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## INFLATION AND MONETARY POLICY

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## KEY MESSAGES

- Inflation in the euro area has reached its highest level since the inception of the monetary union and is likely to remain elevated for some time. In 2021 it was mainly driven by supply shortages and energy prices, but prices are now rising across the board.
- High inflation leads to welfare losses and has significant distributional effects. Low-income households bear the greatest financial burden owing to their high consumption rates.
- Despite the challenges posed by supply shocks, it is necessary for the European Central Bank (ECB) to maintain its firm response to high inflation for the time being.

## EXECUTIVE SUMMARY

The **inflation rate** in the euro area has risen sharply since the beginning of 2021. In 2022 it has reached its highest level **since the inception of the monetary union**. While, initially, much of this inflation was due to rising energy prices and supply shortages, **prices are now increasing across the board**. In addition to the aforementioned supply-side disruptions, the causes include higher aggregate demand, primarily from abroad.

Because some of these influences, such as supply shortages, will only gradually become less important, elevated inflation is likely to last longer than initially expected. Second-round effects on the labour market and higher inflation expectations are **risk factors in the medium term**. Against this background the persistence of the inflation process has likely increased.

High inflation rates are associated with substantial welfare losses and have significant distributional effects. Given their high consumption rates in particular, **low-income households** bear the **greatest financial burden** and, at the same time, have little financial leeway.

**Supply-side disruptions** – a major cause of high inflation – pose a **challenge for monetary policy**. On the one hand, in order to meet its mandate of price stability it must act decisively to contain inflation expectations and wage-price spirals, despite a possible negative impact on the real economy. On the other hand, excessive tightening during an emerging economic slowdown could plunge the euro area into a deep recession. Moreover, if it is overly hesitant it could be forced to react even more decisively later, which would act as an even greater drag on growth and employment.

**Economic policy options at the national level** such as the Concerted Action could help to mitigate the risk of a wage-price spiral and, consequently, rising inflation. However, their effect is difficult to predict and is likely to be rather limited. Fiscal policy relief measures can limit wage demands by stabilising real income. Since they generally generate higher demand, however, they can drive up inflation further if they are too widespread and implemented on a large scale. They should therefore target as much as possible low- and middle-income households and distort as few incentives as possible.

# I. INTRODUCTION: INFLATION AND MONETARY POLICY

87. The inflation rate **in the euro area** has risen sharply since the beginning of 2021 and is now at its **highest level since the inception of the monetary union in 1999**. The Harmonised Index of Consumer Prices (HICP) rose by 9.9 per cent in the euro area in September 2022 relative to the same month of last year. The GCEE expects to see an average inflation rate of 8.5 per cent for 2022 as a whole compared with 2.6 per cent in 2021 and 0.3 per cent in 2020. [↪ ITEM 45](#) Inflation in the euro area in 2022 has been pushed up significantly by the rise in **energy prices**. The corresponding component in the HICP was 41 per cent higher in September than it had been a year earlier. In addition, **food inflation** was above average at 11.8 per cent. Year-on-year **core inflation** was 4.8 per cent in September 2022 and is expected to become the main driver of inflation in the euro area in 2023.
88. Both **supply-side and demand-side factors** are driving these massive price increases. On the supply side, the COVID-19 pandemic disrupted international supply chains, which has made imported goods worldwide much more expensive. [↪ ITEM 97](#) Russia's war of aggression against Ukraine has further constrained energy supplies. Demand picked up after the lifting of pandemic-related restrictions. Some of these factors are expected to have **longer-lasting inflationary effects**. In addition, price increases are expected to cause second-round effects such as stronger wage growth and rising inflation expectations. Furthermore, monetary policy has greatly expanded the money supply through bond purchase programmes in recent years, which may also have fuelled inflationary trends. [↪ ITEM 114](#)
89. **The impact of inflation** differs considerably across households. There are three main determinants. First, individual inflation rates may differ from the consumer price index depending on the composition of a household's personal basket of goods. The cost of living for low-income households in particular has tended to rise more sharply in recent decades. [↪ BACKGROUND INFO 5](#) Second, these effects depend on the levels of nominal income over time and what proportion of it is spent on living costs. Third, inflation can create distributional effects through changes in asset values. [↪ ITEM 119](#) The financial burden relative to net disposable income is **greatest for households on lower incomes**. More than 60 per cent of households in the lowest income decile have a saving rate of zero or less and thus have very little scope to hold their consumption constant as prices rise. Poorer households also have fewer substitution options to limit increases in their cost of living. [↪ ITEM 124](#)
90. According to its mandate the **ECB's primary objective** is to maintain **price stability** in the euro area. [↪ BACKGROUND INFO 7](#) In the July 2021 Strategic Review the Governing Council of the ECB decided that price stability could best be maintained using a symmetric medium-term inflation target of 2 per cent (GCEE Annual Report 2021 item 164). As long as the objective of price stability is not

