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THE CURRENT EPISODE OF PRICE PRESSURES IN THE EURO AREA, THE MONETARY POLICY RESPONSE AND ITS EFFECTS

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THE CURRENT EPISODE OF PRICE PRESSURES IN THE EURO AREA, THE MONETARY POLICY RESPONSE AND ITS EFFECTS

1 Introduction

This chapter analyses the current inflationary episode in the euro area and Spain and its short and medium-term outlook. This process started in 2021, mainly as a result of various global factors that had a negative impact on supply. However, inflationary pressures became more widespread over the course of 2022 and domestic demand factors have also begun to play an important role in the most recent price dynamics. While still high, particularly in the more stable components and in food, inflation has started to ease in recent quarters. Looking ahead, inflation is expected to move over the medium term towards rates consistent with the monetary policy target, although there are some risk factors that generate uncertainty about the scale of the disinflation process.

The monetary policy response to the rise in prices is also described and its effects on financial conditions, economic activity and inflation dynamics in the euro area are assessed. Over the past few quarters, the world's main central banks – including the European Central Bank (ECB) – have responded to the persistently high inflationary pressures by significantly tightening their monetary policies. This chapter analyses in detail how this monetary policy tightening is being transmitted to the economy. As part of this exercise, particular attention is paid to how this episode compares with previous tightening episodes, and to the uneven impact that these monetary policy decisions are having across jurisdictions and economic agents.

It is particularly important that the transmission of monetary policy be studied in the current situation as, for several reasons, it is not clear whether monetary policy is operating as it did in previous episodes. First, the last cycle of significant and sustained monetary policy tightening began in 2005, almost two decades ago. Since then, the euro area economy and the global economy have undergone major transformations in various dimensions. Second, there is no precedent in recent decades for monetary policy tightening as intense and rapid as the current one. Lastly, the current tightening cycle was preceded by a long period of expansionary monetary policy – including new unconventional instruments, such as the purchase of financial assets – which now needs to be reversed. Given these distinct elements, which could suggest that the historical evidence on monetary policy transmission may not be directly applicable in the current context, it is essential to rigorously and thoroughly monitor how monetary policy transmission has been operating in recent quarters so that this analysis can guide monetary policy conduct.

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2 The rise in inflation and its key determinants over the medium term

Since 2021, the rise in inflation in the euro area and Spain[1] has been driven by a succession of factors (most of them global and extraordinary) that have had varying degrees of influence in recent quarters (see Figure 3.1). This section first provides a brief overview of the factors driving up inflation. This is followed by an analysis of the recent moderation of inflation and its changing nature. Lastly, the medium-term outlook and some of the most significant risk factors are presented.

2.1 The rise in inflation

The euro is facing an extraordinary inflationary episode in terms of its scale and persistence. This episode began worldwide in 2021,[2] but it gathered pace in 2022, exacerbated by the impact on commodity markets of the Russian invasion of Ukraine. As a net energy importer highly dependent on the supply of key inputs (most notably, gas) from the regions at war, Europe was particularly exposed to these effects.[3] This made the inflationary shock highly exceptional in terms of both its scale and persistence, and the fact that it affected different commodities simultaneously, including food,[4] which made the spread of inflationary pressures to a large part of the consumption basket practically inevitable. For much of 2021 and 2022, these factors were further compounded by the depreciation of the euro, particularly against the US dollar, which made imported goods and services more expensive. As discussed below, the depreciation was the result, among other factors, of a sharper tightening of monetary policy in other regions, particularly the United States.

The rise in inflation in 2022 was stronger and more persistent than expected. This was evidenced by the successive upward revisions to inflation forecasts in both the euro area and Spain, which largely reflected a stronger upward momentum in energy commodity prices than that incorporated in the assumptions underlying the forecasts.[5] But they were also indicative of a complex pass-through of the sharp increases in commodity prices to consumer prices.

The materialisation of indirect effects of the energy shock was particularly important. Unlike direct effects – which capture, for instance, the impact of higher oil and gas prices on the cost of energy to the consumer – indirect effects spread more gradually through production costs and affect the productive sectors unevenly depending on their cost structure. For example, their impact is higher in sectors such as transport services, where energy accounts for a large share of the production costs. But the propagation of indirect effects through the

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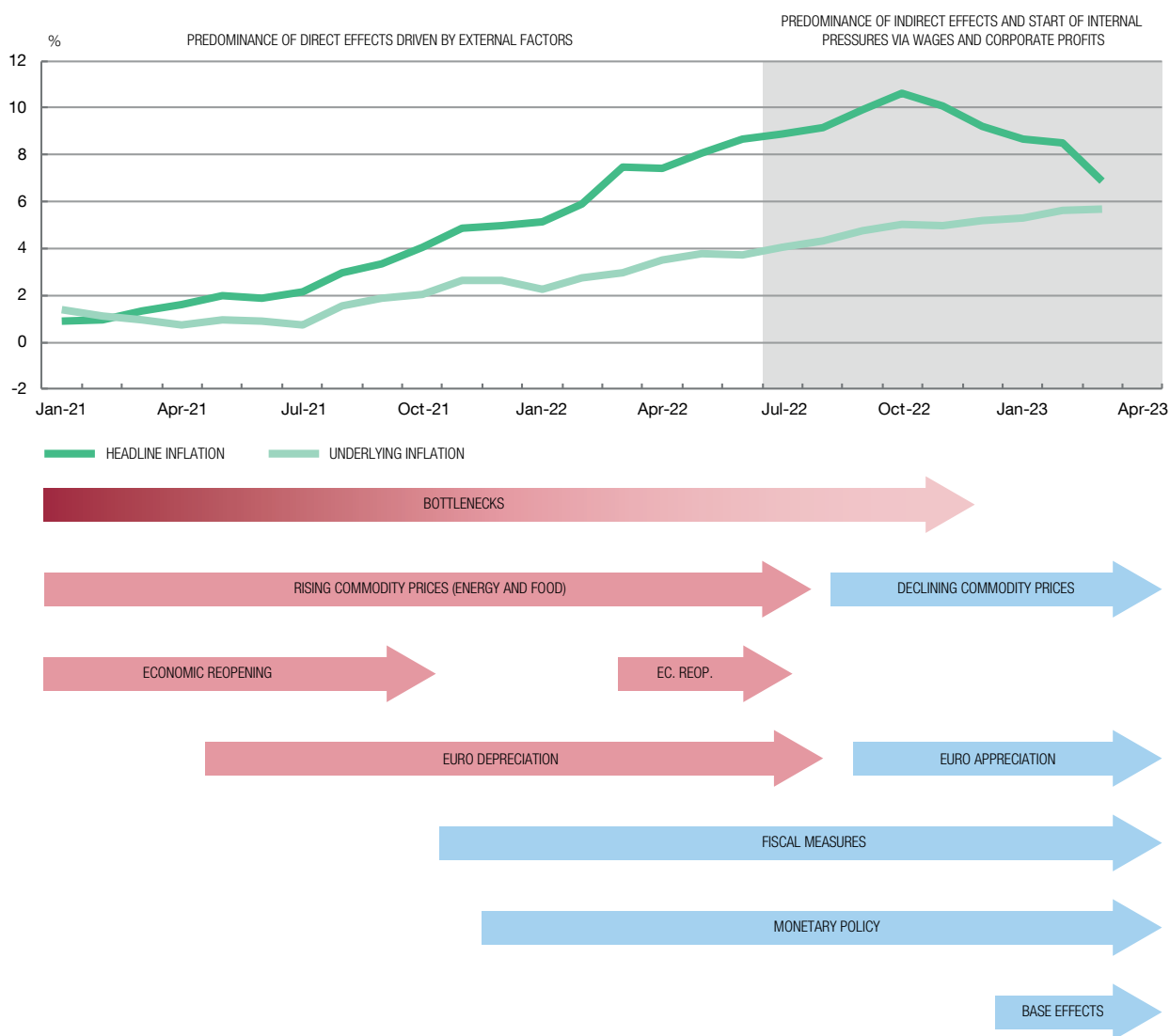1 For more details about inflation developments in Spain, see Chapter 1 of this *Annual Report.*

2 For more details on the origins of this inflationary process, see also Banco de España (2022a).

3 See Chapter 4 of this *Annual Report.*

4 Eminently global factors also explain the rise in food commodity prices. See Bodnár and Schuler (2022) and Borrallo, Cuadro-Sáez, Pacce and Sánchez (2023) for an analysis of cereal and milk prices in Europe.

5 The Eurosystem projection exercise is based on the assumption that commodity prices will change as indicated by futures contracts at the time of the forecast. For more details, see Chahad, Hoffmann-Drahonsky, Page and Tirpák (2023).

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Figure 3.1
MAIN DETERMINANTS OF EURO AREA INFLATION (a)

SOURCE: Banco de España.

a The arrows mark the start and end of the factor in question. A red (blue) arrow indicates that the factor has an upward (downward) effect on inflation. The factors used to determine the start and end dates are as follows: for bottlenecks, the indicator detailed in Burriel, Kataryniuk, Moreno Pérez and Viani (2023), "New supply bottlenecks index based on newspaper data", Documento Ocasional - Banco de España, 2304; for commodity prices, a composite indicator that captures oil, gas and food prices; for exchange rates, the euro nominal effective exchange rate; for the economic reopening, a mobility indicator drawing on data from Google Global Mobility Reports; and for monetary policy, the start in December 2021 corresponds with the introduction of the first stimulus withdrawal measures by the ECB (See Figure 3.2).

production and distribution chain ends up making production processes more expensive practically across the board.[6] Moreover, against a background of global inflation and depreciation of the euro, imported intermediate inputs also exerted pressure on costs.

In fact, the spread of the inflationary pressures across the consumer basket was stronger than expected. This reflected, first, the sheer size of the energy shock, which forced
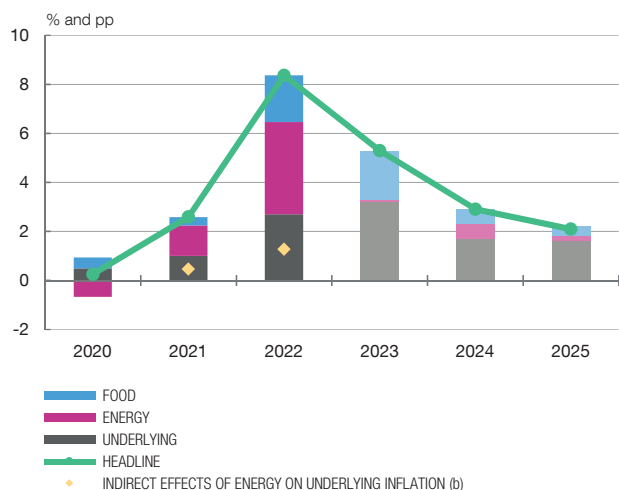
6   For a description of the distribution of energy costs across the Spanish business sector see Matea and Muñoz-Julve (2022).

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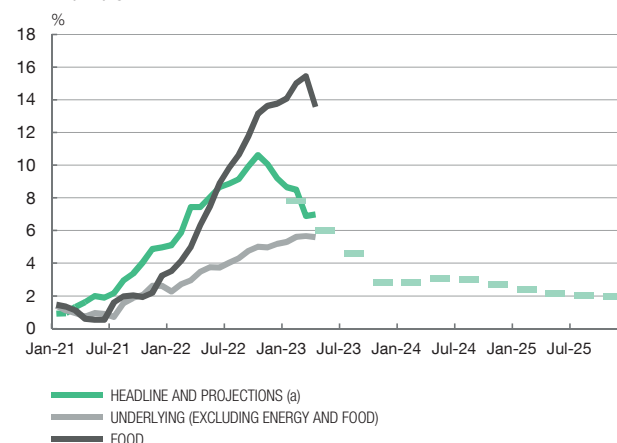abbreviations

Chart 3.1

THE INFLATIONARY EPISODE INTENSIFIED IN THE EURO AREA IN 2022, BUT HAS BEGUN TO EASE

Food and energy prices, including indirect effects, accounted for 80% of euro area inflation in 2022. Euro area headline inflation began to decline in autumn 2022, driven by the moderation in the energy component. By contrast, food and underlying inflation remained high and are expected to be more persistent.

1 INFLATION AND CONTRIBUTION BY COMPONENT (a)

2 EURO AREA INFLATION
HICP y-o-y growth

FOOD
ENERGY
UNDERLYING
HEADLINE
INDIRECT EFFECTS OF ENERGY ON UNDERLYING INFLATION (b)

HEADLINE AND PROJECTIONS (a)
UNDERLYING (EXCLUDING ENERGY AND FOOD)
FOOD

SOURCES: Eurostat and ECB.

a   Data observed to 2022 and March 2023 ECB staff macroeconomic projections.
b   The indirect effect is calculated by applying the historical elasticities in the Eurosystem projections macroeconomic models to data from
    a composite indicator combining oil and gas prices.

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firms to adjust selling prices more frequently than in response to smaller shocks.[7] In addition, some circumstances linked to the pandemic also contributed to the spread of inflation. These included bottlenecks in global supply chains, the growth in demand for certain types of goods and services (such as more contact-intensive services) following the lifting of the restrictions and the higher consumption of housing-related goods and services. Moreover, the significant savings accumulated during the pandemic and the strength of the labour market helped support consumption.[8] As a result, in 2022 underlying inflation (i.e. excluding energy and food) was close to 4% in the euro area and Spain,[9] doubling the forecast made at end-2021 and also exceeding the mid-2022 projection, which put underlying inflation slightly above 3% in 2022 for both regions.

Food and energy prices, including indirect effects, accounted for 80% of euro area inflation in 2022. Average inflation in 2022 reached 8.4%, of which 23% was explained by the food price component and 60% by energy prices, including an estimated impact of energy-

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7   Costain, Nakov and Petit (2022). For a specific analysis of the Spanish economy, see González Mínguez, Hurtado, Leiva-León and Urtasun (2022).

8   That said, there is limited evidence that it was used for consumption, as illustrated by Martínez-Carrascal (2022).

9   The INE publishes an alternative underlying inflation measure for Spain based on the domestic Consumer Price Index (CPI), which excludes energy products and unprocessed food. It is therefore an aggregate that includes processed food. Its average annual rate of change in 2022 was 5.2%.

related indirect effects on underlying inflation of 1.3 percentage points (pp) – 15% of the harmonised index of consumer prices (HICP) – on average in 2022 (see Chart 3.1.1).

Against this background, medium-term inflation expectations shifted slightly upwards. The long-term inflation forecasts of the Survey of Professional Forecasters (SPF) and of Consensus and those estimated on the basis of two-year forward two-year inflation swaps rose from 1.7%, 1.9% and 1.6% on average, respectively, to 2% (2.1% in the case of the SPF) on average in 2022. Meanwhile, the Survey of Consumer Expectations raised the median value of the three-year inflation outlook to 3% in mid-2022.

2.2 The incipient moderation of inflation and its changing nature

Euro area inflation began to decline in autumn 2022, and slightly earlier in Spain, in both cases underpinned by the energy component. As Chart 3.1.2 shows, euro area inflation rose steadily up to October 2022, when the year-on-year HICP rate peaked at 10.6%. At that point, food HICP showed an increase of more than 13% and energy HICP of 40%, with gas and electricity accounting for approximately half of the increase in euro area consumer energy prices. Headline inflation then began to decline, reaching 7% in April 2023, according to the flash estimate. This fall in inflation owed exclusively to consumer energy prices. But underlying and food inflation are still very high, standing at 5.6% and 13.6%, respectively, in April.

In Spain, inflation began to moderate earlier, also underpinned by the energy price correction. Inflation stood at 3.8% in April, according to the preliminary estimate, down from its peak of 10.7% in July 2022. Underlying inflation continued to rise up to February 2023, when it reached 5.2%, and began to decline – to 4.6% – in March. By contrast, food inflation has continued to climb and, as in the euro area, was over 15% in March, despite the impact of the reduced VAT rate on certain basic foodstuffs introduced in Spain in January 2023, with an estimated high level of pass-through.[10]

In the near term, headline inflation is expected to continue to head down. According to the March ECB staff macroeconomic projections, euro area inflation is set to fall to slightly below 3% in 2023 Q4.[11] This downward path entails a decline in inflation from 8.4% on average in 2022 to 5.3% in 2023. Meanwhile, the Banco de España's latest forecasts for Spain envisage a sharper fall in inflation, from 8.3% in 2022 to 3.7% in 2023.[12]

The fall in headline inflation is partly due to short-term mechanical factors. One of these stems from the fact that inflation is generally measured by the year-on-year rate of growth of consumer prices. Accordingly, the rate of inflation depends on the initial point of calculation, or in other words, on the price level a year earlier. In this respect, the fact that prices rose

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10   Quarterly report and macroeconomic projections for the Spanish economy. March 2023.
11   March 2023 ECB staff macroeconomic projections.
12   Quarterly report and macroeconomic projections for the Spanish economy. March 2023.

