005-EN-N
HTML ISSN 2363-3417, QB-BP-23-005-EN-Q

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	-4.3	2.2	-6.0	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	5.5	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	3.4	9.6	6.8	8.0	9.1	2.5	1.9	8.4
2022 Q2	-0.1	-0.1	0.1	1.4	-1.9	0.8	9.7	6.5	8.6	9.2	2.5	2.2	8.0
Q3	1.4	0.8	-0.1	-0.4	3.2	0.4	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	0.7	2.2	0.0	8.6	7.2	5.8	10.2	3.6	1.3	8.0
2023 Jan.	-	-	-	-	-	-	9.2	7.2	6.4	10.1	4.3	2.1	8.6
Feb.	-	-	-	-	-	-	8.8	7.3	6.0	10.4	3.3	1.0	8.5
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	.	5.5

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.

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	51.7	54.0	55.0	52.1	44.9	54.2	50.2	52.1	48.8	-0.1	-0.2	0.0
Q3	50.0	47.2	50.3	50.2	51.8	49.0	49.9	50.1	47.5	0.5	-0.4	1.4
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	50.9	47.7	52.1	50.2	54.0	49.9	50.7	51.0	48.6	1.2	0.5	1.9
Aug.	49.3	44.6	49.6	49.4	53.0	49.0	49.8	49.1	47.5	1.0	-0.4	2.6
Sep.	49.9	49.5	49.1	51.0	48.5	48.1	49.1	50.1	46.5	0.5	-0.4	1.4
Oct.	49.3	48.3	48.2	51.8	48.3	47.3	49.5	49.2	47.3	-0.1	-0.7	0.5
Nov.	48.0	46.4	48.2	48.9	47.0	47.8	48.1	47.9	47.0	-1.0	-1.3	-0.6
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											
	Total	Domestic demand								External balance [1]		
		Total	Private consumption	Government consumption	Gross fixed capital formation				Changes in inventories [2]	Total	Exports [1]	Imports [1]
						Total construction	Total machinery	Intellectual property products				
	1	2	3	4	5	6	7	8	9	10	11	12
	Current prices (EUR billions)											
2020	11,517.2	11,110.8	5,956.0	2,577.9	2,527.3	1,228.1	687.4	605.0	49.6	406.4	5,210.1	4,803.7
2021	12,402.4	11,909.3	6,324.2	2,731.1	2,720.9	1,384.2	762.1	567.3	133.2	493.1	6,131.7	5,638.6
2022	13,422.1	13,183.8	7,056.4	2,885.3	3,014.9	1,560.4	842.7	604.2	227.3	238.3	7,385.1	7,146.8
2022 Q2	3,328.3	3,258.2	1,741.3	713.9	745.0	389.0	205.7	148.4	58.0	70.1	1,854.3	1,784.2
Q3	3,373.8	3,347.8	1,798.0	723.2	766.2	393.9	216.1	154.2	60.4	26.1	1,907.0	1,881.0
Q4	3,442.6	3,370.7	1,823.6	741.0	771.1	396.6	217.1	155.5	35.0	71.9	1,893.1	1,821.2
2023 Q1	3,503.1	3,373.7	1,844.7	728.8	783.8	406.7	221.7	153.4	16.5	129.4	1,888.3	1,758.9
	as a percentage of GDP											
2022	100.0	98.2	52.6	21.5	22.5	11.6	6.3	4.5	1.7	1.8	-	-
	Chain-linked volumes (prices for the previous year)											
	quarter-on-quarter percentage changes											
2022 Q2	0.8	0.8	0.9	-0.1	0.8	0.0	1.1	2.6	-	-	1.8	1.9
Q3	0.4	1.1	1.3	0.0	1.0	-0.9	2.9	3.1	-	-	1.1	2.6
Q4	-0.1	-0.6	-1.0	0.6	-0.6	-0.8	-1.0	0.7	-	-	-0.3	-1.5
2023 Q1	0.0	-0.8	-0.3	-1.6	0.6	1.3	1.7	-2.3	-	-	0.2	-1.2
	annual percentage changes											
2020	-6.0	-5.7	-7.7	1.0	-6.2	-4.0	-11.9	-3.6	-	-	-9.0	-8.5
2021	5.5	4.2	3.8	4.3	3.8	6.5	8.7	-7.5	-	-	11.1	8.7
2022	3.4	3.6	4.5	1.4	2.9	1.9	4.3	3.5	-	-	7.1	8.1
2022 Q2	4.2	4.4	5.9	1.0	2.7	2.0	1.9	5.8	-	-	8.3	9.2
Q3	2.4	3.5	2.7	0.6	4.7	1.4	8.1	8.3	-	-	7.6	10.6
Q4	1.8	1.2	1.5	0.9	0.8	0.2	5.7	-3.5	-	-	4.3	3.2
2023 Q1	1.1	0.5	0.8	-1.0	1.9	-0.5	4.7	4.1	-	-	2.7	1.8
	contributions to quarter-on-quarter percentage changes in GDP; percentage points											
2022 Q2	0.8	0.8	0.5	0.0	0.2	0.0	0.1	0.1	0.2	0.0	-	-
Q3	0.4	1.1	0.6	0.0	0.2	-0.1	0.2	0.1	0.2	-0.7	-	-
Q4	-0.1	-0.6	-0.5	0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.6	-	-
2023 Q1	0.0	-0.7	-0.2	-0.3	0.1	0.1	0.1	-0.1	-0.4	0.8	-	-
	contributions to annual percentage changes in GDP; percentage points											
2020	-6.0	-5.5	-4.1	0.2	-1.4	-0.4	-0.8	-0.2	-0.3	-0.5	-	-
2021	5.5	4.3	2.1	1.0	0.9	0.7	0.6	-0.4	0.3	1.4	-	-
2022	3.4	3.6	2.4	0.3	0.6	0.2	0.3	0.2	0.3	-0.2	-	-
2022 Q2	4.2	4.3	3.0	0.2	0.6	0.2	0.1	0.3	0.5	0.0	-	-
Q3	2.4	3.4	1.4	0.1	1.0	0.2	0.5	0.4	0.8	-1.0	-	-
Q4	1.8	1.1	0.8	0.2	0.2	0.0	0.3	-0.2	0.0	0.7	-	-
2023 Q1	1.1	0.6	0.4	-0.2	0.4	-0.1	0.3	0.2	-0.1	0.6	-	-