affected, the ECB supports the general economic policies adopted within the European Union (EU). Following a prolonged period of low inflation and expansionary monetary policy, the ECB needs to prevent a de-anchoring of medium- and long-term inflation expectations and the emergence of a wage-price spiral, given the currently high inflation. For the time being, it will probably be necessary for the ECB to continue with its recent decisive response to the sharp increase in inflation. The art will be to minimise the expected negative cyclical effects in the necessary fight against inflation.

91. **Negative supply shocks**, such as the current shortage of energy supplies, pose major **challenges for monetary policy**. [↘ ITEM 132](#) They both fuel inflation and, at the same time, dampen output. Any tightening of monetary policy can have further adverse effects on output and, thus, on the overall economy. If, on the one hand, the central bank is overly **hesitant**, the subsequent monetary policy response would have to be even stronger, which would have an even more adverse impact on the economy as a whole. On the other hand, too much tightening at a time of emerging economic slowdown could plunge the euro area into a deep recession.
92. **Fiscal policy measures** should be used to cushion some of the financial burden on households and businesses resulting from higher energy prices. [↘ ITEM 151](#) This could reduce adjustment pressures in the upcoming wage negotiations. However, the associated support of aggregate demand could have an inflationary impact. Fiscal policy relief measures [↘ ITEM 131](#) should therefore be targeted as **specifically as possible** at the households most affected **and** involve as **few incentive distortions as possible**. In this respect, transfers are generally more effective than interventions in the price mechanism. Incentives to boost energy supplies and save energy could dampen energy prices and mitigate supply shocks. [↘ ITEM 339](#)

## II. DETERMINANTS OF CURRENT INFLATIONARY TRENDS

93. **There are many causes** of the sharp rise in inflation in the euro area since the beginning of 2021. The prices of goods such as energy and food, for example, have generally contributed more to this increase than the prices of services. Moreover, rising inflation has been accompanied by the **depreciation of the euro**, which has fuelled price pressures from imported intermediate goods, energy carriers and commodities. [↘ ITEM 34](#) [↘ BOX 9](#) **Second-round effects are likely to drive up prices** in the medium term, for example, via higher inflation expectations and wages.