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sharply in 2022 has given rise to very significant negative base effects in 2023, which could come to dominate short-term movements in inflation, especially in consumer energy prices. The cumulative base effect between January and March amounts to a fall of 3 percentage points (pp) in euro area inflation (4 pp in Spain), and will account for around a further 4 pp (less than 1 pp in Spain) up to year-end (see Chart 3.2.1). Meanwhile, the new HICP consumer basket weights, applicable since January 2023, reflect a shift in households' consumption towards services and a lower weight of the more inflationary items, especially energy and food. It is estimated that the weightings update had a downside impact of 0.2 pp and 0.4 pp on euro area headline and underlying inflation, respectively, in January. In Spain, the effect of the change in weights was on the upside, and this together with methodological changes and the end of the fuel rebate for non-professional drivers temporarily halted the decline in inflation at the start of the year.[13]

The commodity price correction and the recent appreciation of the euro have also helped moderate inflation. The price of Brent fell by 40% in 2022 H2 and has since fluctuated around $80 per barrel (see Chart 3.2.2). The European natural gas benchmark reached all-time highs in August 2022, over €300 per megawatt hour (MWh), and has since fallen sharply, to around €40 per MWh in April, levels not seen since summer 2021 (see Chart 3.2.3). These changes reflect the slowdown in global demand and the high European gas reserves built up, thanks to the energy saving measures introduced and, especially, to the mild autumn and winter weather. Oil and gas futures prices suggest that this favourable performance should continue. Meanwhile, in October 2022 the euro began to appreciate and, as analysed in more detail below, has recovered part of the significant depreciation experienced since early 2021. In any event, lower energy prices will be passed through with some delay, once more via the direct and indirect effects mentioned earlier. These delays are especially lengthy in the case of gas prices.[14] The decline in the cost of energy will also be passed through to the production of food commodities and processed food. Agricultural commodity prices remain very high, having fallen only modestly so far.

Inflation is also being affected by the various fiscal measures deployed by the authorities to mitigate the impact of rising prices on households and firms. In 2022 the national authorities in the main euro area countries significantly increased fiscal support to protect firms and households in the face of the energy crisis and high inflation. The bulk of these measures have been extended into 2023 and fresh ones have been introduced. In total, the stimulus measures amount to almost 2% of euro area GDP in both years (1.4% and 0.9% in 2022 and 2023, respectively, in Spain) (see Chart 3.2.4). Although these measures helped contain inflation in 2022 and are expected to do so again in 2023, the scale of their impact this year is still uncertain. In addition to the uncertainty stemming from their design and implementation, some of these
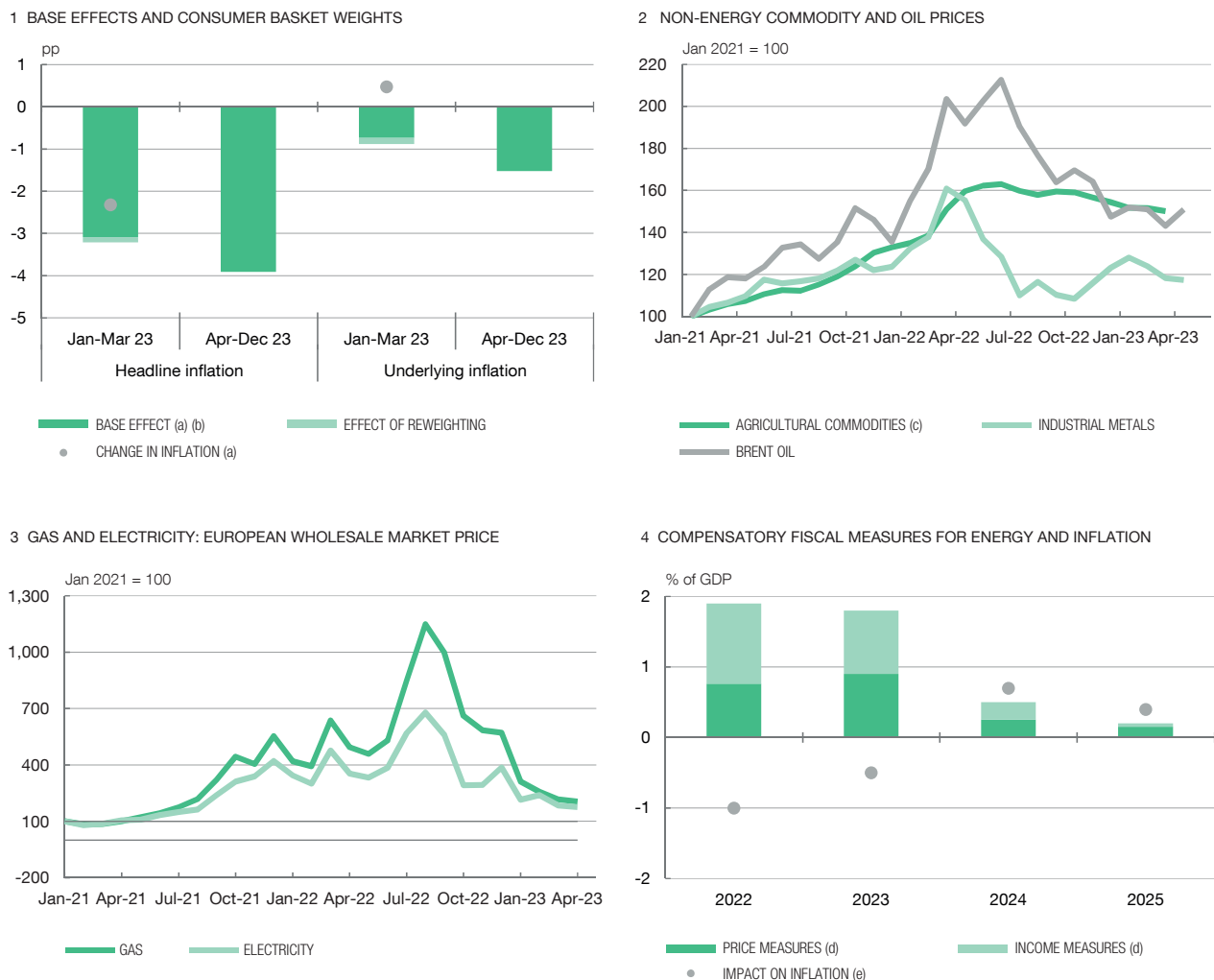
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13   The upside effect of the weightings reflects, among other factors, that consumer energy prices were already falling in January (by 8% year-on-year). Also, the reduction in the weight of energy was more pronounced in Spain; indeed, in 2023, its weight in Spanish HICP fell below its weight in euro area HICP. The main methodological change was the incorporation into the measure of gas and electricity prices of the part relating to the free market. See Quarterly report and macroeconomic projections for the Spanish economy. March 2023.

14   López, Párraga and Santabárbara (2022).

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Chart 3.2

THE INCIPIENT DECLINE IN EURO AREA HEADLINE INFLATION IS SHAPED BY A NUMBER OF FACTORS

The fall in headline inflation is partly due to short-term mechanical factors (such as base effects), but also the commodity price correction and the recent appreciation of the euro. The fiscal measures are also mitigating inflation, but their withdrawal could have reverse (upside) effects in the coming years, particularly in 2024.

1 BASE EFFECTS AND CONSUMER BASKET WEIGHTS

BASE EFFECT (a) (b)
EFFECT OF REWEIGHTING
CHANGE IN INFLATION (a)

2 NON-ENERGY COMMODITY AND OIL PRICES

AGRICULTURAL COMMODITIES (c)
INDUSTRIAL METALS
BRENT OIL

3 GAS AND ELECTRICITY: EUROPEAN WHOLESALE MARKET PRICE

GAS
ELECTRICITY

4 COMPENSATORY FISCAL MEASURES FOR ENERGY AND INFLATION

PRICE MEASURES (d)
INCOME MEASURES (d)
IMPACT ON INFLATION (e)

SOURCES: Eurostat, Refinitiv, DG-Agri, ECB and Banco de España.

a Cumulative since December 2022.
b The base effect is calculated for each month as the difference between the month-on-month price change in the same month of the previous year compared with the average for the five previous years.
c Aggregate index based on European Union prices (except coffee and sugar, for which international market prices are used). Constructed as the sum of the following components weighted by their relative share in HICP in 2022: cereals (25%), eggs and dairy (21%), edible oils (5%), meat (35%), sugar (9%) and coffee (5%). See Borrallo, Cuadro-Sáez and Pérez (2022).
d The measures are classified based on the European Commission methodology. Price measures are those that directly affect the cost of consuming an additional unit of energy. Income measures do not directly depend on the quantity of energy consumed.
e The impacts on inflation are shown at aggregate level for the euro area as percentage point deviations against a reference scenario of no compensatory fiscal policy measures for energy and inflation. The simulations are conducted under the simplified assumption that the fiscal shocks are exogenous and there is no monetary policy response.
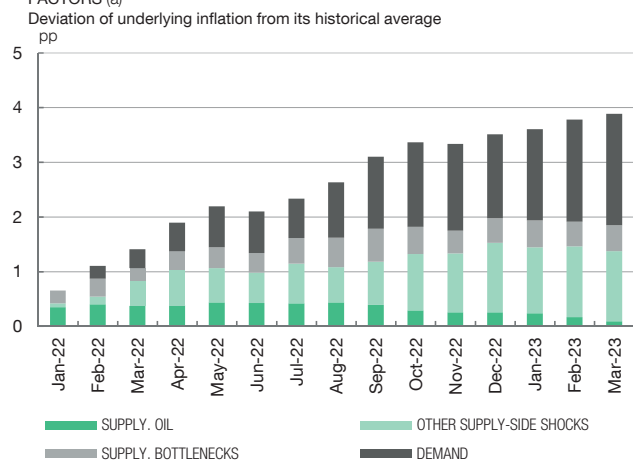
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measures include energy price caps and, therefore, whether or not they are activated will depend on energy market developments. Moreover, the withdrawal of these measures will have the reverse effect, exerting upside pressure on prices in the coming years, especially in 2024. The scale of these effects will depend on the pace of their withdrawal.

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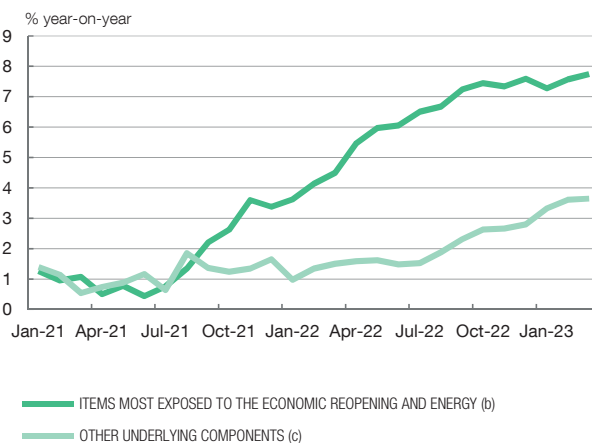
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Chart 3.3

UNDERLYING INFLATION IN THE EURO AREA IS PROVING TO BE MORE PERSISTENT

Underlying inflation is still driven by the pass-through of past shocks, a process in which both demand and supply factors play a role. The latest data suggest that inflationary pressures are still spreading.

1 UNDERLYING INFLATION IN THE EURO AREA: SUPPLY AND DEMAND FACTORS (a)
Deviation of underlying inflation from its historical average
pp

2 UNDERLYING INFLATION IN THE EURO AREA BY COMPONENT
% year-on-year

SUPPLY. OIL
SUPPLY. BOTTLENECKS
OTHER SUPPLY-SIDE SHOCKS
DEMAND

ITEMS MOST EXPOSED TO THE ECONOMIC REOPENING AND ENERGY (b)
OTHER UNDERLYING COMPONENTS (c)

SOURCES: Eurostat and ECB.

a Contributions extracted from a structural BVAR model with four variables: oil prices, the Federal Reserve's global supply chain pressure index (SCPI), HICP and industrial output. The variables are seasonally adjusted. The sample is monthly and covers the period 2002-2022. Supply and demand-side shocks and bottlenecks are identified using sign restrictions, assuming that demand-side shocks shift production and prices in the same direction, and supply-side shocks and bottlenecks shift them in different directions. Bottlenecks are identified based on movements in the SCPI. Oil is considered exogenous to the other variables in terms of its impact. See Alonso, Kataryniuk and Martínez-Martín (2021).
b Aggregate of the "household equipment and maintenance", "transportation" and "recreation, hospitality and tourism" sub-indices. See Pacce, del Río and Sánchez (2022).
c This sub-index includes "clothing and footwear", "housing (excluding energy and maintenance)", "health", "communications", "education" and "other miscellaneous goods and services". It includes rent for main residences but not tourist rentals.

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Some underlying inflation components are showing signs of steadying, but the data suggest that inflationary pressures are still spreading. During 2022 there was a particularly strong upward trend in consumer prices for home equipment and maintenance, transport and activities involving more social contact.[15] These items were more exposed to higher energy and food prices, global supply chain disruptions and the rapid reactivation of demand when the economy reopened. The aggregate price index of all these components for the euro area (see Chart 3.3.2) indicates a certain degree of steadying in their inflation rate, albeit at high levels over 7% since summer 2022. The index for Spain posted growth of around 6% year-on-year in March, on account of the lower relative inflation in the transportation component. Excluding these expenditure components, in the remaining basket, which accounts for more than 30% of the HICP, inflation has been highly contained throughout the inflationary episode. However, since mid-2022 it has climbed, from around 1.5% in the euro area (or even less in Spain) to 3.5% in 2023 Q1 (3% in Spain), suggesting that inflationary pressures continue to spread. The increase in the proportion of components with inflation rates over 4%, to almost 64% in the case of euro area underlying HICP (45% in Spain), reflects the same pattern.

15 Pacce, del Río and Sánchez (2022).

Underlying inflation will remain high in the short term as it is still driven by the pass-through of past shocks. Following the high underlying inflation (3.9%) recorded in the euro area in 2022 (3.8% in Spain), the March 2023 ECB staff macroeconomic projections point to a further increase in 2023 to 4.6% (3.9% in Spain according to the Banco de España's latest projections). The estimates in Chart 3.3.1 show that demand and supply-side pressures on prices remain high. Demand factors had a lesser bearing at the start of 2022, but their contribution gradually increased up to the autumn, and has steadied since at high levels. Supply-side factors associated with higher production costs and supply chain bottlenecks – the predominant factors at the start of 2022 – account for around half of the deviation of euro area underlying inflation from its historical mean at the start of 2023.

2.3 The medium-term inflation path and risk factors

Euro area inflation is expected to continue to decline towards levels compatible with the medium-term monetary policy target. The latest ECB staff macroeconomic projections published in March expect inflation to fall gradually from 8.4% on average in 2022 to 5.3% in 2023, 2.9% in 2024 and 2.1% in 2025. Meanwhile, in Spain, a sharper initial fall is expected, from 8.3% in 2022 to 3.7% in 2023, followed by a slower descent in 2024 to 3.6% (assuming that the fiscal measures come to an end) and a fresh decline in 2025 to 1.8%.[16] The improvement in global supply chain bottlenecks, the reversal of the indirect effects in light of the decline in energy prices and the economic slowdown observed in 2022 H2 will help curb underlying inflation. The ECB's monetary policy decisions and their transmission through tighter financial conditions will play an increasingly important role in moderating demand, as described below.

Although the upside risks to inflation have moderated, there are risk factors that introduce uncertainty as to the reach of the disinflation process. First, the degree of resilience of the euro area economy and the course of the global economy, against a backdrop of monetary policy tightening worldwide and significant geopolitical risks. Second, the possibility that lower commodity prices may be slower to pass through to consumer prices than higher ones were. Lastly, the upside risks from second-round effects via wages or profit margins.

The euro area economy has proved resilient to the current inflationary setting and geopolitical tensions. The economic slowdown in the euro area since mid-2022 has been more modest than expected and the GDP growth outlook for 2023 has been revised up slightly in recent months (to 1% in the March ECB staff macroeconomic projections). This recent strength has not been underpinned by domestic demand performance, but rather by the build-up of stocks and the contribution of the external sector. However, qualitative data available for 2023 Q1 point to growing confidence among consumers and firms, in a setting in which inflation is correcting and despite the recent financial sector turmoil.

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16 Macroeconomic projections for the Spanish economy (2023-2025). Banco de España (2023).

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A further source of uncertainty is the course of the global economy, against a backdrop of monetary policy tightening and significant geopolitical risks. The more restrictive monetary policy stance and consequent tightening of financial conditions are weakening the global economy. In this respect, financial instability episodes such as those seen in March in the face of financial problems at some medium-sized US banks and Credit Suisse in Switzerland could fuel recessionary forces. Although these episodes have had a limited impact, any resurgence of financial instability could further tighten financial conditions and stoke up uncertainty. Moreover, prolongation of the war in Ukraine or demand factors linked, inter alia, to the macroeconomic situation of other economies, especially China, could exert renewed pressure on commodity prices.

The impact on global inflation of China's economic reopening, after abandoning its zero-COVID policy, is currently one of the main sources of uncertainty. On the one hand, stronger growth in China would drive up global demand, especially for commodities, which would exert upward pressure on inflation. On the other, China's reopening could accelerate the elimination of bottlenecks from global production chains and boost global supply capacity to meet demand, which would allow the current high inflationary pressures to ease somewhat. At this stage it is highly uncertain which of these channels will ultimately prevail and to what extent; it will depend, among other factors, on the composition of the economic recovery in China. Inflation moderated and the various indicators of supply chain difficulties continued to improve worldwide throughout 2023 Q1, despite the strong growth in China.