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	10,378.7	177.1	2,008.3	549.5	1,802.5	546.9	484.5	1,214.4	1,203.8	2,067.5	324.1	1,138.5
2021	11,117.7	189.8	2,184.9	596.5	2,008.1	591.5	501.3	1,251.0	1,292.3	2,163.9	338.4	1,284.7
2022	12,082.8	221.6	2,420.0	660.1	2,321.1	624.1	513.3	1,303.6	1,393.0	2,254.2	371.8	1,339.3
2022 Q2	2,987.0	54.5	602.6	163.4	575.8	154.3	125.4	320.6	345.5	552.9	92.0	341.3
Q3	3,039.3	57.2	602.6	165.6	593.0	157.4	128.5	325.5	350.0	564.7	94.8	334.6
Q4	3,118.9	58.1	634.1	170.8	598.3	159.0	134.5	334.3	358.4	576.9	94.5	323.7
2023 Q1	3,184.2	59.2	659.6	179.8	604.3	161.7	139.9	342.5	363.0	578.3	95.9	318.9
	as a percentage of value added											
2022	100.0	1.8	20.0	5.5	19.2	5.2	4.2	10.8	11.5	18.7	3.1	-
	Chain-linked volumes (prices for the previous year)											
	quarter-on-quarter percentage changes											
2022 Q2	0.8	-0.2	0.4	-0.1	1.8	1.7	0.0	0.3	1.1	-0.2	4.1	1.1
Q3	0.7	0.4	0.6	-1.0	1.0	1.4	0.0	-0.2	0.4	1.1	3.0	-2.1
Q4	-0.2	0.1	0.0	-0.4	-1.1	0.6	-0.3	0.3	0.2	0.3	-2.4	0.9
2023 Q1	0.3	0.6	-0.2	2.4	0.4	1.0	-1.1	0.7	0.4	0.0	1.7	-3.0
	annual percentage changes											
2020	-5.9	0.1	-6.2	-5.2	-14.1	2.1	0.4	-0.7	-5.6	-2.8	-17.7	-7.2
2021	5.3	-0.4	7.5	3.8	7.9	7.5	3.8	1.8	6.1	3.5	4.2	6.6
2022	3.5	-0.1	1.7	1.5	7.9	5.3	-0.7	1.9	4.7	1.6	11.7	2.0
2022 Q2	4.4	-0.4	1.9	2.0	11.4	5.4	-0.6	2.2	5.5	1.3	16.6	2.9
Q3	2.6	0.0	1.9	1.0	4.7	6.2	-1.0	1.3	3.7	1.2	7.0	0.3
Q4	2.1	-0.3	1.5	-0.1	2.8	3.9	-0.8	1.2	3.2	2.0	6.7	-1.2
2023 Q1	1.6	1.0	0.7	1.0	2.1	4.9	-1.4	1.0	2.2	1.2	6.5	-3.2
	contributions to quarter-on-quarter percentage changes in value added; percentage points											
2022 Q2	0.8	0.0	0.1	0.0	0.3	0.1	0.0	0.0	0.1	0.0	0.1	-
Q3	0.7	0.0	0.1	-0.1	0.2	0.1	0.0	0.0	0.0	0.2	0.1	-
Q4	-0.2	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.1	-0.1	-
2023 Q1	0.3	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	-
	contributions to annual percentage changes in value added; percentage points											
2020	-5.9	0.0	-1.2	-0.3	-2.7	0.1	0.0	-0.1	-0.7	-0.5	-0.6	-
2021	5.3	0.0	1.5	0.2	1.4	0.4	0.2	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	0.6	0.3	0.4	-
2022 Q2	4.4	0.0	0.4	0.1	2.0	0.3	0.0	0.3	0.6	0.3	0.5	-
Q3	2.6	0.0	0.4	0.1	0.9	0.3	0.0	0.1	0.4	0.2	0.2	-
Q4	2.1	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	0.1	0.1	0.4	0.3	-0.1	0.1	0.3	0.2	0.2	-

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										
		Employees	Self-employed	Agriculture, forestry and fishing	Manufacturing, energy and utilities	Construction	Trade, transport, accommodation and food services	Information and communication	Finance and insurance	Real estate	Professional, business and support services	Public administration, education, 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	1.4	1.6	0.4	0.2	-0.2	3.3	0.5	4.7	1.1	1.0	3.0	2.0	1.0
2022	2.3	2.5	1.1	-0.4	1.2	3.2	3.3	5.7	0.0	3.0	3.0	1.5	1.7
2022 Q2	2.8	3.0	1.0	0.2	1.3	3.6	4.7	6.0	0.3	2.8	3.4	1.6	1.9
Q3	1.8	2.0	1.1	-0.7	1.3	3.3	2.0	6.2	-0.3	4.1	2.4	1.4	0.9
Q4	1.6	1.7	0.7	-0.8	1.0	2.2	1.7	4.5	0.4	3.3	2.1	1.3	1.0
2023 Q1	1.6	1.7	1.3	-1.1	1.2	1.5	2.2	4.5	1.1	2.5	2.0	1.2	0.9
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	7.3	25.3	3.5	2.5	1.1	14.0	21.9	5.9
annual percentage changes													
2020	-8.0	-7.2	-11.2	-3.4	-7.4	-6.1	-14.5	-1.8	-2.1	-5.1	-8.3	-2.3	-12.3
2021	5.4	5.2	6.5	0.1	4.6	9.2	6.7	7.3	2.9	6.9	7.5	3.1	5.8
2022	3.5	3.6	3.0	-1.0	1.0	3.4	7.4	5.8	-0.2	4.9	4.1	0.7	5.9
2022 Q2	3.7	3.9	2.8	-1.4	0.4	2.9	9.8	5.4	-1.0	5.1	3.9	-0.1	6.7
Q3	2.6	2.8	1.3	-0.5	1.9	3.5	3.3	7.2	0.2	4.9	3.7	1.2	2.4
Q4	2.3	2.3	2.1	-0.5	1.4	3.4	3.0	5.0	1.2	3.7	3.2	1.2	2.8
2023 Q1	1.9	2.1	1.0	-0.3	1.7	1.6	2.7	4.2	1.4	1.6	2.4	1.3	1.7
Hours worked per person employed													
annual percentage changes													
2020	-6.7	-5.9	-10.2	-0.9	-5.6	-6.8	-11.3	-3.7	-2.5	-5.8	-6.4	-3.2	-9.5
2021	3.9	3.5	6.0	-0.1	4.8	5.6	6.2	2.5	1.7	5.8	4.4	1.1	4.8
2022	1.1	1.1	1.8	-0.6	-0.2	0.2	3.9	0.1	-0.2	1.8	1.0	-0.8	4.2
2022 Q2	0.9	0.8	1.8	-1.6	-0.9	-0.6	4.8	-0.5	-1.3	2.3	0.5	-1.7	4.7
Q3	0.7	0.9	0.2	0.2	0.6	0.3	1.3	0.9	0.5	0.8	1.2	-0.3	1.5
Q4	0.7	0.6	1.4	0.3	0.4	1.2	1.3	0.4	0.8	0.4	1.0	-0.1	1.8
2023 Q1	0.3	0.5	-0.2	0.8	0.5	0.1	0.5	-0.3	0.3	-0.9	0.5	0.1	0.9

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-employ-ment, % of labour force	Unemployment [1]											Job vacancy rate [3]
			Total		Long-term unemploy-ment, % 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 Q2	167.794	3.1	11.299	6.7	2.7	9.038	5.9	2.261	14.6	5.704	6.4	5.595	7.1	3.2
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
2022 Dec.	-	-	11.290	6.7	-	9.043	5.9	2.247	14.2	5.651	6.3	5.639	7.1	-
2023 Jan.	-	-	11.268	6.7	-	9.016	5.9	2.251	14.2	5.645	6.3	5.623	7.1	-
Feb.	-	-	11.196	6.6	-	8.958	5.8	2.238	14.1	5.639	6.3	5.557	7.0	-
Mar.	-	-	11.110	6.6	-	8.888	5.8	2.222	14.0	5.603	6.2	5.507	6.9	-
Apr.	-	-	11.071	6.5	-	8.855	5.8	2.215	13.9	5.594	6.2	5.477	6.9	-
May	-	-	11.014	6.5	-	8.788	5.7	2.226	13.9	5.562	6.2	5.452	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						Con-struction produc-tion	Retail sales				Services production [1]	New passenger car regis-trations
	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	-5.3	-0.8	3.7	-2.3	-14.4	-9.8	-24.3
2021	8.9	9.8	9.6	11.6	8.1	1.5	6.0	5.0	0.9	7.8	9.6	8.1	-2.9
2022	2.3	3.0	-1.3	5.5	5.3	-3.4	2.4	0.7	-2.8	2.5	6.3	10.0	-4.3
2022 Q1	1.6	2.1	1.1	0.3	6.3	-1.4	6.2	5.8	-1.6	11.1	12.5	12.4	-12.3
Q2	2.0	2.6	-0.3	4.6	3.2	-1.4	2.7	1.0	-2.7	2.9	7.7	13.3	-16.2
Q3	3.4	4.0	-1.6	9.9	3.0	-1.3	0.8	-0.5	-1.6	-0.6	3.3	9.1	1.5
Q4	2.2	3.5	-4.4	7.2	8.9	-9.0	0.3	-2.5	-5.0	-1.5	3.1	6.2	15.3
2023 Jan.	1.0	2.3	-5.6	8.6	3.4	-7.7	0.5	-1.8	-4.6	0.0	4.8	6.2	12.1
Feb.	2.0	2.9	-5.0	9.9	3.6	-4.1	2.2	-2.4	-4.7	-0.8	0.4	4.1	11.6
Mar.	-1.3	-0.6	-4.5	-1.6	6.1	-6.5	-0.7	-3.3	-6.3	-1.6	1.8	4.7	30.8
Apr.	0.2	1.0	-6.0	8.6	-0.2	-8.7	0.4	-2.9	-4.6	-1.2	-3.1	3.1	19.4
May	-2.2	-1.8	-5.4	2.5	-3.0	-6.2	0.1	-2.9	-3.5	-2.1	-2.2	.	20.3
June	.	.	.	.	.	.	.	.	.	.	.	.	19.0
month-on-month percentage changes (s.a.)													
2023 Jan.	0.7	0.5	1.2	0.3	-1.5	-1.1	3.3	0.9	1.8	1.3	-1.6	-	-8.7
Feb.	1.8	1.5	0.8	1.7	1.0	0.7	2.2	-0.3	-0.3	-0.1	-1.2	-	3.0
Mar.	-4.4	-5.5	-1.0	-14.9	-0.3	-1.1	-1.8	-0.4	-0.8	-0.7	0.4	-	-1.5
Apr.	1.0	0.5	-0.9	14.7	-2.6	-0.3	-0.6	0.0	-0.3	0.3	-2.4	-	-1.1
May	0.2	1.3	0.5	1.0	0.1	-1.1	0.2	0.0	-0.5	0.1	-0.3	-	-0.5
June	.	.	.	.	.	.	.	.	.	.	.	-	1.5