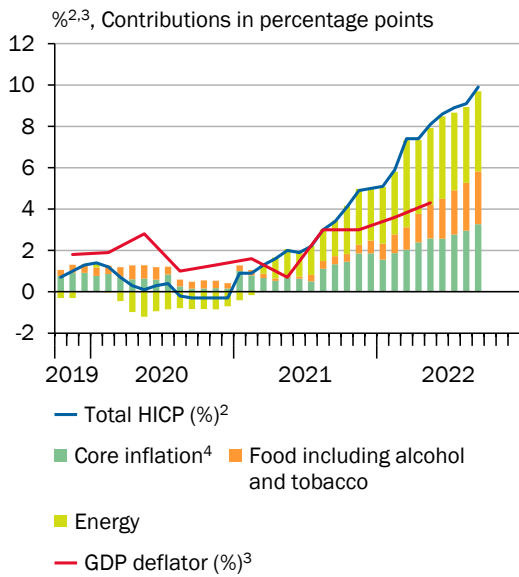
## 1. High inflation of goods prices

94. The inflation in the euro area in 2021 and 2022 has been largely due to **elevated energy prices**. [↪ ITEM 26 Russia's war of aggression in Ukraine](#) and lower Russian natural gas supplies since mid-2021 have caused natural gas and electricity prices in Europe to rise much more sharply than they have in other regions of the world. [↪ CHART 31 TOP RIGHT](#) For example, the European EGIX natural gas price index rose from an initial €11 per megawatt hour in September 2020 to €64 in September 2021 and to €204 in September 2022. The price of oil has also risen since its pandemic-related low in summer 2020. It increased by 21 per cent (from 75 US dollars to 90 US dollars) between September 2021 and September 2022.
95. Accordingly, the **energy component in the HICP increased by 41 per cent in September 2022** compared with September 2021. The price of fuels such as petrol and diesel rose by 19 per cent and contributed 0.8 percentage points of the 9.9 per cent increase in the HICP. The growth contributed by natural gas and electricity was 1.5 and 1.2 percentage points respectively. Overall, the energy component accounted for about 42 per cent of the increase in the headline HICP. Despite further energy price surges during 2022, this share has fallen since the beginning of 2022. In March 2022 it was still 59 per cent. However, its declining share is due to the growing momentum of the other components in the HICP.
96. **Food prices** – including tobacco and alcohol – **increased by 11.8 per cent** year on year in September 2022. [↪ CHART 31 BOTTOM LEFT](#) The percentage growth contributed by food prices to the overall increase in the HICP was 25 per cent in September. It has risen steadily since November 2021, when its contribution was 10 per cent. Russia's war of aggression in Ukraine has significantly accelerated this increase. **High oil and natural gas prices** have been primarily responsible for this trend and have made fuel – for agricultural machinery and transport vehicles – as well as **fertiliser production more expensive** (Bodnár and Schuler, 2022). Before the outbreak of the war in Ukraine, moreover, the euro area imported large quantities of important agricultural inputs such as fertilisers from Russia and maize, wheat, oilseeds and sugar from Ukraine. The maize from Ukraine is mainly used for animal feed production. The direct consequences of the war – especially the disruption of supply chains and the higher transport costs – have reduced supplies of these goods. [↪ ITEMS 10, 22 AND 56](#)
97. **Core inflation**, which excludes food and energy from the representative basket of goods, rose by 4.8 per cent year on year in September. [↪ CHART 31 BOTTOM RIGHT](#) The weighted contribution made by core inflation to the overall increase in the HICP was 33 per cent, which was a slightly higher share than in previous months. Given that the basket of **goods and services** underlying core inflation accounts for around 68 per cent of the total basket of goods in the HICP, this share is relatively small. However, it is expected to grow significantly in 2023. This is likely to be due to base effects in energy prices and to a sharper rise in core inflation. [↪ ITEMS 71 AND 109](#)