Asymmetries could appear in the consumer price response. In particular, in view of the recent declines in some commodity prices, the pace of the ensuing decline in the prices of consumer goods and services could be slower than the pace of their increase when these inputs rose in price during a good part of 2021 and 2022. The economic literature is inconclusive as regards the possible existence of asymmetries. For instance, in the case of oil prices, Kilian and Vigfusson (2011) rule out the existence of asymmetries for both economic activity and inflation for the United States, while An, Jin and Ren (2014) conclude, also for the United States, that the impact on inflation is less marked after a drop in oil prices than after an increase. In the case of food commodities, Ferrucci, Jiménez-Rodríguez and Onorantea (2011) find that, in the euro area, increases in input prices are passed through to food consumer prices to a greater degree than equivalent declines in input prices.
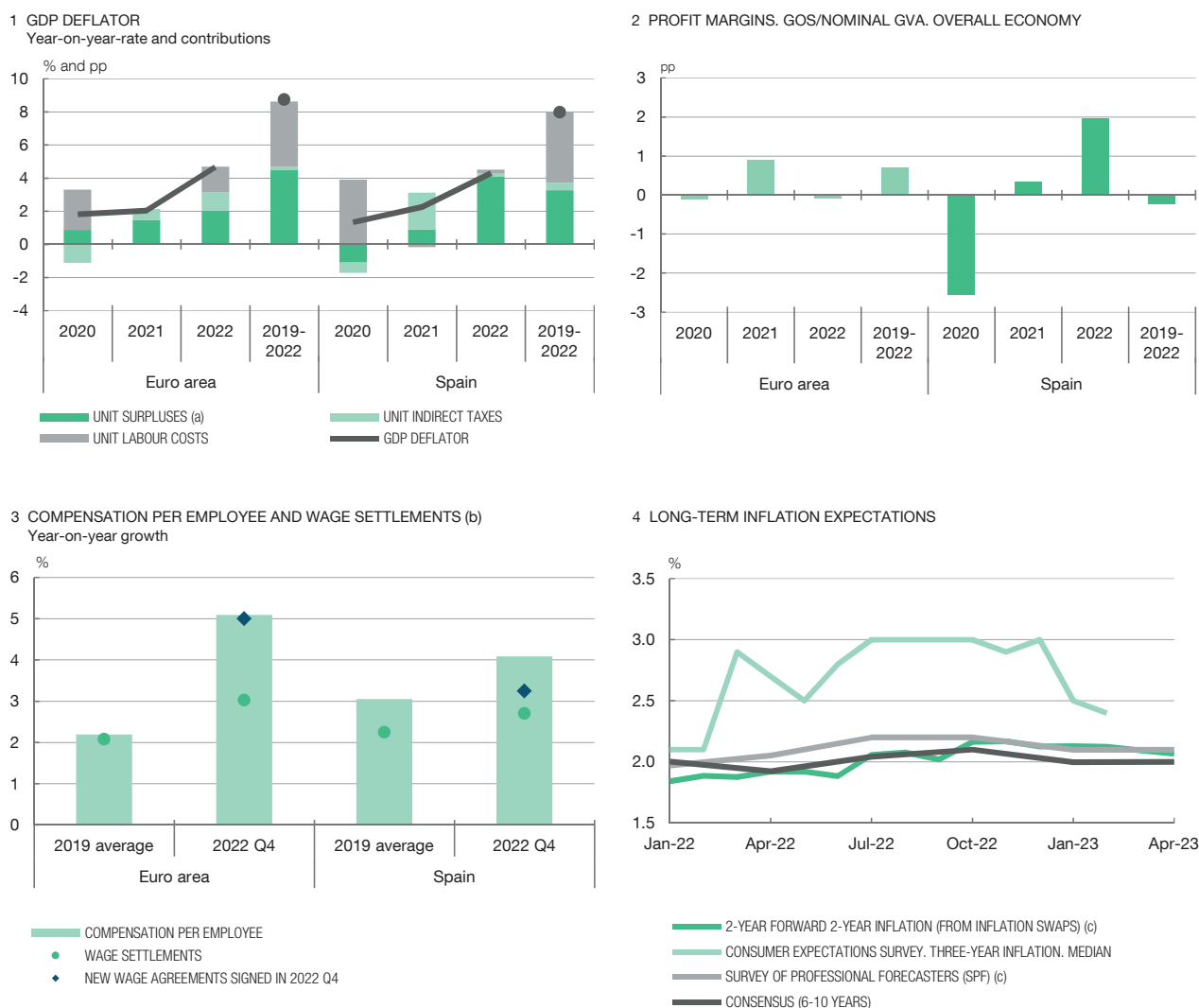
The wage and profit margin response will be a key determinant in the future course of inflation. Domestic inflationary pressures are gaining ground in the euro area and in Spain. The euro area GDP deflator rose by 4% on average in 2022 (4.3% in Spain), with an accelerating profile over the year, compared with an average of 2% in 2021 (2.3% in Spain) (see Chart 3.4.1). In 2022 the accounting decomposition of this indicator points to contained wage pressure, reflected in unit labour costs,[17] which were somewhat more restrained in Spain than in the

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17   The ratio of compensation per employee to real GDP, or in other words, unit labour costs, i.e. compensation per employee divided by apparent labour productivity.

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Chart 3.4
SECOND-ROUND EFFECTS ARE A RISK FACTOR THAT COULD AFFECT FUTURE INFLATION

Although upside risks to inflation have moderated, there are elements of uncertainty about the scale of the disinflation process. These include possible second-round effects via corporate profits and labour costs. The anchoring of medium to long-term inflation expectations at 2% is key for wage and price-setting.

1 GDP DEFLATOR
Year-on-year-rate and contributions

UNIT SURPLUSES (a)
UNIT LABOUR COSTS
UNIT INDIRECT TAXES
GDP DEFLATOR

2 PROFIT MARGINS. GOS/NOMINAL GVA. OVERALL ECONOMY

3 COMPENSATION PER EMPLOYEE AND WAGE SETTLEMENTS (b)
Year-on-year growth

COMPENSATION PER EMPLOYEE
WAGE SETTLEMENTS
NEW WAGE AGREEMENTS SIGNED IN 2022 Q4

4 LONG-TERM INFLATION EXPECTATIONS

2-YEAR FORWARD 2-YEAR INFLATION (FROM INFLATION SWAPS) (c)
CONSUMER EXPECTATIONS SURVEY. THREE-YEAR INFLATION. MEDIAN
SURVEY OF PROFESSIONAL FORECASTERS (SPF) (c)
CONSENSUS (6-10 YEARS)

SOURCES: Eurostat, European Commission, Consensus Economics, ECB and Banco de España.

a Ratio of gross operating surplus (GOS) to real GDP. GOS includes mixed income.
b Excluding one-off payments.
c Adjusted for risk premia. See Gimeno and Ortega (2023).
d SPF inflation expectations are 4-5 years ahead. The latest survey was in April and refers to 2027.

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euro area. By contrast, unit operating surpluses[18] made an increasing contribution in the year. However, if the period 2019-2022 is considered, the contributions of unit labour costs and unit operating surpluses to the growth of the GDP deflator are relatively similar, both in the euro area and in Spain. Meanwhile, at the aggregate level, profit margins are generally proxied by

18   The ratio of gross operating surplus (GOS) to real GDP.

the ratio of GOS to nominal gross value added (GVA). Although this measure must be interpreted with caution, as it does not only reflect profit performance, in the euro area margins have now exceeded their pre-pandemic levels, while in Spain they are still somewhat lower (see Chart 3.4.2). This, in principle, does not suggest there may be feedback effects with inflation.

Pressures to recoup lost purchasing power could increase in the coming quarters and could have second-round effects on inflation. Wage negotiations are taking place against a backdrop of tight labour markets. In particular, the unemployment rate has dropped to low levels (6.5% in the euro area and 12.8% in Spain in March), at the same time as labour shortages perceived by firms have steadied at very high levels in historical terms. In this setting, some indicators, such as new collective bargaining agreements, point to growing wage pressure, especially in the euro area (see Chart 3.4.3). In Spain, the most recent agreements signed point to a lower increase in wage pressure than in the euro area. If this pattern is confirmed in the wage negotiations during the rest of the year, this could signal smaller risks of second-round effects on inflation. As regards margins, the economic weakness forecast in the short term, moderate demand in the medium term as a consequence of the tightening of financing conditions, and the clearing of supply bottlenecks are all expected to exert downward pressure on profit margins. However, stronger demand, the emergence of financial vulnerabilities at firms or persistent supply difficulties could give rise to a more dynamic than expected margin performance.

Lastly, inflation expectations, which currently remain anchored around 2%, will be crucial for price and wage setting. According to the latest Consumer Expectations Survey (CES) conducted in February 2023, median expectations for inflation three years ahead stood at 2.4%, compared with expectations of 3% since mid-2022 (see Chart 3.4.4). Meanwhile, the long-term inflation forecasts of the Survey of Professional Forecasters (SPF) for 2027 and Consensus estimates for the 2028-2032 average shifted down slightly, to 2.1% and 2%, respectively, in the April survey.

3 The monetary policy response to inflationary tensions

In view of the growing inflationary pressures, and similarly to other central banks, since the last stretch of 2021 the ECB has adopted a tighter monetary policy stance, aiming to achieve its main objective of keeping inflation at 2% over the medium term. Although these measures involve short-term costs in terms of economic activity, maintaining price stability is the main contribution that a central bank can make to ensure sound economic growth in the long term.

The current monetary policy tightening cycle is different from previous ones in terms of its intensity and speed and the range of instruments used. The policy rate rise has been the biggest and swiftest so far in the history of monetary union. These hikes in interest rates,[19] which have been the ECB's main monetary policy tool, as they offer greater certainty

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19   Specifically, the interest rate on the deposit facility, the marginal lending facility and the main refinancing operations.

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regarding their transmission to financial conditions and the euro area economy, have been accompanied by other measures related to the targeted longer-term refinancing operations (TLTROs) and financial asset purchases.

In a first phase, net asset purchases were discontinued. In March 2022, net asset purchases under the pandemic emergency purchase programme (PEPP) came to an end, as announced in December 2021, and net asset purchases under the asset purchase programme (APP) were recalibrated and then terminated on 1 July 2022 (see Figure 3.2). These measures sought to normalise financial conditions through the gradual withdrawal of the monetary stimulus generated in previous years when inflation was running below target.

Once the net purchases were terminated, the policy rate hikes began. The 50 basis point (bp) rate rise in July 2022 – the first rate hike for more than a decade – lifted the deposit facility rate out of negative territory. From then on, in view of the uncertainty as to the course of inflation in the short and medium term, the ECB abandoned its forward guidance and adopted a data-dependent approach for its monetary policy decisions. This subsequently led to the biggest rate hikes in the history of the euro, including two consecutive 75 bp rate rises in September and October 2022, subsequent 50 bp increases at the following meetings up to March 2023, and a 25 bp increase at the latest meeting in May. In total, up to the cut-off date for this report, policy interest rates have risen by 375 bp since July 2022.

Following these moves, policy rates are now in restrictive territory, in a setting marked by the prospect of persistently high inflation. In other words, these interest rates are above the available estimates for their neutral level (that which holds real GDP at its potential value and inflation steady at its target level).[20]

To strengthen the transmission of the rate hikes to financing conditions in the banking sector, in October 2022 the ECB Governing Council decided to recalibrate the criteria applicable to the third series of TLTRO (TLTRO III). Specifically, the applicable interest rates were recalibrated, raising the average expected cost of the financing obtained through these operations. This measure encourages early repayment of the outstanding amounts and helps speed up the reduction in the Eurosystem's balance sheet. At the cut-off date for this report, approximately 55% (€1.2 trillion) of the maximum amount of TLTRO III funds, whose last tranche matures in December 2024, remained outstanding.

The reduction in holdings of assets acquired under the APP began in March 2023 and will continue at a measured and predictable pace. After the net purchases under its purchase programmes were discontinued, the ECB Governing Council decided that from the

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20 This neutral – or natural – interest rate is not directly observable and can only be estimated, with a certain degree of uncertainty, using econometric techniques. The deposit facility rate expected by analysts in the long term, which stood at 2% according to the results of the March ECB Survey of Monetary Analysts (SMA), may be used to proxy the natural interest rate. The concept, determinants and implications for monetary policy of the natural interest rate are discussed in detail in Galesi, Nuño and Thomas (2017).

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Figure 3.2
ECB MONETARY POLICY DECISIONS SINCE DECEMBER 2021

	Interest rates	Asset purchases and liquidity operations
Dec-2021		**APP:** €40 billion in 2022 Q2, €30 billion in Q3 and €20 billion from October **PEPP:** net purchases to be discontinued at end-March 2022; reinvestments to continue at least until end-2024
Feb-2022		Confirmation of measures announced in December 2021
Mar-2022		**APP:** pace of purchases recalibrated **PEPP:** net purchases discontinued
Apr-2022		**APP:** announcement of intention to discontinue net purchases in 2022 Q3
Jun-2022	Intention to raise interest rates	**APP:** net purchases to be discontinued as of 1 July **Ad hoc meeting:** flexibility in reinvestments under the PEPP and announcement of design of an anti-fragmentation instrument
Jul-2022	+50 bp *DFR: 0.0%*	**TPI:** approval of Transmission Protection Instrument (TPI)
Sep-2022	+75 bp *DFR: 0.75%*	
Oct-2022	+75 bp *DFR: 1.50%*	**TLTRO III:** terms and conditions recalibrated
Dec-2022	+50 bp *DFR: 2.0%*	**APP:** from beginning of March 2023, decline of €15 billion per month (on average) up to end-June 2023
Feb-2023	+50 bp *DFR: 2.50%*	**APP:** details of ways to reduce holdings
Mar-2023	+50 bp *DFR: 3.0%*	
May-2023	+25 bp *DFR: 3.25%*	**APP:** the Governing Council expects to discontinue reinvestments under the APP as of July 2023

SOURCE: Banco de España.
NOTE: APP = asset purchase programme; PEPP = pandemic emergency purchase programme; DFR = deposit facility rate; TLTRO III = third series of targeted longer-term refinancing operations.

beginning of March 2023 it will not reinvest all of the principal payments from maturing securities purchased under the APP. The decline will amount to €15 billion per month on average. More recently, at its May meeting, the Governing Council announced that it expected to discontinue the reinvestments under the APP as of July 2023.

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The ECB maintains its commitment to ensure the uniform transmission of its monetary policy stance to all euro area countries, to prevent unwarranted financial market fragmentation. The ECB Governing Council decided that, as a first line of defence against financial fragmentation risks not warranted by country-specific fundamentals, it would apply flexibility in reinvesting redemptions coming due in the PEPP portfolio.[21] If this were insufficient, the ECB has at its disposal a new Transmission Protection Instrument (TPI),[22] to guarantee appropriate and effective transmission of monetary policy throughout the euro area. Under the TPI, the Eurosystem may make secondary market purchases of securities issued in jurisdictions that are experiencing a deterioration in financing conditions not warranted by country-specific fundamentals, provided in all cases that certain criteria are met.

The Governing Council's future decisions will ensure that policy rates will be brought to levels sufficiently restrictive to achieve a timely return of inflation to the 2% medium-term target and will be kept at those levels for as long as necessary. The Governing Council will continue to follow a data-dependent approach to determining the appropriate level and duration of restriction. In particular, the Governing Council's policy 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.[23]

4 The transmission of monetary policy to financial conditions, activity and inflation

The impact that the measures adopted by the ECB have had and will have in the future is felt in different stages and through different channels. These channels initially affect financial conditions in the economy and subsequently affect activity and inflation (see Figure 3.3). While it is too early to make a detailed assessment of all the consequences of the monetary tightening conducted, it is possible to study its transmission to financial conditions and, from there, to infer its potential impact on inflation and activity using macroeconometric tools. To this end, this section first describes the different transmission channels from a conceptual point of view. The evidence available so far on their reach is then presented. Finally, the impact on economic activity and prices is estimated.

4.1 The transmission channels of monetary policy

In a first stage, the tightening of monetary policy impacts financial conditions through different channels, the first of which is the capital markets channel. An increase in policy interest rates expected by the market is passed through immediately to risk-free interest

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21 Statement after the ad hoc meeting of the ECB Governing Council, ECB press release of 15 June 2022.

22 The Governing Council announced the approval of the TPI on 21 July 2022. For more information on its design, see The Transmission Protection Instrument, ECB press release of 21 July 2022.

23 For more details, see Hernández de Cos (2023).

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Figure 3.3
TRANSMISSION CHANNELS OF MONETARY POLICY TIGHTENING

STAGE 1: TRANSMISSION TO FINANCIAL CONDITIONS	SPEED OF TRANSMISSION
Capital markets channel: ↑ cost of market financing	Very fast ("immediate")
Bank channel: ↑ cost of bank financing and deposit remuneration	Fast (6-12 months)
Income channel: ↑ interest income and payments	Slow (more than 12 months)
Wealth channel: ↓ value of financial wealth and real wealth	Very fast in financial wealth and fast in real wealth
Exchange rate channel: appreciation of the euro	Very fast ("immediate")

STAGE 2: TRANSMISSION TO THE REAL ECONOMY	SPEED OF TRANSMISSION
Intertemporal substitution effect: contraction in spending due to higher interest rates	Slow (12-18 months)
Income effect: contraction in spending due to lower income	Slow (12-18 months)
Wealth effect: contraction in spending due to lower wealth	Slow (12-18 months)
Exchange rate effect: the appreciation of the euro reduces external demand and exerts downward pressure on the price of imported goods	Slow (12-18 months)
Euro area trade channel: lower exports due to the contraction in activity in other euro area countries	Slow (12-18 months)
Price declines due to the drop in aggregate demand and the appreciation of the euro	Very slow (18-24 months)

SOURCE: Banco de España.

rates[24] at different horizons (what is known as the risk-free rate curve) that are traded on the capital markets. The latter are also influenced by changes in the term premium, which reflects the compensation demanded by investors for bearing the risk of unexpected future changes in short-term interest rates.[25] The interbank yield curve, which captures the interest rates on interbank lending transactions at different horizons, also shifts upwards, as these yields capture the risk-free rates plus liquidity and bank credit risk premia. Similarly, the pass-through

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24 Risk-free interest rates are defined as interest rates that do not incorporate credit risk, but may incorporate risks associated with changes in short-term interest rates.