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 confidence indicator	Service industries		Purchasing Managers' Index (PMI) for manufacturing	Manufacturing 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	-11.6	-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	-7.4	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	1.8	81.9	-26.8	2.9	-6.7	7.5	90.8	49.3	46.3	49.9	49.0
Q4	95.3	-0.9	81.2	-24.5	3.1	-4.8	4.9	90.4	47.1	45.9	49.0	48.2
2023 Q1	99.3	0.1	81.1	-19.7	1.3	-1.0	9.4	90.1	48.2	49.8	52.8	52.0
Q2	96.9	-5.1	.	-17.0	-0.5	-4.1	7.5	.	44.7	46.4	54.5	52.3
2023 Feb.	99.3	0.1	-	-19.0	1.5	-0.4	9.1	-	48.5	50.1	52.7	52.0
Mar.	98.9	-0.8	-	-19.1	0.9	-1.8	8.9	-	47.3	50.4	55.0	53.7
Apr.	98.9	-2.9	81.2	-17.5	0.7	-1.0	9.7	90.0	45.8	48.5	56.2	54.1
May	96.4	-5.3	-	-17.4	-0.3	-5.3	7.1	-	44.8	46.4	55.1	52.8
June	95.3	-7.2	-	-16.1	-2.0	-6.0	5.7	-	43.4	44.2	52.0	49.9
July	.	.	-	-15.1	.	.	.	-	42.7	42.9	51.1	48.9

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]	Housing wealth	Profit rate [3]	Saving rate (gross)	Debt ratio [4]	Financial investment	Non-financial investment (gross)	Financing
	Percentage of gross disposable income (adjusted) [1]		Annual percentage changes					Percentage of gross value added		Percentage of GDP	Annual percentage changes		
	1	2	3	4	5	6	7	8	9	10	11	12	13
2020	19.6	95.2	-0.1	4.2	-1.7	5.6	4.8	46.0	24.6	81.1	3.7	-12.0	2.5
2021	17.5	95.4	1.5	3.8	17.4	8.0	8.2	48.6	26.6	78.9	5.5	7.5	3.4
2022	13.5	92.7	0.0	2.6	12.4	1.4	6.9	48.7	23.8	74.1	3.0	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 Economic activity

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 Q2	1,307.5	1,343.4	-35.9	721.3	753.4	316.8	278.9	227.7	222.0	41.6	89.2	116.1	11.6
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
2022 Dec.	442.4	438.5	3.9	242.9	239.1	101.3	87.6	84.2	84.4	14.0	27.3	40.5	25.9
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.	433.5	429.7	3.8	232.2	215.3	108.2	104.2	79.7	82.5	13.4	27.7	6.4	5.7
May	460.4	451.3	9.1	249.8	227.3	109.6	103.4	86.3	94.0	14.6	26.7	5.2	3.8
12-month cumulated transactions													
2023 May	5,430.1	5,479.0	-48.9	2,981.9	2,950.7	1,278.7	1,186.0	1,003.5	1,011.4	166.1	330.9	138.5	96.2
12-month cumulated transactions as a percentage of GDP													
2023 May	39.8	40.1	-0.4	21.8	21.6	9.4	8.7	7.4	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	Manufacturing		Intermediate goods	Capital goods	Consumption goods	Manufacturing	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 Q2	20.3	45.5	714.2	359.0	126.0	216.0	577.5	812.6	511.4	111.9	164.0	516.4	108.2
Q3	20.2	47.6	729.6	365.4	133.5	217.1	589.5	856.4	529.4	117.0	168.8	534.1	108.0
Q4	14.9	20.2	733.2	361.0	139.8	221.4	604.7	797.3	482.1	114.0	169.9	517.8	97.1
2023 Q1	8.6	0.4	722.4	345.9	137.6	223.9	595.4	725.1	425.3	113.3	160.5	499.6	77.7
2022 Dec.	9.2	8.6	236.3	115.2	46.0	73.3	196.6	256.1	154.6	35.5	55.5	165.6	30.4
2023 Jan.	11.1	10.2	239.5	115.0	45.0	74.2	194.9	252.2	149.6	39.2	53.7	169.1	30.1
Feb.	7.6	1.5	241.3	115.4	45.8	75.9	199.2	243.5	143.0	37.4	54.3	168.1	24.4
Mar.	7.5	-8.9	241.6	115.5	46.7	73.9	201.3	229.3	132.6	36.7	52.5	162.3	23.1
Apr.	-4.1	-12.3	232.4	108.6	46.5	72.1	191.6	240.3	141.1	37.3	55.3	168.2	25.7
May	-2.3	-12.9	239.1	.	.	.	197.2	240.0	.	.	.	169.0	.
Volume indices (2000 = 100; annual percentage changes for columns 1 and 2)													
2022 Q2	2.2	11.6	106.9	106.3	102.0	117.6	106.2	121.7	121.8	124.5	120.5	123.0	143.4
Q3	2.8	14.9	106.6	104.8	105.9	114.5	106.3	124.0	121.7	123.7	121.2	122.9	140.2
Q4	1.5	3.5	107.1	103.9	109.6	114.6	106.8	119.8	116.1	120.0	121.5	120.5	144.8
2023 Q1	1.6	-1.3	106.3	101.8	105.3	116.9	105.9	114.7	111.5	119.3	115.5	117.0	142.2
2022 Nov.	2.5	4.2	108.1	104.9	112.8	114.0	108.0	119.6	115.9	121.8	121.1	121.3	139.6
Dec.	-1.1	-3.4	105.6	100.8	107.9	115.7	105.3	117.2	114.2	113.3	119.9	116.7	147.0
2023 Jan.	2.9	4.1	106.0	101.9	103.7	117.0	104.8	117.8	115.0	122.0	116.8	118.2	151.6
Feb.	-0.4	-0.6	106.8	101.3	105.4	118.8	106.6	117.1	114.1	118.3	117.1	118.2	143.8
Mar.	2.2	-6.9	106.1	102.3	106.8	115.0	106.3	109.2	105.6	117.6	112.6	114.5	131.2
Apr.	-6.6	-4.9	102.5	98.0	105.6	112.2	102.7	118.5	115.3	121.9	118.2	120.4	159.4