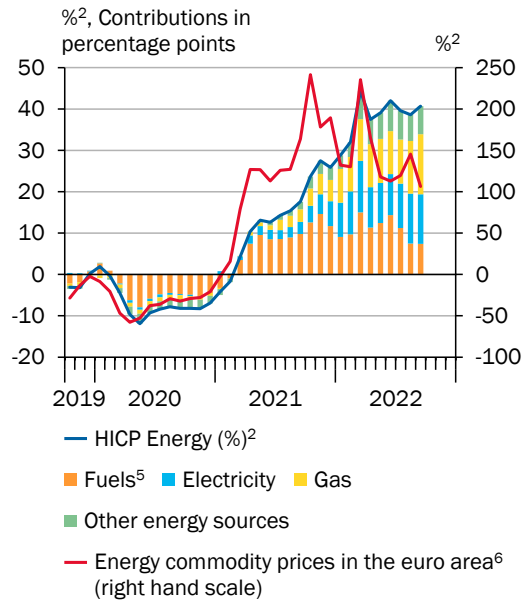
CHART 31

Components of the euro area HICP<sup>1</sup> and inflation indicators

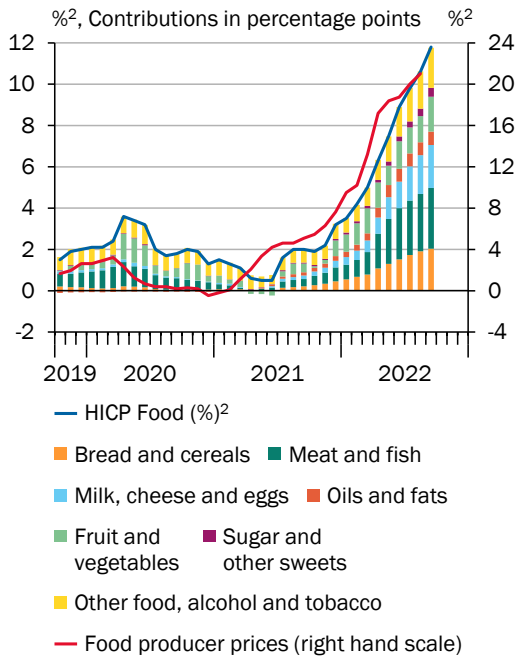
Food and core inflation gain importance



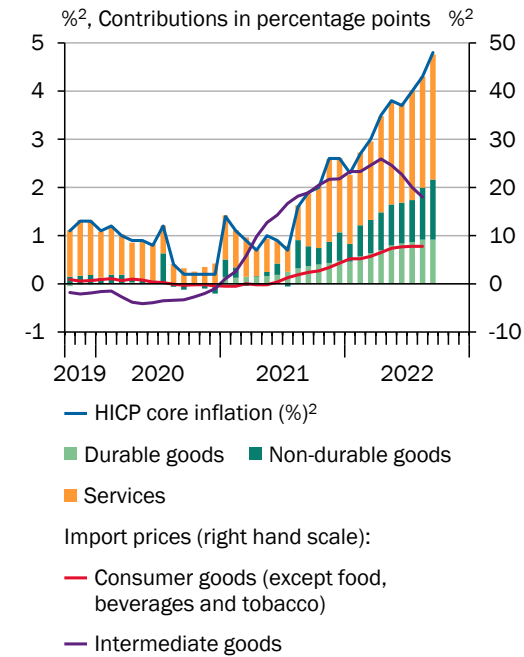
Marked increase in consumer prices for gas and electricity



Food prices rise across the board



Goods prices in particular drive core inflation



1 - Harmonised Index of Consumer Prices. 2 - Change on the same month of the previous year. 3 - Change on the same quarter of the previous year. Data on the GDP deflator are available until Q2 2022. 4 - Non-energy industrial goods and services. 5 - Diesel, petrol, other transport fuels and lubricants. 6 - The HWWI's energy commodity price index comprises the fossil energy commodities coal, natural gas and crude oil with weightings of 6 %, 19 % and 75 %. The percentages are based on the import shares of the member states of the euro area from other countries, 2017-2019. Monthly averages of daily values.