25 The term premium is the difference between the long-term yield on a bond and the expected interest rate over that time horizon. This premium is not observable. This chapter uses an estimate based on Barahona and Rodriguez-Moreno (2023).

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of the increase in risk-free interest rates to the financing conditions of the various agents that raise capital market funding through bond issuance (such as general government, large corporations and commercial banks) also takes place immediately. This is because the yields on these bonds are determined by adding a premium to risk-free interest rates or interbank yields that depends on characteristics such as these assets' credit and liquidity risk. The reduction in the Eurosystem's asset portfolio is putting additional upward pressure on these yields.[26]

Banks pass higher financing costs through to their customers in what is known as the bank channel of monetary policy transmission. This channel is particularly relevant in the euro area, given the important role banks play in financial intermediation. First, the increase in the cost of commercial bank funding in the capital markets puts pressure on the remuneration of deposits, which further raises the cost of these financial intermediaries' liabilities. In the current setting, the cost of these liabilities is also pushed up by the maturity of the TLTROs, insofar as banks have to refinance these liabilities generally at a higher cost of funds. Second, the higher remuneration of bank reserves and government debt makes lending less attractive for banks. These financial intermediaries end up tightening credit terms and conditions for firms and households, albeit with a lag of between six months and one year, a more gradual process than what happens in capital markets.[27] The specific characteristics of banks and of different countries' banking systems may affect the intensity with which they tighten credit standards, in terms of both price and quantity.[28]

Rising interest rates drive up agents' financial income and expenditure in what is known as the income channel. Households, firms and general government see a rise in both income from their interest-bearing assets, such as bank deposits, and expenditure associated with debt servicing payments. While at the individual level the net effect may be either positive or negative, depending on each agent's wealth position, at the aggregate level the net impact of an interest rate rise on each of these groups is generally negative.

The tightening of monetary policy also leads to lower asset prices and, in the case of the euro area, to an appreciation of the euro. Higher interest rates raise the discount factor implicit in the value of financial or real assets, such as equities or housing, which translates into a decline in their price (wealth channel). Moreover, if there are no changes in the monetary policy of the rest of the world, an interest rate rise by the ECB tends to appreciate the exchange rate of the euro against other currencies, as investment in this currency offers a higher return (exchange rate channel).

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26 In theory, the tapering of asset purchases by a central bank puts upward pressure on long-term yields through three channels. First, a signalling channel, through which the central bank communicates to the markets its commitment to maintaining a contractionary monetary policy, thereby raising expected short-term interest rate levels. In addition, by reducing its asset portfolio the central bank returns to the market both long-term risk (through the duration extraction channel) and default risk (through the default risk extraction channel). See Costain, Nuño and Thomas (2022) and Eser, Lemke, Nyholm, Radde and Vladu (2019).

27 See, for example, Lane (2022).

28 For more details on the euro area, see Altavilla, Canova and Cicarelli (2020) and Gambacorta and Marqués-Ibáñez (2011). For the case of the United States, see Kashyap and Stein (1995), Kashyap and Stein (2000) and Kishan and Opiela (2000).

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In a second stage, the tightening of monetary policy lowers aggregate demand and reduces inflation. Various channels, which are generally linked to those described in the first stage, are also at work in this stage. First, interest rate rises change present and future consumption decisions through the intertemporal substitution channel: when interest rates rise, households and firms reduce their consumer spending and their investment and increase their savings.[29] Second, there is an income effect whereby lower net interest income acts as a constraint on their spending decisions. Third, capital losses as a result of lower asset prices also drive down spending, in what is known as the wealth effect. Fourth, the appreciation of the euro has a negative effect on external demand and exerts downward pressure on the price in euro of imported goods (exchange rate effect). Fifth, the tightening of monetary policy reduces imports from other euro area countries, as economic activity in these countries is also impacted (euro area trade channel). Lastly, there are several indirect channels through which the above direct channels change labour market conditions (including wages) and the fiscal stance. As a result, monetary tightening moderates activity and prices with some lag, typically estimated at around 18-24 months.[30]

4.2 Evidence for the first stage: effects on financial conditions

4.2.1 The capital markets channel

The euro area risk-free rate curve[31] has shifted very sharply upwards since end-2021, in line with changes in the expected path of policy interest rates. This upward shift started in late 2021, before the ECB began raising its policy interest rates in July 2022, as markets anticipated these hikes some months in advance. The curve subsequently continued its upward shift as market expectations for monetary policy decisions were revised. At the cut-off date for this report, the 1-year risk-free rate was up by 405 bp and its 10-year counterpart by 268 bp.

However, the increase in risk-free rates, in particular for longer-dated terms, was also attributable to the sharp rise in term premia, something not witnessed in previous policy rate hiking cycles. In particular, for the 10-year horizon, the term premium is estimated to account for half (139 pp) of the increase in the risk-free rate (see Charts 3.5.1 and 3.5.2). Conversely, in the 2005 cycle, and over a comparable period of time, this premium increased by just 44 bp, while in the 1999 tightening cycle it declined by 69 bp. A number of factors could be behind the increase in term premia in the current cycle. First, the higher interest rate risk perceived by investors, reflecting the heightened uncertainty over the future path of inflation

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29 This would be the case for net borrowers.

30 For example, Bernanke and Gertler (1995), using a VAR model with US data, suggest that GDP begins to decline four months after a tightening of monetary policy and bottoms out after about two years. They also show that price levels start to decline one year after the tightening. See also Cloyne, Ferreira and Surico (2019), Havranek and Rusnák (2012), Cloyne, Ferreira, Froemel and Surico (2023), and Lane (2022).

31 The overnight risk-free rate is proxied by the euro short-term rate (€STR), which is an indicator of the interest rate on unsecured overnight lending between euro area banks. For longer terms, the risk-free rate is proxied by the overnight indexed swap (OIS) rate, which is the fixed component of interest rate swaps in which the floating component is indexed to the €STR.

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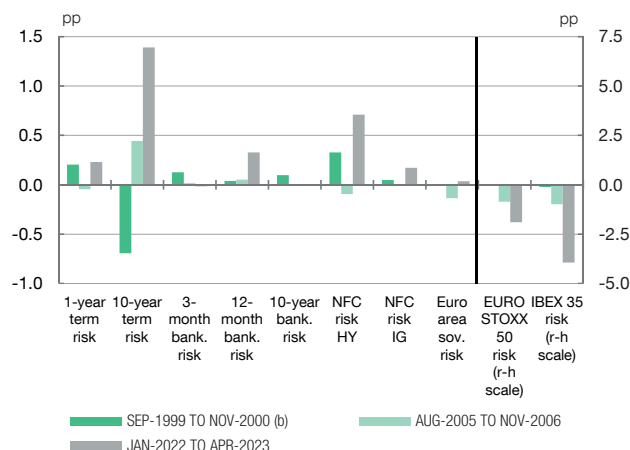abbreviations

Chart 3.5

THE TIGHTENING OF MONETARY POLICY HAS FED THROUGH TO CONDITIONS IN CAPITAL MARKETS

Expectations of monetary policy tightening have been passing through to risk-free interest rates since the beginning of 2022, before the first rise in policy rates. At the long end of the curve, yields have also reflected the significant increase in term premia, which was not the case in other historical periods of policy rate hikes. Moreover, the increase in long-term risk-free rates appears to have been strongly influenced by monetary policy in the United States, again in contrast to other monetary policy tightening cycles. Lastly, real risk-free interest rates have also risen markedly from their levels in early 2022.

1 10-YEAR YIELDS

10-YEAR OIS €STR
10-YEAR €STR EXPECTATIONS
10-YEAR EURIBOR SWAP
INVESTMENT GRADE NFC
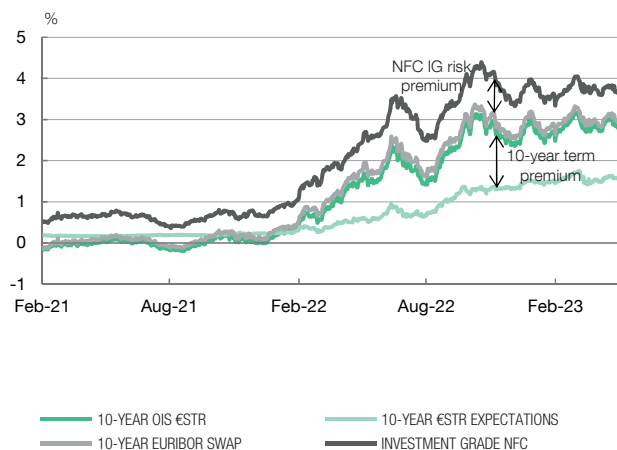
2 CHANGES IN VARIOUS PREMIA DURING ECB RATE HIKING CYCLES (a)

SEP-1999 TO NOV-2000 (b)
AUG-2005 TO NOV-2006
JAN-2022 TO APR-2023

3 BREAKDOWN OF THE CUMULATIVE CHANGE IN THE 10-YEAR OIS
RATE IN DIFFERENT TIGHTENING CYCLES (c)

EURO AREA MACRO
EURO AREA MON. POL.
US MACRO
US MON. POL.
GLOBAL RISK
10-YEAR OIS
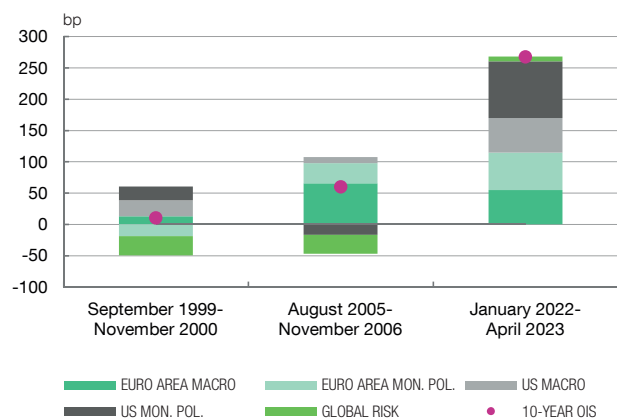
4 REAL INTEREST RATES (d)
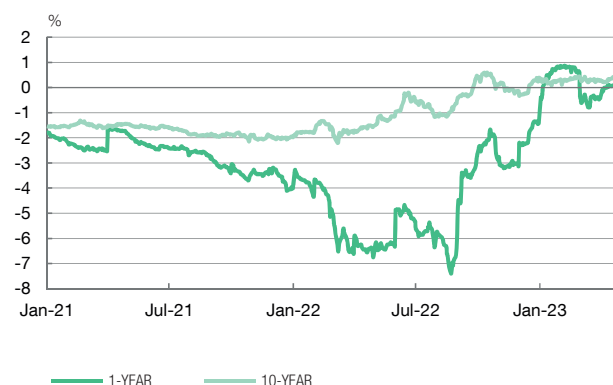
1-YEAR
10-YEAR

SOURCES: Refinitiv Datastream, Bloomberg Datalicense and Banco de España.

a Cumulative change in the various risk premia during the rate hiking cycles. These include (i) the term premia for 1-year and 10-year risk-free interest rates; (ii) the spreads between 3-month, 6-month and 10-year interbank interest rates and risk-free interest rates at the same maturities; (iii) the spread between non-financial corporate bond yields in the high yield and investment grade segments and the swap curve; (iv) the spread between the 10-year GDP-weighted yield on euro area countries' sovereign debt and the 10-year risk-free interest rate; and (v) the equity risk premia of the EURO STOXX 50 and the IBEX 35 indices.

b The 10-year term premium and 10-year banking risk are calculated based on the 10-year German bond. The hiking cycle that began in 1999 ended in November 2000, which is when expectations of rate cuts begin to emerge.

c Calculated using a two-country BVAR model that includes the euro area 10-year OIS rate, euro area and US share prices, the bilateral nominal USD/EUR exchange rate and the spread between the euro area 10-year OIS rate and the US Treasury bond. Identification using impact sign restrictions, following Brandt, Saint Guilhem, Schröder and Van Robays (2021), and estimated using daily data for the period 1999-2023. To illustrate the cumulative change of the various shocks influencing the bilateral nominal USD/EUR exchange rate in the period September 1999 to November 2000, the sample of data is extended to the start of 1999, using the German Bund price as a proxy for the euro area 10-year OIS rate. The hiking cycle beginning in 1999 ends in November 2000, which is when expectations of rate cuts begin to emerge.

d Calculated by subtracting from the OIS rate the value of the inflation-linked swap (ILS) at the same maturity.

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and monetary policy. Second, the anticipated decline in the Eurosystem's asset portfolio (or "quantitative tightening") will entail a reversal of the absorption of duration risk that was associated with the asset purchase programme ("quantitative easing") of previous years and which led to the compression of these premia.[32] Lastly, higher long-term interest rates in the United States, associated with the country's monetary policy tightening, appear to have exerted pressure on long-term yields in the euro area. According to econometric models,[33] the results of which are shown in Chart 3.5.3, the shocks associated with US monetary policy explain 90 bp of the 268 bp increase in the euro area 10-year risk-free rate.

Real risk-free rates – the relevant measure for agents' consumption and investment decisions – have also risen significantly. Indeed, since end-2021 the 1-year risk-free rate[34] has climbed by 425 bp overall, having fallen heavily until the summer of 2022 – driven by changes in 1-year expected inflation – followed by an equally marked increase thereafter. The real 10-year risk-free rate, which followed a rising path throughout the period analysed, has increased by 227 bp (see Chart 3.5.4).

Interbank rates – used as a reference to set the cost of raising funds on the debt markets and of bank financing – have risen in line with risk-free rates. However, these two interest rates – which reflect the counterparty risk in interbank loans, along with other factors such as the liquidity conditions and the microstructure of bank funding markets[35] – have moved in opposite directions across the various terms. Specifically, the spread between them increased slightly in the case of the 1-year EURIBOR, the main reference rate for Spain's mortgage market (see Chart 3.5.2). This suggests that the cost of floating rate mortgage funding has risen even more sharply than the risk-free rates indicate, which happened to a lesser extent in the 2005 and 1999 hiking cycles. However, in 3-month interbank loans, whose interest rates generally serve as a reference for firms' short and medium-term floating rate financing through bank loans or debt securities, the premium barely changed in the last two cycles, but increased slightly in the 1999 cycle. Lastly, for the 10-year interbank rate[36] – which generally serves as a reference for setting long-term financing conditions for households and firms – the premium has barely changed in the current cycle. This was also the case in the 2005 cycle, while during the 1999 tightening episode it increased slightly.

Higher risk-free rates have also immediately fed through to the cost of capital market-based funding for firms and general government, although the spread between the two has widened somewhat, and more so than in previous monetary policy tightening cycles. The increase in these risk premia may have been conditioned by the current heightened

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32 Benigno, Canofari, Di Bartolomeo and Messori (2022).

33 A two-country structural VAR model identified with sign restrictions is used, following Brandt, Saint Guilhem, Schröder and Van Robays (2021), which includes the euro area 10-year OIS, euro area and US share prices, the bilateral nominal USD/EUR exchange rate and the spread between the euro area 10-year OIS rate and the 10-year US Treasury bond.

34 Real risk-free rates are proxied as the difference between the nominal rate and the inflation-linked swap (ILS) rate for the same term. This rate, referred to as inflation compensation, captures both inflation expectations and an inflation risk premium.

35 Michaud and Upper (2008).

36 Since there is no 10-year EURIBOR rate, this variable is proxied through the fixed component of a 10-year interest rate swap where the variable component is the 6-month EURIBOR.

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macroeconomic and geopolitical uncertainty, by the low starting levels for these premia (largely due to the Eurosystem's bond purchase programmes) and by expectations that these holdings will be reduced.[37] Further, the increase in the sovereign risk premium might also be related to some countries' high debt ratios compared with those in 2005 and 1999. In any event, the rise in this premium in the current cycle appears to have been attenuated by the flexibility of the PEPP reinvestment policy and the announced launch of the TPI.

Quantitative tightening – which will reduce the Eurosystem's asset holdings – could, if it is faster than expected by the markets, put additional upward pressure on the different agents' capital market-based funding costs. Indeed, a sharper-than-expected decline in these holdings could cause term, corporate and sovereign premia to rise (see Box 3.1).

For its part, the cost of equity for listed euro area and Spanish firms, which measures the cost of share issuance, has barely risen since end-2021. According to the estimates available, this largely owes to the sharp drop in equity risk premia, which has been more pronounced than in previous monetary policy tightening cycles (see Chart 3.5.2).