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		Goods	Services	Total	Processed food	Unprocessed food	Non-energy industrial goods	Energy (n.s.a.)	Services	Total HICP excluding administered prices	Administered prices
			Total excluding food and energy										
	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	1.9	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	0.9	3.4	2.7	1.8	-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 Jan.	120.3	8.6	5.3	11.7	4.4	0.6	1.1	0.3	0.7	0.6	0.4	8.7	8.2
Feb.	121.2	8.5	5.6	11.1	4.8	0.6	1.0	3.1	0.6	-1.1	0.5	8.6	7.8
Mar.	122.3	6.9	5.7	8.1	5.1	0.3	0.9	2.3	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	0.1	-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	0.5	0.7	0.2	-0.7	0.4	5.2	7.7

	Goods						Services					
	Food (including alcoholic beverages and tobacco)			Industrial goods			Housing		Transport	Communication	Recreation and personal care	Miscellaneous
	Total	Processed food	Unprocessed 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 Jan.	14.1	15.0	11.3	10.4	6.7	18.9	3.4	2.3	5.4	0.2	6.5	3.7
Feb.	15.0	15.4	13.9	8.9	6.8	13.7	3.6	2.6	6.0	0.2	7.3	3.8
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

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 Prices and costs

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 Q2	149.2	36.5	20.0	15.8	24.8	7.4	11.6	16.3	7.5	95.4	12.4	9.2	2.3
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	.
2022 Dec.	162.6	24.5	13.0	12.3	13.6	7.5	15.0	19.3	9.4	48.6	-	-	-
2023 Jan.	157.7	14.8	11.7	11.1	11.2	7.3	14.8	18.8	8.8	20.1	-	-	-
Feb.	156.5	12.7	9.9	10.3	9.4	7.4	14.6	18.3	8.7	15.9	-	-	-
Mar.	154.4	5.5	5.7	8.1	5.8	6.7	12.9	15.3	8.1	0.0	-	-	-
Apr.	149.4	0.9	3.1	5.1	1.2	6.2	10.6	11.3	7.2	-9.1	-	-	-
May	146.5	-1.5	0.6	3.4	-1.5	5.6	9.4	9.3	6.4	-13.3	-	-	-

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 consump-tion	Govern-ment consump-tion	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	1.5	3.7	5.9	7.8	59.8	29.6	21.5	37.2	29.1	22.2	37.1
2022	114.7	4.7	6.8	6.7	4.2	7.7	12.5	17.5	95.0	18.1	29.0	9.0	19.2	28.2	9.9
2022 Q3	115.0	4.7	7.5	7.5	4.6	7.8	13.5	19.6	98.3	14.4	30.0	1.5	14.7	26.9	2.3
Q4	117.4	5.8	7.0	8.6	5.7	7.4	9.9	12.6	86.6	5.3	13.8	-2.3	4.9	12.2	-3.1
2023 Q1	119.5	6.2	5.5	8.1	4.1	6.4	5.2	3.8	75.8	-10.5	-5.2	-15.1	-11.2	-6.4	-16.4
Q2	.	.	.	.	.	.	.	.	71.6	-18.4	-16.4	-20.3	-18.6	-16.3	-21.3
2023 Jan.	-	-	-	-	-	-	-	-	77.1	-4.6	0.4	-8.9	-6.0	-1.7	-10.4
Feb.	-	-	-	-	-	-	-	-	77.3	-7.9	-1.7	-13.4	-8.7	-3.1	-14.7
Mar.	-	-	-	-	-	-	-	-	73.3	-17.9	-13.2	-22.1	-18.1	-13.5	-23.2
Apr.	-	-	-	-	-	-	-	-	76.7	-19.1	-14.7	-23.1	-19.2	-14.8	-24.2
May	-	-	-	-	-	-	-	-	69.7	-19.4	-18.1	-20.7	-19.6	-17.9	-21.7
June	-	-	-	-	-	-	-	-	69.0	-16.4	-16.4	-16.5	-16.8	-16.1	-17.6

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	54.6	27.7	40.8	76.5	74.3	74.9	67.1	61.8
Q4	40.2	51.6	29.0	41.7	78.1	65.8	74.3	63.7	62.0
2023 Q1	23.8	43.5	26.0	27.2	78.4	51.3	69.9	57.8	61.2
Q2	7.5	30.2	18.1	11.9	76.9	41.6	64.3	49.2	58.0
2023 Feb.	22.9	43.4	25.9	25.8	78.6	50.9	71.0	58.4	61.8
Mar.	17.8	41.4	23.5	21.5	78.6	46.8	68.5	53.4	59.8
Apr.	11.5	34.9	19.5	15.4	78.3	44.0	67.2	51.6	58.7
May	6.5	30.3	18.7	12.4	77.4	41.3	64.4	49.0	59.1
June	4.4	25.4	16.1	8.0	74.9	39.5	61.3	47.0	56.3
July	.	.	.	.	.	35.5	61.2	44.6	55.8

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: 2016 = 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	3.6	1.5	2.8	3.9	1.8
2021	101.3	1.2	1.4	0.8	1.1	1.5	1.3
2022	105.7	4.4	3.7	6.6	4.8	3.7	2.9
2022 Q2	108.7	4.7	4.2	6.6	5.5	3.4	2.6
Q3	102.3	3.4	2.8	5.5	3.7	3.2	3.0
Q4	113.8	5.5	5.0	7.4	5.6	5.5	3.1
2023 Q1	103.0	5.0	4.6	6.1	5.3	4.4	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	-1.0	2.1	5.0	7.7	-0.1	-0.1	1.2	3.6	6.2	16.5
2021	110.2	0.0	2.9	-3.1	4.2	-1.8	2.5	0.5	4.1	1.1	0.7	-0.2
2022	113.7	3.2	4.7	3.1	5.4	1.5	3.6	4.3	4.6	3.3	3.4	-3.3
2022 Q2	112.6	2.7	5.6	3.5	4.9	0.7	3.3	4.7	4.2	2.6	2.9	-6.2
Q3	113.9	3.2	4.4	1.9	5.5	1.8	3.0	3.9	6.2	3.5	3.7	-1.1
Q4	116.2	4.6	5.4	2.9	7.0	4.0	4.2	4.7	3.9	4.9	4.6	-1.0
2023 Q1	118.8	5.9	4.0	6.2	5.0	6.6	4.6	7.4	5.2	6.6	3.8	-0.2
Compensation per employee												
2020	107.0	-0.4	1.7	-2.4	-1.2	-3.9	0.0	-0.2	-0.2	-0.2	2.3	-1.1
2021	111.2	3.9	2.3	4.5	4.7	5.4	5.3	3.2	4.9	4.2	2.1	3.1
2022	115.9	4.3	5.0	3.5	3.6	6.0	3.2	3.5	3.4	5.0	3.5	6.3
2022 Q2	114.9	4.2	5.0	4.1	3.3	7.1	2.8	3.8	3.7	4.7	2.6	7.4
Q3	116.4	3.7	5.2	2.6	3.2	4.4	3.0	3.2	3.4	4.7	3.5	4.8
Q4	118.3	4.8	6.1	3.4	4.6	5.1	3.5	3.5	1.7	6.0	5.3	4.6
2023 Q1	120.3	5.4	6.1	5.7	4.5	6.5	5.0	4.7	3.7	6.8	3.9	5.4
Labour productivity per person employed												
2020	97.1	-4.7	2.7	-4.4	-5.9	-10.8	0.1	0.0	-1.4	-3.7	-3.7	-15.1
2021	100.9	4.0	-0.6	7.8	0.5	7.4	2.7	2.6	0.8	3.0	1.4	3.2
2022	102.0	1.0	0.2	0.4	-1.7	4.4	-0.4	-0.8	-1.1	1.6	0.1	9.9
2022 Q2	102.1	1.4	-0.6	0.6	-1.5	6.3	-0.5	-0.9	-0.5	2.1	-0.3	14.4
Q3	102.2	0.5	0.7	0.6	-2.2	2.6	0.0	-0.7	-2.7	1.2	-0.2	6.0
Q4	101.8	0.2	0.6	0.5	-2.3	1.0	-0.6	-1.1	-2.1	1.0	0.7	5.6
2023 Q1	101.2	-0.5	2.1	-0.5	-0.5	-0.1	0.4	-2.5	-1.4	0.2	0.1	5.5
Compensation per hour worked												
2020	113.8	5.8	4.3	2.9	5.0	7.0	3.1	1.8	4.4	5.9	5.3	6.8
2021	114.3	0.4	0.0	-0.1	-0.3	-0.2	2.8	1.7	0.5	0.4	1.3	-0.8
2022	117.9	3.2	5.9	3.8	3.8	1.6	3.4	3.7	2.6	3.8	4.5	2.9
2022 Q2	116.7	3.4	6.8	4.9	5.2	1.6	3.8	4.9	3.0	4.0	4.4	3.4
Q3	118.4	2.8	5.1	2.0	3.0	2.4	2.2	2.3	2.9	3.1	3.8	3.8
Q4	120.4	4.1	7.0	3.0	3.2	3.7	3.4	2.9	1.2	5.1	5.6	3.4
2023 Q1	121.9	4.9	4.7	5.3	4.3	5.6	5.1	4.5	4.4	6.1	3.8	4.6
Hourly labour productivity												
2020	104.7	2.1	3.6	1.3	1.0	0.5	3.9	2.5	4.7	2.9	-0.5	-6.2
2021	104.7	0.0	-0.6	2.8	-4.9	1.1	0.1	0.9	-4.8	-1.3	0.4	-1.5
2022	104.6	-0.1	0.9	0.6	-1.8	0.5	-0.5	-0.6	-2.8	0.6	0.9	5.5
2022 Q2	104.6	0.5	1.0	1.5	-0.9	1.5	0.0	0.4	-2.7	1.6	1.4	9.3
Q3	104.9	-0.2	0.6	0.0	-2.5	1.3	-0.9	-1.2	-3.4	0.0	0.1	4.5
Q4	104.4	-0.5	0.3	0.2	-3.4	-0.2	-1.0	-1.9	-2.5	0.0	0.8	3.8
2023 Q1	103.6	-0.8	1.3	-1.0	-0.6	-0.5	0.7	-2.8	-0.5	-0.2	0.0	4.6