Sources: Eurostat, HWWI, Refinitiv Datastream, own calculations  
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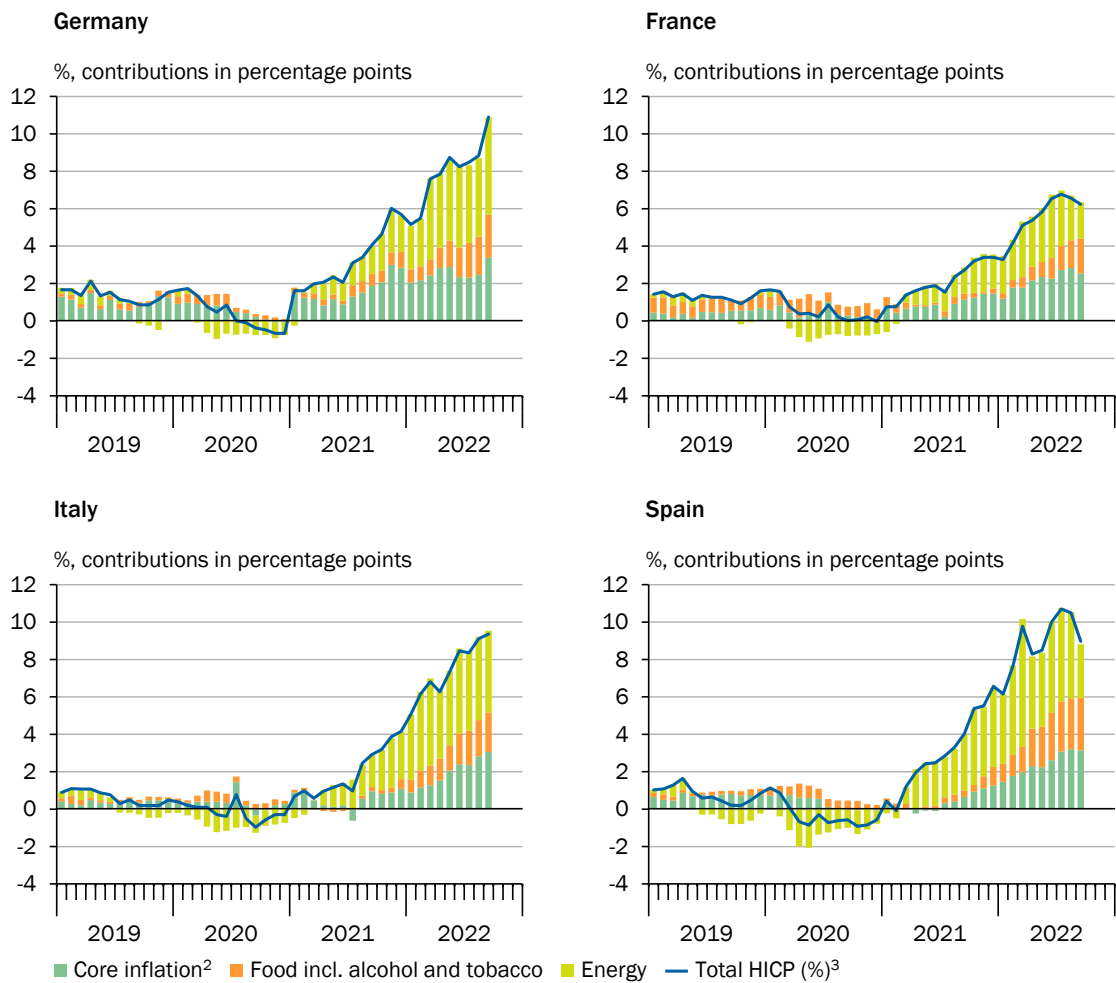


**Rising prices of goods** were **responsible for about half of the increase in core inflation**, while their weight is only 39 per cent of core inflation. Goods inflation was 5.6 per cent in September 2022. Consumer durables in particular gained in importance compared with the pre-pandemic period. This price increase can be explained, firstly, by high global **demand for durable goods** such as home office equipment in 2020 and 2021 (Rees and Rungharoenkitkul, 2021; Tauber and Van Zandweghe, 2021) and, secondly, by **supply shortages** of imported intermediate goods as well as higher transport costs. For example, prices of imported intermediate industrial goods rose by 18 per cent year on year in August 2022. **Services inflation** is likely to be driven to a significant extent by the **lifting of pandemic-related restrictions** and the resulting surge in demand as well as by labour shortages. It stood at 4.3 per cent in September 2022.