4.2.2 The bank channel

Euro area credit institutions have gradually passed higher market rates through to their new loans and deposits. Between end-2021 and February 2023 (the latest available figure at the cut-off date for this report), the average interest rate on new loans to households for house purchase rose by 1.9 pp in the euro area (2 pp in Spain), while the increase in consumer credit and other lending was 2.2 pp (1.9 pp in Spain). In bank lending to firms, the average interest rate was up by 2.7 pp (2.3 pp in Spain).[38] During the same period, the average interest rate on households' and firms' time deposits climbed by 1.6 pp and 2.6 pp, respectively (0.8 pp and 2.1 pp, respectively, in Spain).

In the euro area, market rates are, overall, passing through to the cost of new lending to households for house purchase at a similar pace to past cycles,[39] but somewhat more quickly in the case of lending to firms. As Chart 3.6 shows, in new loans for house purchase with interest rate reset periods of more than one year – the bulk of these loans –, the pass-through is in keeping with previous episodes of monetary policy tightening; however, the pass-through has been slightly slower than in previous cycles in the case of reset periods of a year or less. By contrast, in lending to firms higher market rates are passing through more swiftly than in past cycles, both in short-term loans or those with interest rate reset in the next 12 months (the majority) and in loans with longer fixed interest rate periods. This stronger

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37 De Santis,Geis, Juskaite and Vaz Cruz (2018)

38 Narrowly defined effective rates (NDERs), which exclude related charges, such as repayment insurance premia and fees. They are also trend-cycle interest rates, i.e. they are adjusted for seasonal and irregular components (small changes in the series with no recognisable pattern in terms of periodicity or trend). Therefore, the series are subject to revision when the components are re-estimated on the basis of new observations.

39 Mayordomo and Roibás (2023).

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Chart 3.6

BANKS HAVE GRADUALLY PASSED INCREASES IN MARKET INTEREST RATES THROUGH TO THEIR RATES ON NEW LENDING AND DEPOSITS

In the euro area, higher interest rates are passing through to the cost of new loans to households for house purchase at a similar pace to past episodes, except in loans with an interest rate reset period of up to one year, but in Spain the pass-through has been slower. In lending to firms, the pass-through in the euro area is currently faster than in the past, while in Spain it is similar to that observed in previous cycles. As for new time deposits, the pass-through in the euro area is slower in the current cycle for households and similar to past episodes for corporate deposits, while in Spain it is slower in both segments.

1 CUMULATIVE CHANGE IN BANK RATES FROM DECEMBER 2021 TO FEBRUARY 2023. EURO AREA (a)

2 CUMULATIVE CHANGE IN BANK RATES FROM DECEMBER 2021 TO FEBRUARY 2023. SPAIN (a)

OBSERVED   ● ESTIMATED BASED ON PREVIOUS CYCLE (b)
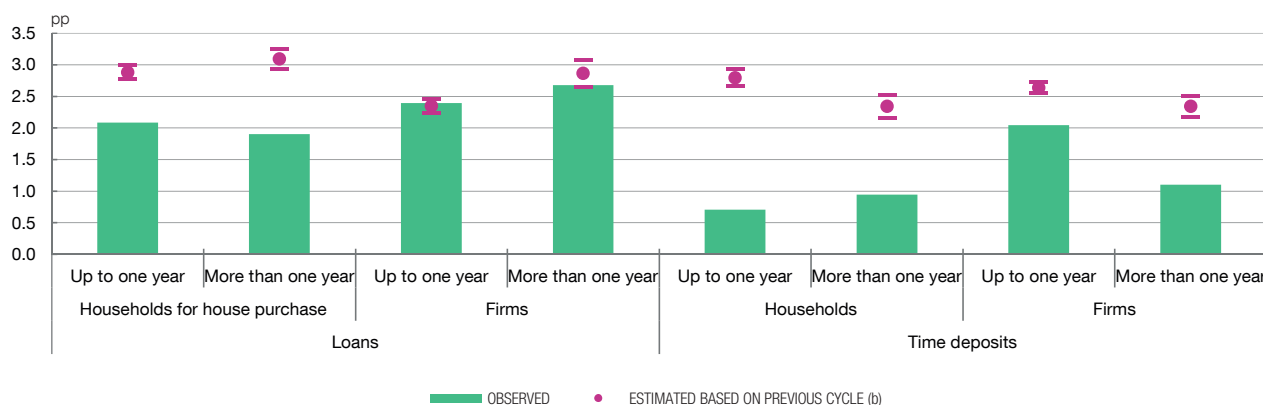
SOURCES: Banco de España, ECB and Refinitiv Datastream.

a Interest rates are narrowly defined effective rates (NDERs), which exclude related charges, such as repayment insurance premia and fees, and are adjusted seasonally and for the irregular component (small changes in the series with no recognisable pattern in terms of periodicity or trend). The term refers to the frequency with which interest rates are reset.
b Resulting bank interest rate if the observed interest rate developments between January 2022 and February 2023 had been passed through to bank interest rates as in past periods, in line with the historical pattern captured by a standard error-correction model estimated between January 2003 and August 2007. The horizontal lines show the confidence bands.

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pass-through could be linked to the weaker macroeconomic environment in the current cycle compared with past episodes, which appears to have translated into higher credit risk premia.

Conversely, in terms of remuneration on new time deposits,[40] **in the current cycle the pass-through of higher market rates has been slower for the deposits of euro area**

40 According to the historical regularities, the remuneration of sight deposits tends to be less sensitive to changes in market rates. However, market rates are likewise passing through to these deposits more slowly in the current cycle than in past episodes. Since end-2021 the average remuneration of these deposits in the euro area has risen by just 9 bp for households (to 0.1%) and 28 bp for firms (to 0.2%).
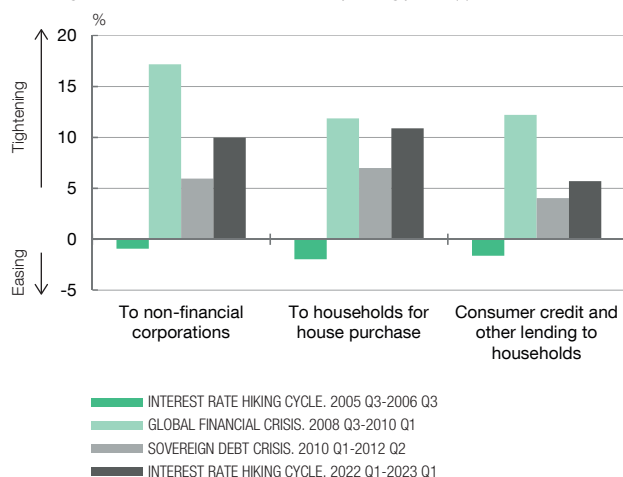
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Chart 3.7

THE TIGHTENING OF MONETARY POLICY HAS GONE HAND IN HAND WITH A CONTRACTION IN THE SUPPLY OF CREDIT AND A LOSS OF MOMENTUM IN NET FINANCING FLOWS
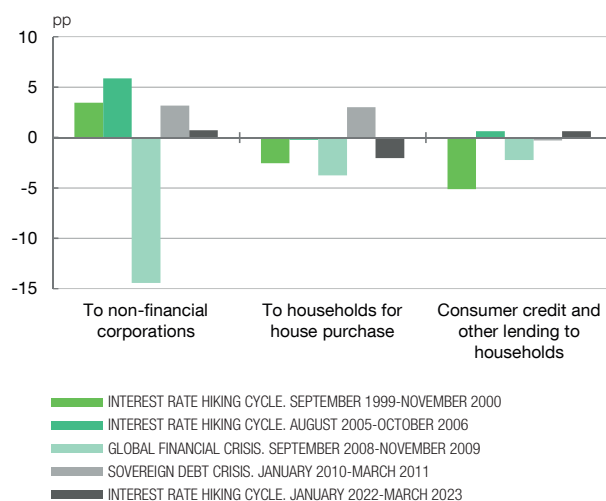
Credit standards appear to have tightened across the board since the beginning of 2022, in both the euro area and Spain. This is in contrast to the easing observed in the previous interest rate hiking cycle, which is explained not only by banks' higher funding costs and balance sheet constraints, but mainly by a higher risk perception among banks, in line with the negative supply shocks. The loss of momentum in net financing flows is generally proving sharper than in the previous monetary tightening cycle of 2005.

1 CHANGE IN EURO AREA CREDIT STANDARDS
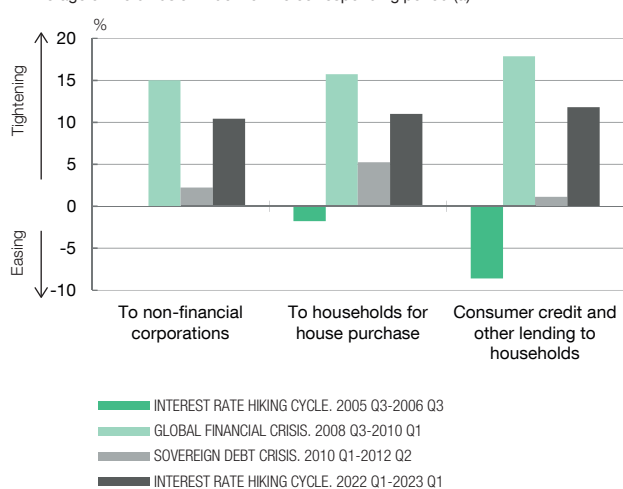Average of the diffusion index for the corresponding period (a)

INTEREST RATE HIKING CYCLE. 2005 Q3-2006 Q3
GLOBAL FINANCIAL CRISIS. 2008 Q3-2010 Q1
SOVEREIGN DEBT CRISIS. 2010 Q1-2012 Q2
INTEREST RATE HIKING CYCLE. 2022 Q1-2023 Q1

2 CHANGE IN YEAR-ON-YEAR CREDIT GROWTH IN THE EURO AREA (b)

INTEREST RATE HIKING CYCLE. SEPTEMBER 1999-NOVEMBER 2000
INTEREST RATE HIKING CYCLE. AUGUST 2005-OCTOBER 2006
GLOBAL FINANCIAL CRISIS. SEPTEMBER 2008-NOVEMBER 2009
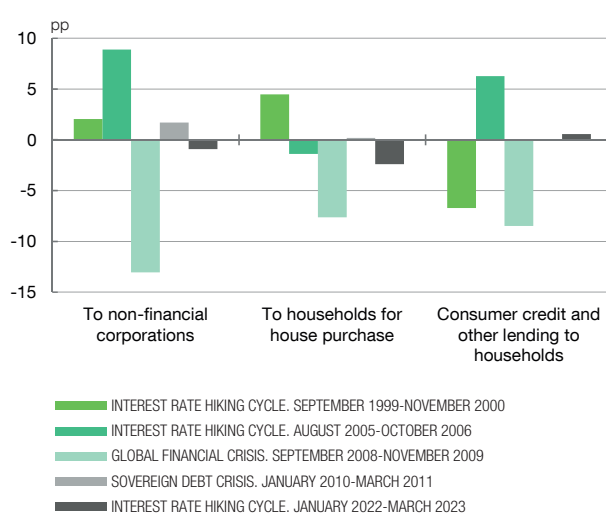SOVEREIGN DEBT CRISIS. JANUARY 2010-MARCH 2011
INTEREST RATE HIKING CYCLE. JANUARY 2022-MARCH 2023

3 CHANGE IN CREDIT STANDARDS IN SPAIN
Average of the diffusion index for the corresponding period (a)

INTEREST RATE HIKING CYCLE. 2005 Q3-2006 Q3
GLOBAL FINANCIAL CRISIS. 2008 Q3-2010 Q1
SOVEREIGN DEBT CRISIS. 2010 Q1-2012 Q2
INTEREST RATE HIKING CYCLE. 2022 Q1-2023 Q1

4 CHANGE IN YEAR-ON-YEAR CREDIT GROWTH IN SPAIN (b)

INTEREST RATE HIKING CYCLE. SEPTEMBER 1999-NOVEMBER 2000
INTEREST RATE HIKING CYCLE. AUGUST 2005-OCTOBER 2006
GLOBAL FINANCIAL CRISIS. SEPTEMBER 2008-NOVEMBER 2009
SOVEREIGN DEBT CRISIS. JANUARY 2010-MARCH 2011
INTEREST RATE HIKING CYCLE. JANUARY 2022-MARCH 2023

SOURCES: ECB and Banco de España.

a Percentage of banks that have tightened standards considerably x 1 + percentage of banks that have tightened standards somewhat x 1/2 percentage of banks that have eased standards somewhat x 1/2 - percentage of banks that have eased standards considerably x 1.
b Does not include securitised credit.

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households, and similar or somewhat slower, depending on the term, for those of firms. In the case of households, the slower pass-through is observed both in deposits of up to one year and those with longer terms, although the difference is starker for the former (see Chart 3.6.1). A slower pass-through, albeit less so, is likewise evident in time deposits provided

to firms with a maturity of up to one year, while for longer-term deposits the pass-through is similar to that observed in past cycles. The lower pass-through to time deposits observed across most segments in the current cycle could owe to credit institutions' lower funding needs, amid ample liquidity in the euro area banking system, which reduces the pressure on banks to raise their deposit remuneration. Further, this remuneration may have been prevented from rising until it once again stood below market rates; such remuneration exceeded market rates during the negative interest rate period (particularly in the case of household deposits) because it did not stand at a level below 0%.

Broadly speaking, in Spain the pass-through of higher market rates to the cost of credit and deposit remuneration has, to date, been more sluggish than might be expected based on the historical regularities. This is particularly noticeable in households' time deposits (see Chart 3.6.2). The possible explanatory factors for this are discussed later in this chapter.

Bank lending rates have risen in step with the tightening of access to credit, which, coupled with lower demand for funds, has translated into a marked slowdown in net financing flows to households and firms, both in the euro area and in Spain. According to the Bank Lending Survey (BLS), credit standards have been tightened since early 2022 in both regions and across all segments, as compared with the stability or even easing observed during the 2005 rate hiking cycle (see Charts 3.7.1 and 3.7.3). This tightening – which was even more pronounced than that observed during the sovereign debt crisis, although not as sharp as that during the global financial crisis – appears attributable not only to banks' higher cost of funds and balance sheet constraints (linked to monetary policy tightening), but also – and more so – to their greater risk perception, which would be consistent with the severity of the negative supply shocks in the current inflationary episode (in contrast with the positive demand shocks that predominated during the 2005 monetary policy tightening cycle). Likewise, demand for credit has decreased during this cycle, due both to higher interest rates and to the worsening macroeconomic environment and heightened uncertainty. All of which has led to a sharper overall drop in net financing flows than recorded in the 2005 cycle[41] (see Charts 3.7.2 and 3.7.4). In the case of firms, the slowdown in bank lending has likewise been more pronounced than in the 1999 cycle.

4.2.3 The income channel

Higher interest rates have begun to have an impact on the income of euro area households and firms. To February 2023 (the latest data available), the impact in the case of euro area households has been an increase in net interest payments on banking products equivalent to 0.3% of their gross disposable income (GDI), while euro area firms have seen an

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41 Another potential contributor to this drop were voluntarily repayments of outstanding debt – amid a rising cost of floating rate loans –, likely underpinned by the significant stock of saving built up during the pandemic.

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increase equivalent to 2.2% of their gross operating surplus (GOS).[42] As discussed in more detail later in this chapter, these effects have been more pronounced in Spain, particularly for households (1% of GDI) – essentially reflecting the strong prevalence of floating rate contracts in the stock of mortgages – and to a lesser extent for firms (2.7% of GOS).

In any event, the income channel has, in net terms, been weakened in the short term, as a result of the changes seen in recent years in the breakdown and volume of households' and firms' outstanding asset and liabilities. On the liabilities side, the lower exposure to interest rates hikes in the near term owes essentially to changes in the structure of the debt, since the aggregate debt of euro area households and firms has hardly increased as a percentage of their income (indeed, in Spain it has decreased).[43] Further, the debt burden has become less sensitive to interest rate hikes. Indeed, as Chart 3.8 shows, the volume of euro area household debt whose interest rate is due to reset in the next 12 months declined from 35% of GDI in 2012 to 24% in 2021 (from 108% to 60% in Spain),[44] while for firms it declined from 230% to 171% of GOS in the same period[45] (from 326% to 207% in Spain). Conversely, in terms of deposits the income channel's positive effect gained momentum, mainly on account of changes in volume. Euro area households' sight deposits, saving deposits and time deposits with an agreed maturity of up to one year increased from 83% of GDI in 2012 to 106% in 2021 (from 86% to 121% in Spain), and those of firms from 84% to 125% of GOS (from 74% to 143% in Spain) during the same period.[46]

However, in net terms, the changes in the pass-through to new bank lending rates in the current cycle have strengthened the income channel. For households, this effect arises from the slower pass-through to deposit remuneration,[47] especially in Spain, while in the case of firms it owes to a faster pass-through to the cost of credit, as discussed above.

In the case of general government, as compared with previous cycles, the higher level of indebtedness has amplified the pass-through of higher interest rates to the debt burden. As Chart 3.9.1 shows, in 2021 government debt stood at 97% of GDP for the euro

---

42 The net income effect is calculated as the difference between the increase in bank loan interest payments and the increase in interest income from time deposits (calculated based on the stock of bank balances at end-2021) relative to that income in 2021. Owing to the non-availability of data, the increase in interest payments associated with firms' debt securities is excluded from the calculation. In the case of households, the net impact on income is negative (higher net interest payments) despite a larger volume of deposits than of bank debt. This is because the average cost of outstanding debt rises more sharply than the average remuneration of total deposits. In the case of firms, in addition to this effect, it should be noted that the volume of bank debt exceeds that of deposits.