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
2022 Dec.	1.57	1.72	2.06	2.56	3.02	4.05	-0.07
2023 Jan.	1.90	1.98	2.34	2.86	3.34	4.30	-0.02
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

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
2022 Dec.	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 Jan.	2.22	2.67	2.51	2.29	2.32	-0.35	-1.18	-0.12	2.65	2.15	2.24	2.41
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

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
2022 Dec.	418.3	3,884.7	944.2	257.4	166.8	121.0	168.9	738.0	757.3	355.1	268.3	786.9	3,912.4	27,214.7
2023 Jan.	439.8	4,092.7	963.0	276.9	167.7	123.3	182.3	780.4	807.6	358.7	277.9	808.6	3,960.7	26,606.3
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

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					
	Overnight	Redeemable 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)]	Composite cost-of-borrowing indicator
			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 June	0.00	0.45	0.22	0.71	4.80	15.87	5.70	5.56	6.16	2.51	1.69	2.06	2.28	1.87	2.21	1.97
July	0.01	0.46	0.30	0.88	4.84	15.86	6.18	5.75	6.36	2.81	1.84	2.27	2.54	1.99	2.36	2.15
Aug.	0.01	0.70	0.40	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	0.60	1.27	5.27	15.83	6.57	5.96	6.58	3.09	2.27	2.59	2.84	2.25	2.67	2.45
Oct.	0.03	0.73	0.90	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	1.19	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	1.40	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	1.58	2.08	6.34	15.98	7.44	6.97	7.60	4.27	3.46	3.32	3.39	2.77	3.39	3.10
Feb.	0.12	1.17	1.89	2.20	6.59	16.07	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	2.09	2.26	6.76	16.06	7.84	7.23	7.92	4.69	3.88	3.78	3.56	3.14	3.72	3.37
Apr.	0.18	1.24	2.26	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 [(p)]	0.21	1.30	2.44	2.48	7.18	16.25	8.35	7.60	8.33	5.08	4.23	3.98	3.65	3.31	3.93	3.58

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
	Overnight	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 June	-0.05	-0.14	1.05	1.72	1.84	2.18	2.56	1.60	1.56	1.94	1.81	1.55	2.14	1.83
July	0.00	0.04	1.20	1.78	1.90	2.44	2.78	1.69	1.86	2.14	1.40	1.77	2.11	1.79
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	2.71	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	3.85
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	4.40	4.86	4.74	4.96	4.60	4.58	3.98	4.32	4.37	3.68	4.39
May [(p)]	0.49	2.96	3.13	4.56	5.04	5.08	5.16	4.75	4.84	4.00	4.46	4.56	4.05	4.57

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 Financial market developments

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 corporations other than MFIs	FVCs	Non-financial corporations		of which central government			Financial corporations other than MFIs	FVCs	Non-financial corporations		of which central government
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short-term														
2020	1,489.1	429.7	126.5	52.5	96.7	836.1	722.5	.	.	.	.	.	.	.
2021	1,412.3	427.9	131.7	49.9	88.0	764.7	674.9	387.7	138.4	79.7	26.4	32.1	137.6	104.8
2022	1,371.9	466.8	143.4	50.3	94.7	667.0	621.7	481.8	182.4	117.4	48.0	48.1	133.9	97.2
2023 Jan.	1,384.2	515.6	135.0	48.9	92.3	641.3	594.2	512.7	222.2	107.9	40.3	50.5	132.1	112.5
Feb.	1,374.4	529.2	137.5	51.5	94.2	613.4	569.4	495.0	224.6	98.4	35.1	49.1	122.8	96.2
Mar.	1,423.4	536.6	135.7	50.7	96.4	654.7	603.4	583.5	239.4	122.3	38.7	53.3	168.5	131.0
Apr.	1,454.0	564.9	133.7	47.6	102.3	653.1	603.5	510.7	218.1	100.9	31.9	60.2	131.5	103.3
May	1,453.9	581.6	133.1	46.3	103.1	636.1	599.6	512.5	243.1	114.2	34.1	53.9	101.4	86.5
June	1,469.1	584.6	124.3	43.9	89.4	670.8	634.6	510.4	225.5	109.6	31.7	47.4	127.8	107.8
Long-term														
2020	19,287.7	4,076.8	3,105.9	1,259.3	1,544.8	10,560.1	9,773.2	.	.	.	.	.	.	.
2021	19,936.6	4,183.6	3,395.3	1,341.8	1,600.1	10,757.4	9,936.5	317.6	68.0	84.7	34.3	23.1	141.8	128.3
2022	17,902.1	3,973.7	3,269.9	1,332.2	1,392.7	9,265.9	8,553.9	299.3	78.4	74.0	29.0	16.4	130.6	121.1
2023 Jan.	18,272.4	4,085.5	3,290.1	1,319.9	1,424.3	9,472.4	8,746.8	377.2	153.1	46.0	10.1	26.6	151.4	135.6
Feb.	18,187.5	4,082.1	3,292.7	1,323.9	1,414.0	9,398.7	8,675.3	354.2	99.1	54.3	12.9	17.9	182.9	165.8
Mar.	18,412.7	4,105.5	3,283.6	1,321.1	1,412.0	9,611.7	8,876.1	338.6	84.4	70.2	30.1	15.6	168.5	155.9
Apr.	18,411.0	4,118.3	3,283.6	1,317.8	1,415.4	9,593.8	8,873.4	308.9	73.0	76.1	22.2	16.4	143.3	137.5
May	18,570.2	4,190.9	3,331.4	1,352.9	1,422.5	9,625.3	8,907.8	371.3	100.0	99.5	56.0	27.4	144.3	135.9
June	18,664.9	4,200.5	3,343.2	1,362.3	1,425.2	9,696.0	8,975.9	389.4	113.0	75.4	28.4	31.4	169.6	157.9