43 In the period 2005-2021, in the euro area households' bank debt rose by 6 pp as percentage of their GDI, while that of firms barely changed as a percentage of their GOS.

44 Data for the interest rate structure of bank debt are available from 2012. The percentages are obtained by multiplying the volume of lending by resident banks whose interest rate resets within a year by the total bank debt-to-income ratio.

45 Bank loans to firms with residual maturity of up to one year are also included, given that they typically renew their short-term loans. Also included are debt instruments, i.e. securities with original maturity of up to one year and those with longer maturities that will be redeemed in the next 12 months.

46 As a proportion of total deposits, these deposits have risen from 84% in 2012 to 91% in 2021 for households and from 91% to 95% for firms.

47 In line with other rate hiking cycles, the remuneration of sight deposits is largely unchanged.

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Chart 3.8

CHANGES IN RECENT YEARS IN THE COMPOSITION AND VOLUME OF HOUSEHOLDS' AND FIRMS' ASSETS AND LIABILITIES HAVE WEAKENED THE NEGATIVE INCOME CHANNEL ASSOCIATED WITH HIGHER INTEREST RATES

In the euro area, the lower exposure, in the short term, of households and firms to interest rate changes owes mainly to the decline in the proportion of debt whose interest rate is due to reset in the next 12 months and by an increase in the volume of deposits. In Spain, the lower exposure mainly owes to deleveraging and the growth in deposits. For households, other contributors were the higher proportion of outstanding fixed rate debt and the higher proportion of sight and time deposits of up to one year, and for firms, the increase in the share of debt maturing in more than one year.

1 EXPOSURE OF HOUSEHOLDS TO INTEREST RATE CHANGES.
EURO AREA
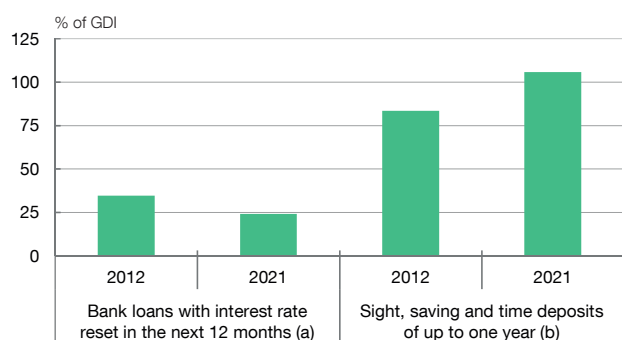
2 EXPOSURE OF FIRMS TO INTEREST RATE CHANGES.
EURO AREA
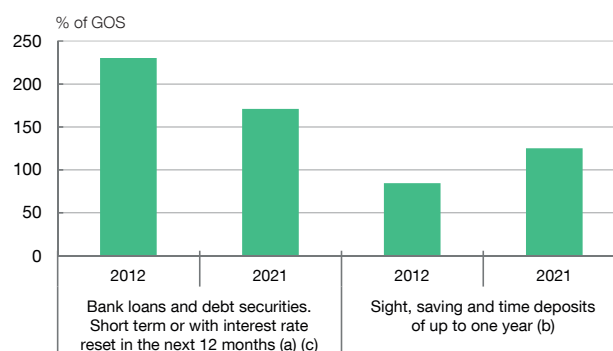
3 EXPOSURE OF HOUSEHOLDS TO INTEREST RATE CHANGES.
SPAIN
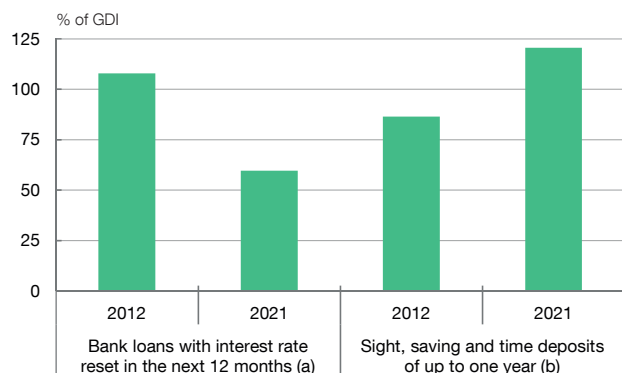
4 EXPOSURE OF FIRMS TO INTEREST RATE CHANGES.
SPAIN
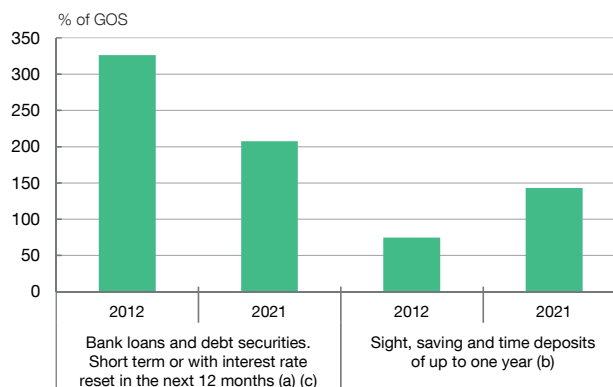
SOURCES: ECB and Banco de España.

a Obtained by multiplying the volume of resident bank loans whose interest rate is reset within a year by the ratio of total bank loans to income.
b Obtained by multiplying the volume of sight and time deposits of up to one year at resident banks by the ratio of total bank deposits to income.
c The bank loans whose interest rate is reset within a year also include those with residual maturity of up to one year, given that firms typically renew their short-term loans. The fixed income component includes securities with an original maturity of up to one year and those with longer maturities that will be redeemed in the next 12 months.
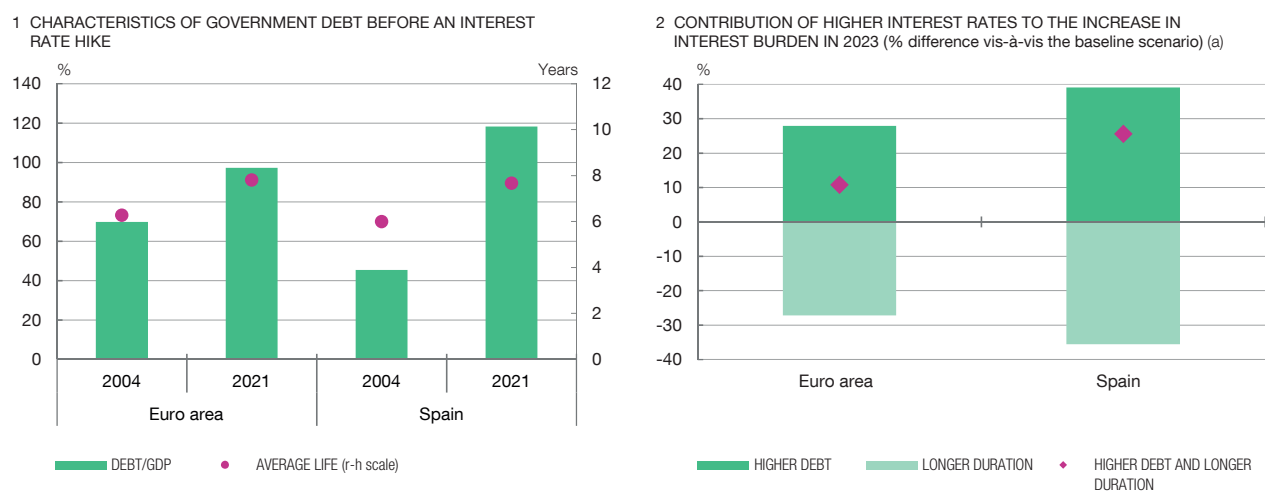
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area as a whole and 118% for Spain, well above the 70% and 45%, respectively, observed in 2004, before the 2005 monetary policy tightening cycle got under way. Since the higher interest rates are now applied to a larger volume of debt, they have entailed a sharper increase in interest payments. In particular, as Chart 3.9.2 shows, the impact of higher interest rates on the euro area interest burden in 2023 has been 28% more pronounced than would have

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Chart 3.9
DETERMINANTS OF THE IMPACT OF HIGHER INTEREST RATES ON THE INTEREST EXPENSE OF GENERAL GOVERNMENT

The growth in government debt between 2004 in 2021 amplified the effect of higher interest rates on interest expense, while the longer duration of debt has acted in the opposite direction. The net effect of these two factors is a sharp increase in interest burden in the euro area and Spain.

1 CHARACTERISTICS OF GOVERNMENT DEBT BEFORE AN INTEREST
  RATE HIKE

2 CONTRIBUTION OF HIGHER INTEREST RATES TO THE INCREASE IN
  INTEREST BURDEN IN 2023 (% difference vis-à-vis the baseline scenario) (a)

DEBT/GDP   ● AVERAGE LIFE (r-h scale)

HIGHER DEBT   LONGER DURATION   ◆ HIGHER DEBT AND LONGER DURATION

SOURCES: Eurostat, European Commission Winter 2022 Economic Forecast and Banco de España.

a Estimates based on the debt sustainablility model for the Spanish economy detailed in Burriel, Kataryniuk and Pérez (2022).

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been the case had the debt-to-GDP ratio stood at 2004 levels.[48] In Spain this impact has been stronger still (39%) due to the sharper rise since 2004 in the country's debt-to-GDP ratio (73 pp compared to 27 pp for the euro area).[49]

However, this effect has been dampened by the lengthening of the average life of outstanding debt. National treasuries capitalised on the prevailing low interest rate environment during the last decade to significantly extend the maturity of new debt issuances. Thus, for the four largest euro area economies, the average duration of the stock of debt increased from 6.3 years in 2004 to 7.8 years in 2021 (from 6 years to 7.8 years in Spain). The longer average maturity of government debt results in a slower pass-through of higher interest rates to the debt burden, as the stock of debt, and thus the interest paid, is renewed less quickly. It is estimated that, as a result of the increased average duration of outstanding debt in the euro area since 2004, the impact in 2023 of higher interest rates on general government interest expense has been 27% smaller than would have been the case had the average maturity remained constant (see Chart 3.9.2). This effect is somewhat larger in Spain (35%), since the average maturity of its debt has been extended somewhat further (1.7 years compared with 1.5 years for the euro area). In net terms, the effect associated with the higher volume of

48 The increase in general government interest expenses is estimated using a government debt sustainability model that factors
    in the maturity and instrument structure of government debt (Burriel, Kataryniuk and Pérez (2022)). The model assumes that
    interest rates rise in line with the shift observed in the forward interest rate curve.

49 At end-2022, the debt-to-GDP ratio stood at 91.6% in the euro area and 113.2% in Spain.

debt is predominant. Thus, it is estimated that in 2023 the general government financial burden for the euro area and for Spain will be 11% and 26% higher, respectively, than would have been the case had debt volumes (as a percentage of GDP) and average debt maturity held at 2004 levels.[50]

4.2.4 The wealth and exchange rate channel

The value of household wealth has been affected by monetary policy tightening, via its adverse impact on asset prices, although other factors have also had an influence. According to the ICE BofA Euro Non-Financial Index, debt securities have been the worst-performing asset class, down by 14.8% between December 2021 and the cut-off date for this report. The broad EURO STOXX index was 3.7% down on end-2021 levels, while the IBEX 35 was up 5.5% in the same period. The resilience of these indices to higher interest rates has been supported largely by the lower equity risk premium, as discussed in Section 4.2.1. There has been a significant slowdown in house prices since early 2022, putting the end-2022 year-on-year growth rate at 2.9% in the euro area and 5.5% in Spain, down from 9.8% and 8.5%, respectively, in 2022 Q1. Overall, in 2022 gross household wealth increased by 1.9% in nominal terms in the euro area and by 3.7% in Spain. However, in real terms household wealth declined by 6.7% in the euro area and by 1.7% in Spain due to higher inflation.

Despite interest rates rising sharply in the euro area, the euro exchange rate has, on balance, tended to depreciate against other currencies, although there has been reverse movement in the most recent period. The euro exchange rate fluctuated significantly last year, moving for most of 2022 in depreciation territory in nominal terms against its main trade partners and, in particular, in the bilateral exchange rate against the US dollar, reaching cumulative depreciation of as much as 4% against its trade partners and 17% against the US dollar (see Chart 3.10.1).

This depreciation mainly reflects an earlier and stronger monetary policy tightening in other regions compared with the euro area. Between December 2021 and April 2023, the euro exchange rate depreciated by 3.1% against the US dollar. According to an econometric model designed to identify the origin of shocks to this bilateral exchange rate, US monetary policy-related shocks contributed to an 8.3% cumulative depreciation of the euro against the dollar during that period, more than offsetting the cumulative effect in the opposite direction associated with ECB monetary policy (6.2%). US monetary policy has had a far more significant offsetting impact in the current cycle than in previous episodes of tightening monetary conditions (see Chart 3.10.2).

---

50 The net effect is calculated against a counterfactual scenario of lower debt and shorter debt maturity. The combined effect of the two factors may not necessarily equal the sum of the individual effects, as illustrated in Chart 3.9.2. This is because the effect of assuming a shorter debt maturity is far smaller when applied to a significantly lower volume of debt.

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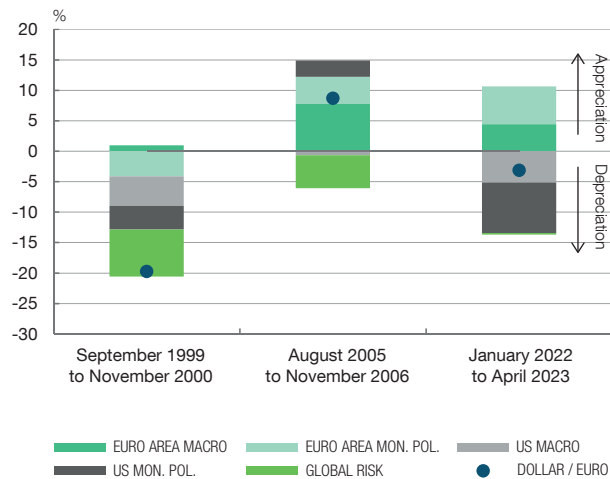
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Chart 3.10

DESPITE THE MONETARY POLICY TIGHTENING IN THE EURO AREA, THE EURO TENDED TO DEPRECIATE DURING MUCH OF 2022

The nominal euro exchange rate against the US dollar depreciated substantially in the first half of 2022, above all due to the interest rate spread against the United States and higher global risk aversion. The Fed's monetary policy has exerted significant downward pressure on the euro compared with previous monetary tightening cycles.

1 NOMINAL BILATERAL USD/EUR EXCHANGE RATE AND THE NOMINAL EFFECTIVE EXCHANGE RATE SINCE 01/01/1999 (a)
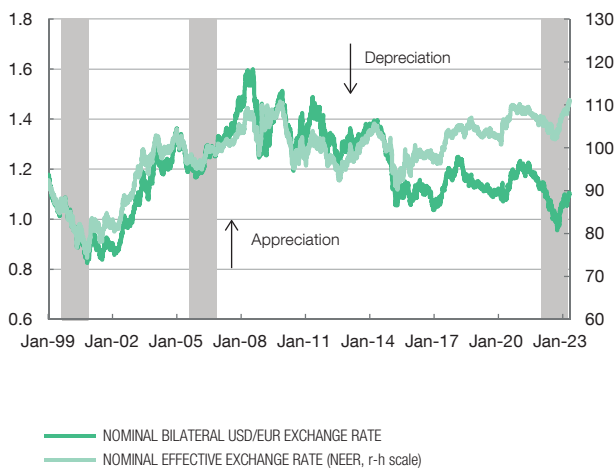
2 BREAKDOWN OF THE CUMULATIVE CHANGE IN THE USD/EUR EXCHANGE RATE IN DIFFERENT TIGHTENING CYCLES (b) (c)

— NOMINAL BILATERAL USD/EUR EXCHANGE RATE
— NOMINAL EFFECTIVE EXCHANGE RATE (NEER, r-h scale)

EURO AREA MACRO   EURO AREA MON. POL.   US MACRO
US MON. POL.   GLOBAL RISK   DOLLAR / EURO

SOURCE: Banco de España.

a   The shaded areas denote the monetary policy tightening cycles in the euro area.
b   Two-country BVAR model that includes the euro area 10-year OIS rate, euro area and US share prices, the bilateral nominal USD/EUR exchange rate and the spread between the euro area 10-year OIS rate and the US Treasury bond. Identification using impact sign restrictions, following Brandt, Saint Guilhem, Schröder and Van Robays (2021), and estimated using daily data for the period 2005-2022. To illustrate the cumulative change of the various shocks influencing the bilateral nominal USD/EUR exchange rate in the period September 1999 to November 2000, the sample of data is extended to the start of 1999, using the German Bund price as a proxy for the euro area 10-year OIS rate.
c   The hiking cycle beginning in 1999 ends in November 2000, which is when expectations of rate cuts begin to emerge. Latest observation: 28 April 2023.

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4.3   Uneven transmission of monetary policy to financial conditions

4.3.1   Cross-country heterogeneity

There is significant cross-country heterogeneity in the transmission of monetary policy to new bank lending in some segments. This is particularly true in loans for house purchase whose interest rate resets in more than five years (see Chart 3.11.1). For instance, since end-2021 the cost of mortgage borrowing in Italy and Germany has increased in line with the reference market rate, while in France the transmission is only around 50%. Likewise, deposit remuneration has risen unevenly, with Spain recording the smallest increase of the four largest euro area countries. Specifically, the increase in Spain is 79 bp smaller than that of the euro area and represents just 20% of the change in the 12-month EURIBOR. Conversely, in loans to firms with an interest rate reset period of up to one year – the bulk of this segment – the pass-through of higher reference rates has been very similar across jurisdictions.