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	20,776.8	4,506.5	3,232.5	1,311.8	1,641.6	11,396.2	10,495.7	8,517.5	473.6	1,336.4	6,706.4
2021	21,348.9	4,611.5	3,527.0	1,391.7	1,688.1	11,522.2	10,611.3	10,414.3	599.8	1,556.4	8,257.1
2022	19,274.0	4,440.5	3,413.3	1,382.6	1,487.4	9,932.8	9,175.6	8,746.7	524.7	1,363.1	6,858.3
2023 Jan.	19,656.6	4,601.2	3,425.2	1,368.9	1,516.6	10,113.6	9,341.0	9,485.5	596.0	1,470.2	7,418.7
Feb.	19,561.9	4,611.3	3,430.2	1,375.4	1,508.2	10,012.1	9,244.7	9,622.7	630.1	1,495.0	7,497.0
Mar.	19,836.1	4,642.0	3,419.4	1,371.9	1,508.4	10,266.4	9,479.4	9,643.2	558.6	1,447.5	7,636.5
Apr.	19,865.1	4,683.2	3,417.3	1,365.5	1,517.7	10,246.9	9,476.9	9,695.0	566.2	1,441.9	7,686.4
May	20,024.1	4,772.5	3,464.6	1,399.2	1,525.6	10,261.4	9,507.4	9,418.4	545.3	1,400.7	7,471.9
June	20,134.0	4,785.1	3,467.5	1,406.3	1,514.6	10,366.8	9,610.5	9,724.2	587.7	1,484.1	7,651.8
Growth rate [1]											
2022 Nov.	3.8	5.3	5.2	1.4	0.5	3.2	3.8	0.0	-1.5	1.4	-0.2
Dec.	3.6	4.7	4.5	-0.1	1.0	3.2	3.8	0.0	-1.8	1.2	-0.1
2023 Jan.	3.9	7.0	3.7	-0.3	0.7	3.1	3.7	0.0	-2.2	0.6	0.1
Feb.	4.1	7.8	2.9	-0.9	1.3	3.3	3.9	0.1	-2.4	0.7	0.2
Mar.	3.7	6.9	2.1	-1.8	-0.2	3.4	4.0	0.0	-2.4	0.5	0.1
Apr.	4.2	8.0	1.5	-2.6	0.5	4.1	4.8	0.0	-2.2	0.5	0.1
May	4.3	9.0	2.1	0.2	0.5	3.6	4.5	-0.1	-2.6	0.5	-0.1
June	5.0	9.7	3.3	1.8	0.8	4.2	5.1	-0.4	-2.3	1.6	-0.7

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	93.6	93.4	89.5	75.5	87.5	119.5	93.9
2021	99.6	93.5	93.3	88.7	71.2	86.0	120.9	94.3
2022	95.5	90.7	93.2	83.7	66.3	81.2	116.8	90.8
2022 Q3	94.0	89.3	92.2	81.9	64.4	79.6	114.5	88.9
Q4	95.9	91.8	94.6	84.5	65.4	81.7	117.3	91.7
2023 Q1	97.4	92.6	96.5	86.3	68.6	84.0	120.2	93.1
Q2	98.3	93.2	97.9	.	.	.	122.1	94.2
2023 Jan.	97.3	92.5	96.3	-	-	-	119.9	92.9
Feb.	97.3	92.6	96.5	-	-	-	120.1	93.1
Mar.	97.5	92.8	96.7	-	-	-	120.5	93.3
Apr.	98.6	93.6	97.6	-	-	-	122.3	94.5
May	98.1	93.0	97.8	-	-	-	121.7	93.8
June	98.3	93.1	98.4	-	-	-	122.5	94.3
Percentage change versus previous month								
2023 June	0.2	0.1	0.6	-	-	-	0.7	0.5
Percentage change versus previous year								
2023 June	2.5	2.7	5.1	-	-	-	5.0	4.5

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 Jan.	7.317	23.958	7.438	396.032	140.544	4.697	0.882	4.9242	11.205	0.996	1.077
Feb.	7.324	23.712	7.445	384.914	142.377	4.742	0.886	4.9087	11.172	0.990	1.072
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
Percentage change versus previous month											
2023 June	2.2	0.4	0.0	-0.5	2.8	-1.6	-1.4	0.2	2.7	0.1	-0.3
Percentage change versus previous year											
2023 June	9.8	-4.1	0.1	-6.6	8.2	-4.0	0.1	0.3	10.2	-4.7	2.6

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	231.3	228.8	2.4	90.1	72.6	82.9	97.9	0.2	49.8	58.3	8.3	115.0
Transactions												
2022 Q2	-2.2	-50.2	48.0	96.2	-50.2	-121.9	-92.2	26.3	-5.2	92.2	2.3	-
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	-
2022 Dec.	-583.0	-625.4	42.5	-267.4	-271.5	53.5	-3.2	-7.7	-366.2	-350.7	4.8	-
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.	5.4	34.9	-29.5	1.8	-5.3	40.4	7.3	1.0	-35.9	32.9	-1.8	-
May	83.2	61.6	21.5	25.9	60.7	37.7	-23.4	13.2	5.0	24.3	1.4	-
12-month cumulated transactions												
2023 May	-208.3	-284.9	76.6	-203.5	-258.0	22.9	280.9	67.1	-94.2	-307.7	-0.5	-
12-month cumulated transactions as a percentage of GDP												
2023 May	-1.5	-2.1	0.6	-1.5	-1.9	0.2	2.1	0.5	-0.7	-2.3	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	4,194.2	15,185.8	103.2	681.3	93.4	877.9	16,063.7
Q2 [p]	1,534.8	9,179.7	10,714.4	1,868.4	2,534.0	4,402.4	15,116.9	113.3	698.7	89.4	901.3	16,018.2
2023 Jan.	1,540.7	9,729.3	11,270.0	1,458.2	2,560.6	4,018.8	15,288.8	133.8	634.5	49.6	817.9	16,106.8
Feb.	1,539.6	9,593.3	11,132.9	1,544.7	2,557.5	4,102.2	15,235.2	124.2	651.9	80.7	856.8	16,092.0
Mar.	1,544.1	9,447.6	10,991.6	1,644.4	2,549.7	4,194.2	15,185.8	103.2	681.3	93.4	877.9	16,063.7
Apr.	1,536.8	9,373.2	10,910.0	1,702.4	2,537.5	4,239.9	15,149.8	101.5	687.1	86.3	874.9	16,024.7
May	1,537.1	9,280.9	10,818.0	1,765.4	2,527.8	4,293.2	15,111.2	112.9	690.8	96.8	900.5	16,011.7
June [p]	1,534.8	9,179.7	10,714.4	1,868.4	2,534.0	4,402.4	15,116.9	113.3	698.7	89.4	901.3	16,018.2
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	-125.8	-20.6	31.2	48.8	59.4	-66.5
Q2 [p]	-9.3	-248.7	-258.0	221.0	-32.7	188.3	-69.8	10.1	17.2	-1.9	25.4	-44.3
2023 Jan.	0.9	-101.6	-100.7	74.9	-0.9	74.0	-26.7	9.9	-15.5	4.7	-0.9	-27.6
Feb.	-1.1	-138.6	-139.7	84.2	-3.2	81.0	-58.7	-10.1	17.4	28.9	36.2	-22.5
Mar.	4.4	-139.1	-134.7	102.0	-7.7	94.3	-40.4	-20.4	29.2	15.2	24.1	-16.3
Apr.	-7.3	-69.8	-77.1	56.8	-12.2	44.6	-32.5	-1.5	5.8	-5.6	-1.3	-33.8
May	0.3	-99.7	-99.4	59.3	-9.8	49.5	-49.9	10.8	3.6	8.8	23.3	-26.7
June [p]	-2.3	-79.2	-81.5	104.9	-10.7	94.2	12.7	0.7	7.7	-5.1	3.4	16.1
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	520.7	23.8	2.1
Q2 [p]	0.4	-9.2	-8.0	85.5	-0.4	24.0	-0.5	-2.5	14.7	343.1	23.1	0.6
2023 Jan.	3.8	-2.0	-1.3	49.6	2.1	15.2	2.6	2.6	5.7	243.6	13.4	3.1
Feb.	2.9	-4.0	-3.1	59.1	1.7	17.5	1.7	-6.1	11.6	459.4	20.9	2.6
Mar.	1.5	-5.6	-4.7	68.8	1.4	20.0	1.1	-17.5	15.3	520.7	23.8	2.1
Apr.	1.0	-6.7	-5.7	73.3	0.8	21.0	0.5	-13.7	14.9	352.0	21.5	1.5
May	0.7	-8.1	-7.0	80.9	0.2	22.5	-0.1	-10.1	15.3	419.5	23.9	1.0
June [p]	0.4	-9.2	-8.0	85.5	-0.4	24.0	-0.5	-2.5	14.7	343.1	23.1	0.6