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Chart 3.11

HIGH HETEROGENEITY ACROSS EURO AREA COUNTRIES IN THE TRANSMISSION OF MONETARY POLICY IN SOME SEGMENTS, INFLUENCED BY THE CHARACTERISTICS OF EACH COUNTRY'S BANKS AND BANKING SYSTEM

The heterogeneity in new loans for house purchase with a maturity of more than five years is very marked, while the differences are less pronounced for loans of up to one year in the non-financial corporation (NFC) segment. For its part, time deposit remuneration has increased to a lesser extent in Spain during this cycle. As for the determinants, the speed of monetary policy transmission depends both on banks' idiosyncrasies and on the differences in each country's banking sector structure and competitive environment. Better-capitalised banks and those whose funding costs have risen least have had a more muted response to higher interest rates. Further, banks in jurisdictions with lower reliance on deposit funding to underpin lending or with higher banking sector concentration have raised deposit rates more moderately.

1 CHANGE IN THE COST OF NEW LOANS AND IN MARKET RATES BETWEEN DECEMBER 2021 AND FEBRUARY 2023 (a)
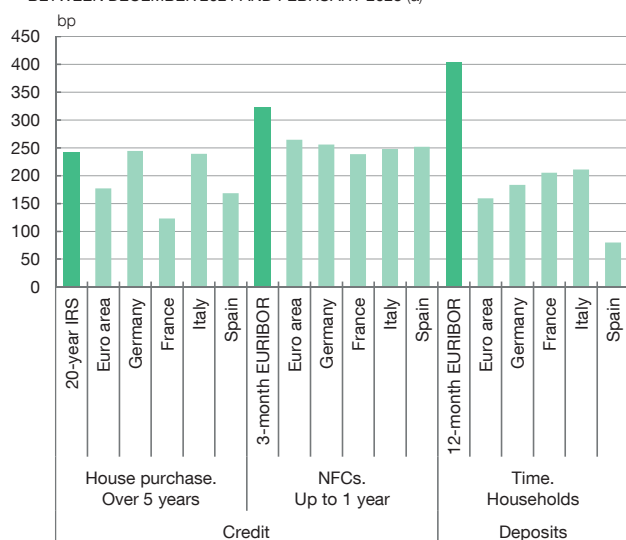
2 DETERMINANTS OF THE CHANGE IN INTEREST RATES ON NEW MORTGAGE LOANS AND HOUSEHOLDS' DEPOSITS
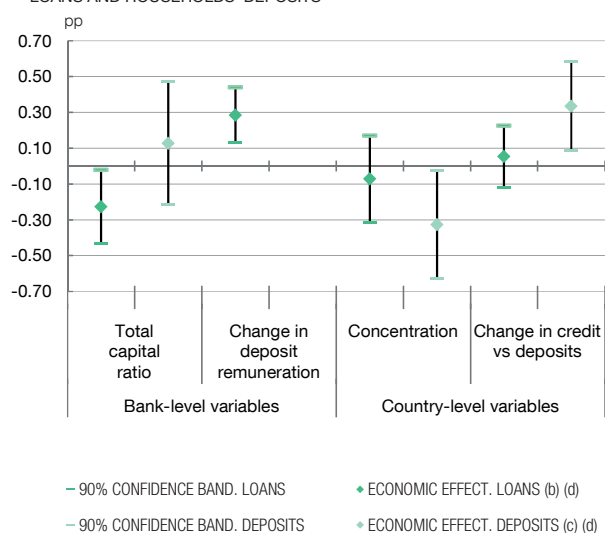
SOURCES: Banco de España, ECB and Refinitiv Datastream.

a Bank interest rates are narrowly defined effective rates (NDERs) and are adjusted for seasonal and irregular components. The term denotes the frequency at which the loan interest rate is reset.
b Economic effect derived from a bank-level regression analysis in which the dependent variable is the change in the average monthly interest rate between September and December 2022 for new mortgage loans with an interest rate reset period of more than five years relative to the average for the same period in 2021.
c Economic effect derived from a bank-level regression analysis in which the dependent variable is the change in the average monthly remuneration between September and December 2022 on time deposits with agreed maturity of less than two years relative to the average for the same period in 2021.
d The economic effect is found by multiplying the estimated value of the coefficient (and its confidence bands) by the standard deviation of the distribution of the corresponding explanatory variable. Weighted least squares are used for the estimation, taking as weighting factor each bank's outstanding mortgage balance at December 2021 in the first regression, and each bank's outstanding balance of household time deposits at the same date in the second regression. Shown are the economic effects associated with the variables for which a significant effect is found in either of the two regressions. The total capital ratio is defined as the sum of Tier 1 and Tier 2 capital as a proportion of risk-weighted assets. The change in deposit remuneration is found as the increase in the average monthly interest rate between September and December 2022 of all bank deposits relative to the average for the same period in 2021. Bank concentration is measured as the total assets of the five largest banks operating in a country as a proportion of the total assets of all banks in that country. The "Change in credit vs deposits" variable is defined as the increase in the stock of credit extended by all banks in a given country between December 2021 and December 2022 less the increase in the stock of deposits in the same period, as a proportion of the country's GDP. Both regression analyses use bank-level controls and a measure of each country's banking system liquidity, the effects of all of which are not statistically significant.

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The different speeds of monetary policy transmission to mortgage and deposit rates seem to reflect both banks' idiosyncrasies and differences in each country's banking sector structure. According to evidence based on a regression analysis – using data for a sample of individual banks from all euro area countries –, better-capitalised banks and those whose funding costs have risen least have raised interest rates on new mortgages to a lesser

extent (see Chart 3.11.2).[51] This may owe to the fact that such banks have less need to build up capital organically by increasing their net interest income.[52] Moreover, according to these same analyses, the cross-country heterogeneity in deposit remuneration mainly owes to differences between the banking systems in terms of their need to raise funds in order to lend and the degree of bank concentration. Specifically, in jurisdictions with lower reliance on deposit funding to underpin lending, banks have raised deposit rates more moderately.[53] Similarly, banks operating in countries with higher levels of bank concentration have raised deposit remuneration in recent quarters to a lesser extent.[54] Thus, of the total difference between Spain and the euro area in terms of the increase in remuneration on households' time deposits (some 79 bp), approximately half would owe to reliance on deposit funding and 18% to bank concentration.[55] Bank concentration explains a smaller share of this difference because the measure of concentration in Spain is only slightly higher than the euro area average.[56]

The cross-country heterogeneity is even more marked in the pass-through of higher interest rates to net bank interest payments made by households and firms. In Spain and Italy, where there is a higher proportion of floating rate household mortgages,[57] the average cost of household debt rose by 1.2 pp and 0.9 pp, respectively, far more than in the euro area as a whole (0.5 pp). As a result, higher interest rates had a larger negative impact on net income in these countries than in the euro area overall. In that same period, net interest payments in Spain and Italy increased by an amount equivalent to 1% and 0.4%, respectively, of households' GDI, compared with 0.3% for the euro area as a whole (see Chart 3.12.1). Conversely, the impact on household income in Germany and France was positive in net terms, essentially due to the prevalence of fixed rate mortgages. In the case of firms, Spain and in particular Italy again recorded a more negative net impact on income, owing to the higher proportion of short-term and floating rate loans. Specifically, firms' net interest payments increased during the period by an amount equivalent to 4.8% of GOS in Italy and 2.7% in Spain compared with 2.2% for the euro area overall (see Chart 3.12.2).

The transmission of monetary policy tightening has also been uneven in sovereign debt markets, although the announcement of the TPI programme and the flexibility in PEPP

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51   For more details, see Mayordomo and Roibás (2023).

52   These findings are consistent with those of Holton and Rodriguez d'Acri (2018) and Altavilla, Canova and Ciccarelli (2020) for other periods of change in bank lending reference rates.

53   For each country, banks' reliance on deposit funding to underpin lending is proxied using the ratio of the difference between the increase in the stock of lending by all banks in that country between December 2021 and December 2022 and the increase in the stock of deposits in the same time window relative to the country's GDP.

54   Van Leuvensteijn, Sorensen, Bikker and Van Rixtel. (2013) reach similar findings.

55   This contribution is the product of the coefficient resulting from the regression analysis and the difference between the value of the corresponding variable for Spain and the euro area relative to the difference in the increase in deposit remuneration between the two jurisdictions.

56   Specifically, in Spain the share in total assets of the five largest banks is only some 3 pp higher than the average for the euro area countries with banks in our sample. In fact, Spain stands squarely at the median of the distribution of this measure of concentration. Conversely, Spain is one of the countries in the sample where the stock of bank credit grew less than the stock of deposits between December 2021 and December 2022. This explains the relatively larger contribution of this variable which proxies reliance on deposit funding to sustain lending. In any event, it is important to note that the measure of concentration used here cannot be directly interpreted as a measure of the effective competition in the different euro area banking systems.

57   In 2021, the proportion of the stock of loans to households whose interest rate would be reset in the next 12 months stood at 67% for Spain and 59% for Italy, compared with the euro area average of 25%.

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Chart 3.12

THE CROSS-COUNTRY HETEROGENEITY IS EVEN MORE MARKED IN THE PASS-THROUGH OF HIGHER INTEREST RATES TO HOUSEHOLDS' AND FIRMS' NET BANK INTEREST PAYMENTS

In Spain and Italy, where there is a higher proportion of floating rate household mortgages, the average cost of household debt has risen far more sharply than in the euro area overall. As a result, higher interest rates have had a larger negative impact on net income in these countries than in the euro area as a whole. Conversely, the impact on household income in Germany and France has been positive in net terms, essentially due to the prevalence of fixed rate mortgages. In the case of firms, Spain and in particular Italy again recorded a more negative net impact on income, which is consistent with the higher proportion of short-term and floating rate loans.

1 CHANGE IN HOUSEHOLDS' NET INTEREST PAYMENTS
BETWEEN DECEMBER 2021 AND FEBRUARY 2023 (a)
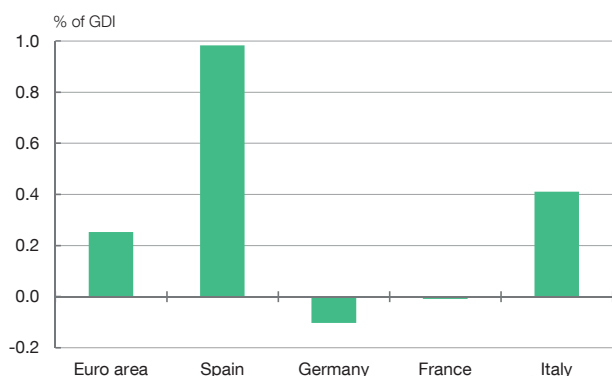
2 CHANGE IN FIRMS' NET INTEREST PAYMENTS
BETWEEN DECEMBER 2021 AND FEBRUARY 2023 (a)
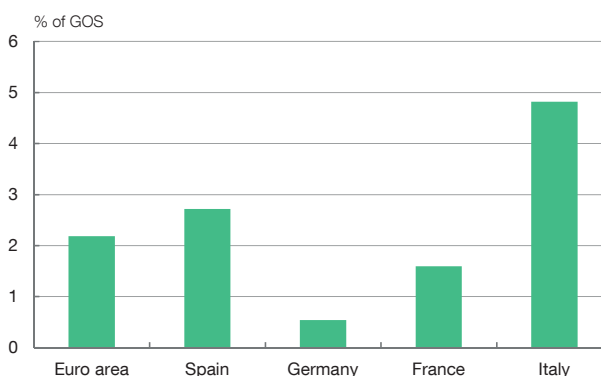
SOURCE: European Central Bank.

a Calculated as the difference between the increase in bank loan interest payments and the increase in interest income on sight and time deposits (calculated based on the stock of bank balances at end-2021) relative to 2021 income.

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reinvestment appears to have curbed the divergence. Between early 2022 and the cut-off date for this report, the spread between the sovereign debt yield and the 10-year OIS rate widened more sharply in countries with higher debt-to-GDP levels. In Italy and Greece this spread widened by 34 bp and 25 bp, respectively, compared with 13 bp in Spain. Conversely, the spread narrowed or barely changed in countries with higher credit ratings, such as Germany and France, influenced in part by stronger demand for high quality collateral assets. Thus, the spread narrowed by 20 bp in Germany and widened by 1 bp in France. In any event, the deviation among these spreads was restricted following the ECB Governing Council's ad hoc meeting of 15 June 2022, when it pledged to act against market fragmentation risk – which was followed by the introduction of the TPI in July – and decided to apply flexibility in reinvestments under the PEPP.

House price developments have likewise been uneven across euro area countries since early 2022. Although the pattern has been one of a general slowdown, the downtrend has been more marked in countries where house prices had risen more sharply over the last decade and were showing signs of overvaluation.[58] For instance, at end-2022 Germany, the Netherlands, Luxembourg and Slovakia registered nominal year-on-year house price declines

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58 European Systemic Risk Board (2022).

of 5%, 2.1%, 1.4% and 0.8%, respectively, compared with an increase of 2.9% in the euro area as a whole.

The differences between euro area countries in terms of mortgage market characteristics and banking industry structure and competition may lead to an uneven transmission of monetary policy to economic activity and inflation. The above-documented differential impacts on the funding costs, deposit remuneration and net interest income of households and firms may ultimately give rise to cross-country differences in sensitivity to monetary policy at the macroeconomic level; for instance, to the extent that those differential impacts at micro level translate into differing dynamics in terms of residential investment or the performance of aggregate consumption and the labour market.[59]

4.3.2 Cross-household and firm heterogeneity

The evidence available indicates that the pass-through of higher interest rates to the average cost of Spanish household debt has been highly uneven and amplifies the effect on aggregate consumption. Chart 3.13.1 shows the distribution of the impact on households of a 400 bp and 500 bp increase in market rates, by income percentile and the proportion of liquid assets (defined as sight deposits as a proportion of the household's total income). The households that experience a larger impact on their net interest expenses (defined as loan interest payments minus interest income from deposits) are those with a proportion of sight deposits below the population median. A 400 bp market rate increase raises their interest expenses by between 1.1% and 2.2% of their income, depending on the quintile of the income distribution in which they stand, once the conditions on floating rate loans have been reset. Since the propensity to consume typically decreases proportionally to liquid assets, these results suggest that the heterogeneity presented in Chart 3.13.1 has an amplifying impact on aggregate consumption.[60]

There is also significant heterogeneity across firms, which is likely to amplify the effect of higher interest rates on aggregate investment. The firms most affected would be those with a liquidity ratio (defined as cash and cash equivalents as a share of total assets) below the median of the distribution (see Chart 3.13.2). Within this group, firms less than five years old (approximately 10% of all firms) are estimated to experience a larger impact. While a market rate increase of 400 bp would result in the median gross debt burden ratio[61] for all firms rising by 3.2 pp, that increase would be 22.1 pp for firms that have a low liquidity ratio and are less than five years old. The recent empirical and theoretical literature indicates that such firms have a relatively high marginal propensity to invest[62] (e.g. when in a growth phase

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59   Pica (2023); Slacalek, Tristani and Violante (2020) and Calza, Monacelli and Stracca (2013).

60   The covariance between marginal propensities to consume and household-level characteristics are key to understanding the aggregate role of heterogeneity (Patterson (2023)).

61   Gross debt burden is defined as the ratio between interest expenses and the sum of operating income and interest income. Prior to the interest rate hikes, the median of this ratio for indebted companies stood at 12.4%.
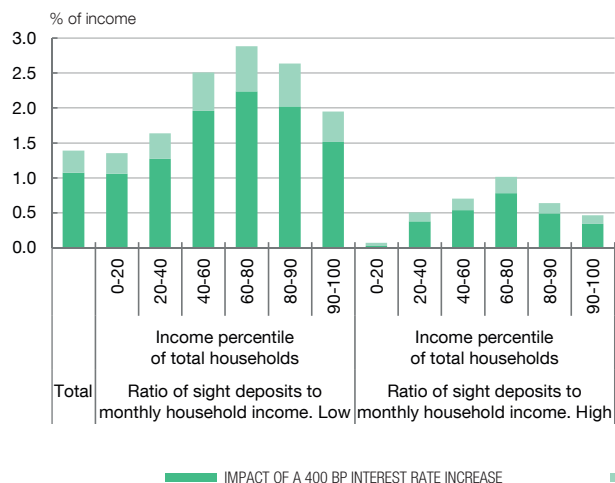
62   Cloyne, Ferreira, Froemel and Surico (2023), Jeenas (2019), Otonello and Winberry (2020).

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Chart 3.13
HIGHER INTEREST RATES HAVE HAD A HIGHLY HETEROGENEOUS IMPACT ACROSS SPANISH HOUSEHOLDS AND FIRMS

A 400 bp increase in market rates would drive up households' net debt burden by 1.1 pp. These effects tend to be more acute for households with a lower volume of sight deposits as a share of their total income and with above-median income. The most affected firms are those less than five years old and with relatively low liquidity. Their median gross debt burden would increase by 22.1 pp in response to a 400 bp increase in market rates.