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 [p]	3,338.3	2,508.5	685.8	132.3	11.7	8,380.6	5,310.1	703.7	2,365.9	0.9	1,181.1	230.6	564.8
2023 Jan.	3,375.9	2,697.2	536.6	134.6	7.4	8,439.1	5,563.9	485.3	2,389.1	0.8	1,271.1	237.0	558.9
Feb.	3,380.1	2,663.2	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	8,376.6	5,398.7	608.1	2,368.9	0.9	1,213.8	227.0	560.5
May	3,308.0	2,531.8	632.7	131.9	11.6	8,378.8	5,361.8	656.8	2,359.2	0.9	1,217.9	226.6	555.8
June [p]	3,338.3	2,508.5	685.8	132.3	11.7	8,380.6	5,310.1	703.7	2,365.9	0.9	1,181.1	230.6	564.8
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	-145.1	120.0	-9.7	0.1	-97.5	-2.1	12.7
Q2 [p]	-4.4	-92.0	84.8	-0.6	3.3	-10.1	-116.1	135.3	-29.2	-0.1	-20.5	-0.9	-14.5
2023 Jan.	0.6	-40.9	40.5	-0.6	1.6	13.1	-25.0	37.3	0.9	-0.1	-30.0	1.0	-2.4
Feb.	1.4	-35.6	35.4	-0.1	1.7	-20.5	-53.2	36.2	-3.3	-0.1	-51.1	-10.2	12.6
Mar.	-31.0	-58.8	28.7	-0.2	-0.7	-27.3	-66.9	46.6	-7.2	0.2	-16.4	7.1	2.5
Apr.	-4.2	-27.7	22.7	-1.0	1.8	-13.9	-44.2	40.0	-9.6	-0.1	14.4	-4.4	-18.6
May	-33.4	-43.0	8.1	0.3	1.2	0.6	-37.7	48.1	-9.8	0.1	-0.9	-0.8	-5.0
June [p]	33.1	-21.3	54.1	0.1	0.3	3.2	-34.2	47.2	-9.8	-0.1	-34.0	4.3	9.1
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 [p]	0.7	-12.6	125.3	2.1	10.3	1.1	-4.4	96.8	-0.3	20.8	-14.1	0.5	-2.1
2023 Jan.	3.2	-4.9	82.0	3.9	-28.1	3.3	1.9	31.7	2.2	-3.1	-4.4	-0.1	3.4
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	0.3	-11.8	119.1	2.3	12.1	1.3	-3.6	83.1	0.3	18.9	-10.1	-1.4	-3.2
June [p]	0.7	-12.6	125.3	2.1	10.3	1.1	-4.4	96.8	-0.3	20.8	-14.1	0.5	-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) 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 corporations [3)]	To households [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	5,127.0	6,633.3	1,074.9	146.5	1,569.9	836.3
2022 Q3	6,359.6	1,002.3	5,333.0	15,421.7	13,051.1	13,204.2	5,165.6	6,613.7	1,110.6	161.2	1,546.0	824.6
Q4	6,374.0	1,007.3	5,341.6	15,387.9	12,981.7	13,177.9	5,127.0	6,633.3	1,074.9	146.5	1,569.9	836.3
2023 Q1	6,358.0	995.7	5,337.4	15,415.4	13,014.0	13,204.5	5,131.2	6,665.9	1,078.4	138.5	1,552.0	849.4
Q2 [p)]	6,269.4	985.9	5,258.1	15,421.6	12,979.2	13,205.9	5,130.6	6,633.6	1,071.0	144.0	1,576.3	866.1
2023 Jan.	6,379.3	996.3	5,358.1	15,422.7	13,028.2	13,223.8	5,141.4	6,655.3	1,084.5	147.0	1,557.9	836.6
Feb.	6,347.5	997.3	5,325.3	15,417.3	13,023.1	13,214.7	5,140.2	6,659.9	1,074.4	148.6	1,548.5	845.7
Mar.	6,358.0	995.7	5,337.4	15,415.4	13,014.0	13,204.5	5,131.2	6,665.9	1,078.4	138.5	1,552.0	849.4
Apr.	6,319.0	981.6	5,312.2	15,422.9	13,000.9	13,202.5	5,125.1	6,666.8	1,064.5	144.6	1,564.3	857.7
May	6,262.0	990.6	5,245.8	15,445.5	13,000.6	13,228.2	5,135.3	6,631.6	1,092.1	141.6	1,582.6	862.3
June [p)]	6,269.4	985.9	5,258.1	15,421.6	12,979.2	13,205.9	5,130.6	6,633.6	1,071.0	144.0	1,576.3	866.1
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	634.5	623.2	680.3	268.5	242.3	125.4	-13.0	17.8	-6.5
2022 Q3	-36.6	2.1	-38.9	222.7	232.6	236.6	139.1	58.7	38.0	-3.2	-9.4	-0.5
Q4	44.4	4.1	39.7	3.5	-31.7	11.4	-17.4	27.4	-27.5	-14.2	22.6	12.5
2023 Q1	-80.5	-19.8	-60.6	-5.9	7.0	4.0	-2.6	14.1	3.3	-7.8	-20.8	7.9
Q2 [p)]	-87.1	-9.7	-77.8	8.0	-29.9	2.6	3.5	-29.7	-9.2	5.5	23.9	14.1
2023 Jan.	-57.5	-17.7	-39.7	-3.5	12.9	7.3	1.6	1.4	9.3	0.6	-15.2	-1.2
Feb.	2.2	1.1	1.1	-9.0	-7.8	-7.4	-2.3	4.4	-11.6	1.6	-8.3	7.1
Mar.	-25.2	-3.2	-21.9	6.7	2.0	4.1	-2.0	8.3	5.7	-10.0	2.6	2.0
Apr.	-34.3	-14.0	-20.5	9.2	-9.3	1.9	-2.7	2.0	-14.7	6.2	12.2	6.4
May	-63.4	8.9	-72.8	18.2	-5.5	17.8	8.0	-35.2	24.9	-3.1	17.0	6.7
June [p)]	10.6	-4.5	15.4	-19.4	-15.1	-17.2	-1.8	3.6	-19.4	2.5	-5.3	1.1
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	4.8	-9.8	-1.4	1.9
Q2 [p)]	-2.5	-2.3	-2.5	1.5	1.4	2.0	2.4	1.1	0.5	-12.1	1.0	4.1
2023 Jan.	1.4	-0.6	1.8	3.8	4.4	4.9	5.3	3.4	9.7	-12.6	1.0	-0.7
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	4.8	-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	3.2
May	-2.2	-1.7	-2.3	2.2	2.1	2.8	3.2	1.5	3.2	-13.0	2.3	2.6
June [p)]	-2.5	-2.3	-2.5	1.5	1.4	2.0	2.4	1.1	0.5	-12.1	1.0	4.1

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)]				
	Total		Up to 1 year	Over 1 and up to 5 years	Over 5 years	Total		Loans for consumption	Loans for house purchase	Other loans
		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	5,127.0	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	5,127.0	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	5,131.2	5,145.0	940.2	1,093.0	3,098.0	6,665.9	6,871.4	723.6	5,236.1	706.3
Q2 [p)]	5,130.6	5,144.0	924.4	1,086.7	3,119.5	6,633.6	6,866.4	725.5	5,207.6	700.4
2023 Jan.	5,141.4	5,151.8	955.0	1,086.3	3,100.1	6,655.3	6,864.0	720.0	5,223.1	712.2
Feb.	5,140.2	5,149.7	945.3	1,092.0	3,103.0	6,659.9	6,868.2	721.7	5,228.3	709.9
Mar.	5,131.2	5,145.0	940.2	1,093.0	3,098.0	6,665.9	6,871.4	723.6	5,236.1	706.3
Apr.	5,125.1	5,142.6	929.9	1,094.3	3,100.8	6,666.8	6,871.9	725.1	5,237.6	704.0
May	5,135.3	5,146.0	924.5	1,096.2	3,114.6	6,631.6	6,870.3	726.1	5,204.3	701.3
June [p)]	5,130.6	5,144.0	924.4	1,086.7	3,119.5	6,633.6	6,866.4	725.5	5,207.6	700.4
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	308.4	78.5	77.6	112.5	242.3	249.8	22.7	218.5	1.1
2022 Q3	139.1	139.2	55.4	39.9	43.8	58.7	59.5	4.9	55.6	-1.8
Q4	-17.4	7.5	-38.2	18.2	2.6	27.4	36.0	5.2	22.0	0.2
2023 Q1	-2.6	3.7	-20.8	10.9	7.3	14.1	22.0	4.2	14.7	-4.9
Q2 [p)]	3.5	0.4	-14.3	-4.5	22.4	-29.7	-3.2	3.4	-27.9	-5.2
2023 Jan.	1.6	-1.2	-7.9	3.0	6.5	1.4	10.2	0.0	2.2	-0.8
Feb.	-2.3	-1.0	-10.4	5.6	2.5	4.4	6.3	1.6	5.1	-2.2
Mar.	-2.0	6.0	-2.5	2.2	-1.7	8.3	5.4	2.6	7.5	-1.9
Apr.	-2.7	0.5	-9.1	3.1	3.3	2.0	2.6	2.0	1.8	-1.9
May	8.0	-0.1	-6.6	1.3	13.3	-35.2	-3.4	1.3	-33.8	-2.8
June [p)]	-1.8	0.0	1.4	-8.9	5.7	3.6	-2.4	0.0	4.1	-0.5
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	6.4	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	6.4	8.8	7.7	3.8	3.8	3.8	3.3	4.4	0.2
2023 Q1	4.5	5.2	4.1	9.1	3.0	2.9	2.9	3.1	3.3	-0.7
Q2 [p)]	2.4	3.0	-1.9	6.3	2.5	1.1	1.7	2.5	1.3	-1.6
2023 Jan.	5.3	6.1	7.5	8.6	3.6	3.4	3.6	3.1	3.9	0.1
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	4.1	9.1	3.0	2.9	2.9	3.1	3.3	-0.7
Apr.	3.8	4.7	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	2.8	1.5	2.1	2.8	1.8	-1.5
June [p)]	2.4	3.0	-1.9	6.3	2.5	1.1	1.7	2.5	1.3	-1.6

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	6,736.7	1,780.8	31.0	2,119.3	2,805.7	1,333.6	410.2	137.8	147.6
2022 Q3	642.5	6,764.3	1,801.9	30.6	2,096.5	2,835.4	1,318.8	520.9	148.0	146.7
Q4	683.4	6,736.7	1,780.8	31.0	2,119.3	2,805.7	1,333.6	410.2	137.8	147.6
2023 Q1	580.0	6,895.3	1,792.7	35.0	2,171.2	2,896.4	1,434.7	330.8	152.1	165.8
Q2 [p]	477.7	6,954.8	1,807.4	40.3	2,227.9	2,879.2	1,468.5	291.2	168.6	172.6
2023 Jan.	564.5	6,842.3	1,784.4	32.5	2,158.3	2,867.0	1,350.5	361.0	155.5	157.0
Feb.	553.6	6,818.8	1,785.7	33.8	2,177.0	2,822.3	1,336.2	363.3	154.6	159.6
Mar.	580.0	6,895.3	1,792.7	35.0	2,171.2	2,896.4	1,434.7	330.8	152.1	165.8
Apr.	586.5	6,907.2	1,807.3	35.8	2,168.6	2,895.5	1,443.2	333.3	153.3	161.9
May	483.6	6,979.3	1,805.9	37.7	2,213.1	2,922.6	1,449.5	317.5	172.9	184.1
June [p]	477.7	6,954.8	1,807.4	40.3	2,227.9	2,879.2	1,468.5	291.2	168.6	172.6
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	31.6	-89.8	-5.2	14.7	111.9	-72.0	-193.4	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	64.4	-15.2	0.3	57.9	21.4	51.7	-73.8	-10.2	1.0
2023 Q1	-110.1	85.4	8.3	4.0	63.9	9.1	72.0	-76.7	15.0	18.9
Q2 [p]	-102.1	83.3	13.9	5.0	56.5	8.0	89.0	-73.0	16.5	6.7
2023 Jan.	-125.1	45.8	0.2	1.6	48.4	-4.3	2.0	-47.8	17.7	9.4
Feb.	-11.2	16.8	0.2	1.3	6.2	9.0	8.4	-18.5	-0.2	3.0
Mar.	26.2	22.8	8.0	1.1	9.3	4.3	61.5	-10.4	-2.5	6.5
Apr.	6.5	23.3	15.4	0.8	4.1	3.0	24.3	-3.2	1.2	-3.9
May	-102.7	40.3	-4.2	1.9	31.0	11.6	-12.2	-31.7	19.6	22.2
June [p]	-5.9	19.7	2.6	2.3	21.4	-6.6	76.9	-38.2	-4.3	-11.5
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 [p]	-37.7	3.3	-2.2	30.5	8.5	2.7	-	-	1.7	10.2
2023 Jan.	-23.0	1.2	-4.4	-9.0	2.9	3.6	-	-	-7.2	-1.8
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	3.9	5.0	3.2	-	-	-16.0	-5.3
May	-35.0	3.2	-2.5	21.2	7.5	3.3	-	-	-4.8	8.2
June [p]	-37.7	3.3	-2.2	30.5	8.5	2.7	-	-	1.7	10.2

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	MFIs	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
	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	Maturities of up to 1 year	Issuance	Redemption
	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	12.0	4.2	1.3	0.3	8.0	1.6	1.2	0.4	1.8	1.9	1.1	0.5
2022 Q1	13.5	12.4	4.6	1.2	0.3	8.0	1.6	1.1	-0.3	1.9	1.8	-0.1	0.4
Q2	13.6	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	12.0	4.2	1.3	0.3	8.0	1.6	1.2	0.4	1.8	1.9	1.1	0.5
2023 Jan.	13.2	11.9	4.3	1.3	0.3	8.0	1.7	1.2	0.6	1.9	1.9	1.4	0.6
Feb.	13.3	12.0	4.6	1.2	0.3	8.1	1.7	1.2	0.8	1.9	2.1	1.7	0.7
Mar.	13.6	12.4	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	12.2	3.4	1.3	0.3	8.2	1.8	1.3	1.2	1.9	2.0	2.6	1.0
June	13.4	12.1	3.6	1.3	0.3	8.1	1.9	1.4	1.3	1.9	2.0	2.8	1.1

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.

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This Bulletin was produced under the responsibility of the Executive Board of the ECB. Translations are prepared and published by the national central banks.

The cut-off date for the statistics included in this issue was 26 July 2023.

For specific terminology please refer to the ECB glossary (available in English only).

PDF ISSN 2363-3417, QB-BP-23-005-EN-N
HTML ISSN 2363-3417, QB-BP-23-005-EN-Q