1 INCREASE IN HOUSEHOLDS' NET DEBT BURDEN ASSOCIATED WITH HIGHER INTEREST RATES (a)

2 ESTIMATED INCREASE IN MEDIAN DEBT BURDEN DUE TO HIGHER INTEREST RATES (b) (c) (d)

IMPACT OF A 400 BP INTEREST RATE INCREASE

IMPACT OF AN INTEREST RATE INCREASE FROM 400 BP TO 500 BP

%
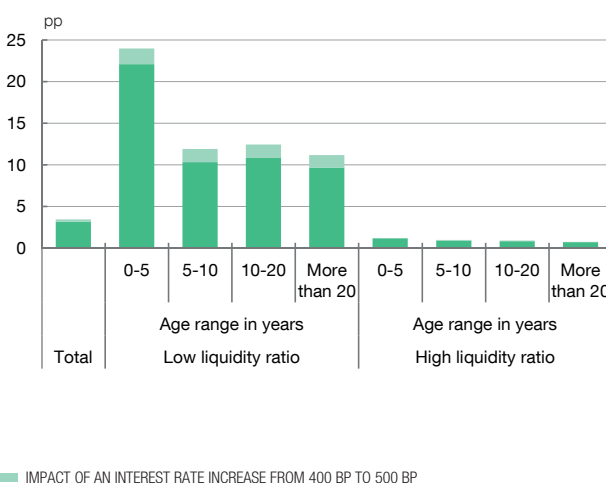
	Total	0 - 20	20 - 40	40 - 60	60 - 80	80 - 90	90 - 100
Household income							
Percentage of households with floating rate loans	29.1%	10.9%	21.1%	27.9%	40.9%	45.9%	45.4%
Firms' liquidity ratio (d)							
Percentage of firms with interest-bearing borrowing	66.3%	79.9%	77.3%	72.3%	62.9%	49.6%	31.3%

SOURCES: Banco de España and Spanish Survey of Household Finances (2020).

a The impact of interest rate increases captures the change in net financial burden (debt service expense less deposit interest income). It is assumed that higher interest rates are fully passed through to the cost of floating rate debt. In the case of deposits, a pass-through of 8% is assumed for sight deposits and of 44% for time deposits. The sight deposit ratio is considered high if it stands above the median ratio for all households and low otherwise.
b Debt burden is defined as interest expense / (gross operating profit + interest income).
c Higher interest rates are fully passed through to interest rates on floating rate debt and credit.
d The liquidity ratio is defined as cash and cash equivalents / total assets. The liquidity ratio is considered low if it stands below the median liquidity ratio for all firms and high otherwise.

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or facing low cash flows). If so, the heterogeneity observed in terms of the effect of higher interest rates on firms' financial burden would entail an amplifying impact on aggregate investment.
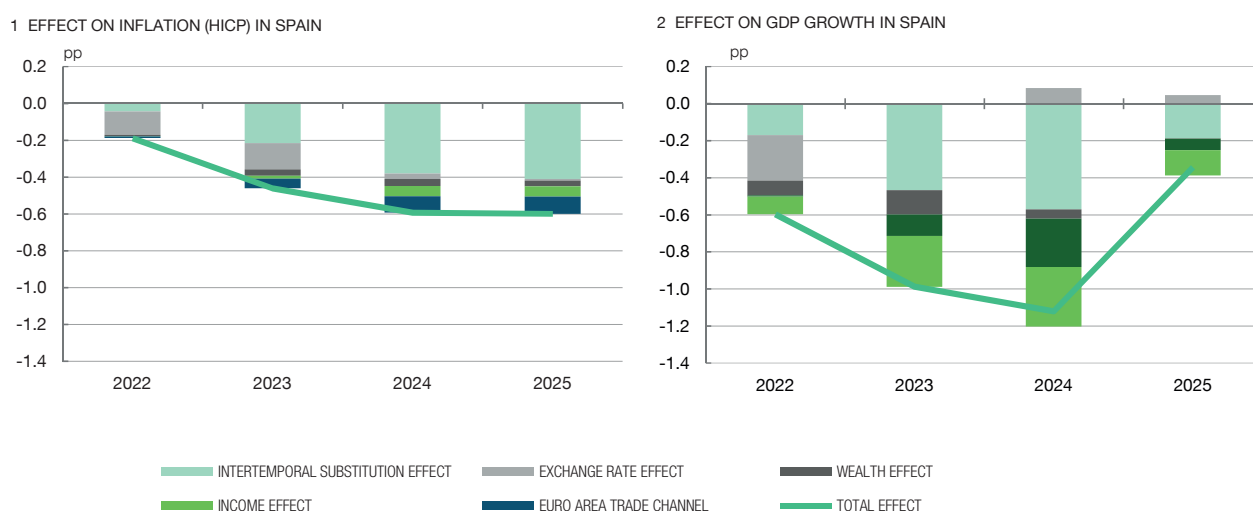
4.4   Evidence on the second stage: effects on economic activity and inflation

The monetary policy tightening is already beginning to pass through to real activity and inflation, but the bulk of the impact will be felt from this year onwards. According to the

Chart 3.14

THE MONETARY POLICY TIGHTENING THROUGH THE DIFFERENT CHANNELS IS ALREADY PASSING THROUGH TO ACTIVITY AND INFLATION IN SPAIN

Monetary policy tightening is beginning to pass through to real activity and inflation in Spain, according to estimates based on the Quarterly Macroeconometric Model of the Banco De España (MTBE).

1 EFFECT ON INFLATION (HICP) IN SPAIN

2 EFFECT ON GDP GROWTH IN SPAIN

INTERTEMPORAL SUBSTITUTION EFFECT

EXCHANGE RATE EFFECT

WEALTH EFFECT

INCOME EFFECT

EURO AREA TRADE CHANNEL

TOTAL EFFECT

SOURCE: Banco de España calculations.
NOTE: The results are based on a quarterly semi-structural model at quarterly frequency, namely the Quarterly Macroeconometric Model of the Banco de España. For more details, see Estrada, Fernández Sánchez, Moral and Regil (2004).

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Quarterly Macroeconometric Model of the Banco de España (MTBE, by its Spanish abbreviation), in a counterfactual scenario in which the different channels described above act in line with the empirical regularities observed in the past and no additional shocks affect any area of the economy,[63] in 2022 the monetary policy tightening of recent quarters would have reduced inflation in Spain by around 0.2 pp (see Chart 3.14). However, given the considerable lag between monetary policy actions and their effect on activity and inflation, the bulk of the impact on inflation is expected to materialise from this year onwards. In particular, the estimates indicate that, all else being constant, monetary policy tightening will reduce inflation by 0.5 pp in 2023 and by 0.6 pp in both 2024 and 2025. In the case of GDP, the tightening is estimated to have reduced growth by 0.6 pp in 2022, although the peak effect (of around 1.1 pp) is expected in 2024.

The exchange rate effect and intertemporal substitution effect are the two main channels of transmission to inflation. The breakdown by channel shows the significance of the impact of the euro exchange rate appreciation on inflation in Spain in the first two years (2022-2023). From 2023 onwards the contraction in economic agents' spending as a result of higher interest rates (intertemporal substitution effect) is expected to be the main contributor of downward pressure on inflation and GDP growth, while the income effect is also significant, albeit less so.

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63   In the case of the transmission channels for the first stage, the evidence documented in the previous sections has been taken into account.

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The estimated effects may underestimate the macroeconomic impact associated with the swift and strong increase in interest rates. This owes essentially to two factors. First, the current cycle of monetary policy tightening has been particularly intense, both in scale and speed, which could give rise to non-linear effects not captured by linear models such as the MTBE. An example of such non-linear effects would be disruptive episodes in financial markets, such as the relatively short-lived and contained episode witnessed in early March, prompted by concerns over the solvency and liquidity of some banks, mainly in the United States. Second, the foregoing estimates ignore the potential amplifying effect on aggregate activity that could stem from the starkly asymmetric impact of the current monetary policy tightening cycle, as document above, on the different types of households and firms.

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Box 3.1

THE IMPACT OF A FASTER THAN EXPECTED REDUCTION IN EUROSYSTEM ASSET HOLDINGS ON EURO AREA SOVEREIGN BOND YIELDS

In March 2023 the European Central Bank (ECB) launched a process of reduction of the portfolio of assets held under the Eurosystem's asset purchase programme (APP), ceasing to reinvest all of the principal payments from maturing securities and allowing the size of this portfolio to decrease at a pace of €15 billion per month. At its latest monetary policy meeting, held in early May, the ECB announced that it intended to continue reducing the APP portfolio at a measured and predictable pace, discontinuing reinvestments under the APP as of July 2023. Since, according to the May 2023 ECB Survey of Monetary Analysts (SMA), financial markets had virtually discounted this decision, it should not prompt significant changes in sovereign bond yields over the coming months.

Against this backdrop, the purpose of this box is to highlight the importance of reducing the APP portfolio at a measured and predictable pace, by simulating the potential response of euro area sovereign bond yields in a hypothetical scenario in which financial markets are surprised by the pace of the decline in this portfolio. Specifically, two alternative paths for the APP sovereign bond portfolio are simulated. The first is the path expected by the financial markets in March 2023 according to the SMA of that month. The second is an accelerated path, in which between May 2023 and December 2024 the APP portfolio declines by an additional €15 billion per month relative to the run-off expected by the analysts in March.[1]

Chart 1 depicts the balance of the Eurosystem's sovereign bond portfolio, distinguishing between two groups of issuers: Germany and France, deemed "core" (dark green lines), and Spain and Italy, deemed "periphery" (light green lines). The unbroken lines depict the change expected in March 2023 by the monetary analysts,[2] while the broken lines denote the alternative scenario.

To simulate the impact of an APP portfolio run-off surprise, this box uses a bond arbitrage model,[3] assumes that the surprise occurs in April and assesses its impact on European sovereign bond yields in that month.

In the model used, the run-off of Eurosystem bond holdings under its asset purchase programmes increases sovereign bond yields through two channels. The first channel reflects the reduction in duration risk absorbed by the Eurosystem. This translates into an increase in the term premium incorporated into sovereign bond yields as the compensation required by investors due to the risk of changes in short-term interest rates during the time to the bonds' maturity. The second channel reflects the reduction in sovereign risk absorbed by the Eurosystem, which increases the sovereign risk premium required by investors on account of the risk of a potential default on those bonds. In both cases, these effects reverse the impact of the Eurosystem's prior increase in its sovereign bond holdings, which caused it to absorb more of these risks.

Chart 2 depicts the impact of the hypothetical change in the expected APP portfolio run-off (depicted in Chart 1) on the sovereign bond yields of Spain and Italy versus Germany and France, as well as the impact on average euro area sovereign bond yields (proxied by the sum of the four countries). It shows the results for two alternative model calibrations, which provide a range for these effects and allow the uncertainty surrounding them to be factored in. In the first estimation, the model is parametrised to be consistent with the actual impacts of the pandemic emergency purchase programme (PEPP), which took place amid severe financial market turbulence and affected yields on periphery bonds much more than those on core bonds. In the second estimation, the model's parameters are consistent with the elasticity of the APP's impact, which did not vary as much across countries.[4] The chart

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1   From January 2025, the run-off will be at the same pace as envisaged in those expectations.

2   The model used assumes a monetary union comprising two member states, in this case "Core" and "Periphery", and therefore groups the two core countries as if they were one and does the same for the two periphery countries. The balance of core country bonds in the model is calculated as the sum of the balances of Germany and France, and the yields on those bonds are calculated as the average of the German and French yields, weighted by GDP. Data for Spain and Italy are likewise aggregated to calculate the periphery country data. To calculate the impact of the faster portfolio run-off, it is assumed that the additional €15 billion monthly decline affects core and periphery bonds in proportion to their current percentage of the total balance of the APP portfolio.

3   The model is used to decompose changes in the yield curve into components related to the expected short-term rate, the term premium and the default premium. For further details, see James Costain, Galo Nuño and Carlos Thomas. (2022). *"The term structure of interest rates in a heterogeneous monetary union"*. Documentos de Trabajo – Banco de España, 2223. The model extends to a monetary union the paper of D. Vayanos and J. Vila. (2021). "A preferred-habitat model of the term structure of interest rates". *Econometrica,* 89(1), pp. 77-112.

4   Specifically, in the first estimation the parameters of the bond arbitrage model are inferred to reproduce the impact of the announcement of the PEPP in March 2020 on the sovereign yields of the aforementioned core and periphery countries, while, in the second estimation, the model is parametrised to reproduce the impact of the APP, as configured in January 2015, on the same yields.

Box 3.1

THE IMPACT OF A FASTER THAN EXPECTED REDUCTION IN EUROSYSTEM ASSET HOLDINGS ON EURO AREA SOVEREIGN BOND YIELDS (cont'd)

Chart 1
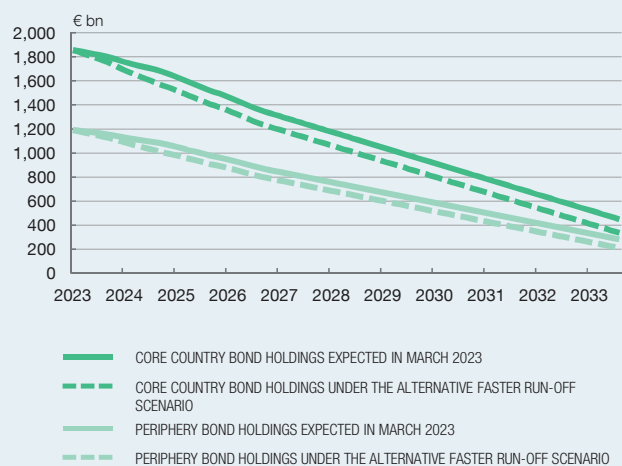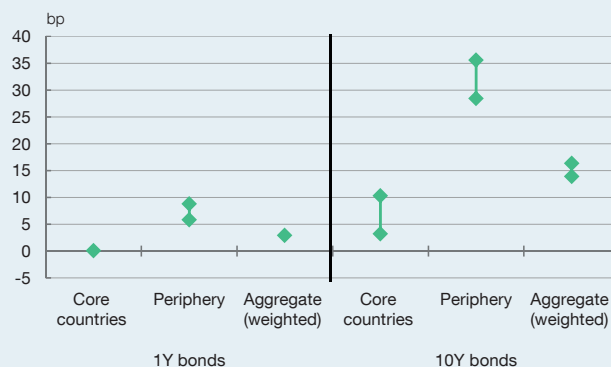BOND PORTFOLIO BALANCE EXPECTED BY THE MARKET (a)

Chart 2
IMPACT ON SOVEREIGN BOND YIELDS OF A FASTER RUN-OFF OF THE EUROSYSTEM'S BOND PORTFOLIO (b)

CORE COUNTRY BOND HOLDINGS EXPECTED IN MARCH 2023

CORE COUNTRY BOND HOLDINGS UNDER THE ALTERNATIVE FASTER RUN-OFF SCENARIO

PERIPHERY BOND HOLDINGS EXPECTED IN MARCH 2023

PERIPHERY BOND HOLDINGS UNDER THE ALTERNATIVE FASTER RUN-OFF SCENARIO

SOURCES: ECB, Bloomberg, Refinitiv Datastream and Banco de España.
NOTE: Analysis conducted using the model in Costain, Nuño and Thomas (2022), "The term structure of interest rates in a heterogeneous monetary union".

a Bond portfolio refers to sovereign bonds held by the central banks under the APP and the PEPP. Expectations for changes in the portfolio are drawn from the Survey of Monetary Analysts (SMA) conducted in March 2023. "Core countries" comprises German and French bond holdings and "Periphery", Spanish and Italian bond holdings.
b The chart depicts changes in euro area sovereign bond yields resulting from an APP bond holding run-off faster than €15 billion per month, between May 2023 and December 2024. "Core countries" refers to the average for Germany and France, "Periphery" to the average for Spain and Italy and "Aggregate" to the average for the four countries weighted by each country's GDP in 2022. The bands denote the range obtained via the two alternative estimations of the model: one where the elasticity of the impact is equal to that observed for the PEPP, and another using the elasticity of the APP's impact.

depicts the change in the sovereign yields for each group of bonds that, according to the model, would be observed in April 2023 after the market expectations for the APP portfolio balance are revised to reflect a faster run-off.

In both cases the impact is, as expected, greater on the longer-term bond yields of the three groups of countries depicted. Specifically, the impact on the average euro area long-term sovereign bond yield is estimated to range between 14 basis points (bp) and 16 bp, whereas it is between 2-3 bp in the case of one-year bonds. In part, this reflects an increase in the term premium, which pushes up the yield on ten-year bonds, but does not change the yields on shorter terms. However, the impact on the average euro area ten-year sovereign bond yield is also due to the additional increase observed for the periphery countries, which the market deems more likely to default on their debts. For these countries, investors

would require a sovereign risk premium, which affects the yields on bonds across all maturities, from the shortest (moderately) to the longest (considerably). Specifically, the yields on Spanish and Italian one-year bonds could increase by 6-9 bp (versus zero impact on core country bonds), while rising by 28-36 bp in the case of ten-year bonds (3-10 bp for Germany and France).

The results of the model therefore suggest that the duration risk channel could be less important than the sovereign risk channel in the context of a faster than initially expected APP portfolio run-off, especially if the change in expectations for that run-off coincides with bond market conditions similar to those when the PEPP was announced. Consequently, although in the hypothetical scenario proposed the financing costs of all euro area countries would increase, they would do so more in those jurisdictions where markets perceive greater sovereign risk.