98. In addition to the HICP, which the ECB uses as a target for its monetary policy, other measures of inflation are also on an upward trajectory. In contrast to the HICP, which is based on a defined consumer basket, the **GDP deflator reflects all goods and services produced in an economy**. In the second quarter of 2022, it increased by 4.3 per cent year on year, which was far below the 8.0 per cent increase in the HICP over the same period. [↪ CHART 31 TOP LEFT](#) This is largely explained by the fact that import prices grew more than export prices, and the difference between them has a negative impact on calculations of the GDP deflator. When import prices rise, on the other hand, the HICP rises regardless of their relationship with export prices (GCEE Annual Report 2021 item 40). Consequently, the GDP deflator is adjusted for these sharp import price increases and can be interpreted as a measure of inflation emanating from domestic sectors of the economy. The fact that the GDP deflator is significantly lower than the HICP highlights the **importance of imports for inflation dynamics** in the euro area (Fröhling et al., 2022). [↪ BOX 6](#)
99. Inflation **varies across the euro area member states**. HICP inflation in September 2022 was highest in Estonia at 24.1 per cent and lowest in France at 6.2 per cent. Inflation in Germany was 10.9 per cent. The paths and components of inflation rates are similar across euro area member states, with the contribution of energy prices slightly higher in Italy and Spain than in the rest of the euro area. [↪ CHART 32](#) This can be explained by the fact that a large proportion of electricity contracts in Italy and Spain are linked to wholesale prices (Insee, 2022a; de Matos and Murillo Gili, 2022). The sizeable contribution of energy prices in Spain in March 2022 is therefore due to the sharp increase in wholesale electricity prices. The decline in the contribution of energy prices in Spain in April and September 2022 also mirrored the trend in wholesale prices but is also the result of the subsidisation of fuel prices and the cap on the wholesale price of natural gas, respectively. The comparatively small contribution of energy prices in France is probably due to the fact that the pass-through of natural gas and electricity prices had been limited via regulatory intervention (Insee, 2022b). Electricity and gas contracts in Germany usually have terms of at least twelve months, which may also have limited price increases so far.

▸ CHART 32

### Components of the HICP<sup>1</sup> in selected euro area member states



1 - Harmonised Index of Consumer Prices. 2 - Total HICP excluding food, alcohol, tobacco and energy. 3 - Change on the same month of the previous year.

Sources: Eurostat, own calculations  
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## 2. Supply-side disruption and strong demand

100. Initially, the direct and indirect **economic effects of the COVID-19 pandemic** were largely responsible for the inflation dynamics. On the supply side, the closure of production and port facilities, especially in China, disrupted the supply of key intermediate goods and materials for industry. In addition, pandemic-related restrictions reduced the labour supply. These factors are likely to have led to lower growth and higher consumer prices in the euro area. Consequently, **shortages of materials and inputs** as well as **higher sea freight rates** contribute significantly and persistently to core inflation (GCEE Annual Report 2021 item 41). Demand-side stimulus from fiscal and monetary policy support measures, such as the ECB's Pandemic Emergency Purchase Programme (PEPP) and the EU's NextGenerationEU recovery plan, are also likely to have fuelled inflation. ▸ ITEM 112 Demand for contact-intensive services picked up again



after the lifting of pandemic-related restrictions from mid-2021 onwards. The expansion of supply did not keep pace with demand, which led to price increases. Consequently, there are currently clear signs of shortages of skilled workers in certain occupations across the euro area. [↪ ITEMS 29 AND 30](#) [↪ CHART 31 BOTTOM RIGHT](#)  
[↪ BOX 4](#)

101. We have seen **supply-side disruption in the energy industry** since the middle of 2021, which has contributed to sharply rising prices. This has particularly affected **natural gas supplies in Europe**. For example, the volumes of Russia's natural gas supplies to Europe shrank since the summer of 2021 (Kuik et al., 2022; Economic Forecast 2022 box 3) and fell to almost zero after the outbreak of Russia's war of aggression in Ukraine. [↪ ITEM 61](#) However, some of these shortfalls were compensated for by larger supplies from Norway and by LNG imports. There was also evidence of **supply-side disruption to global oil production**. [↪ BACKGROUND INFO 3](#)



[↪ BACKGROUND INFO 3](#)

### Disruption to oil supplies

In April and May 2020, OPEC lowered its oil production in order to limit the collapse in prices caused by the first wave of the pandemic. This reduced global supply by ten million barrels per day, or 10 per cent. Global supply slowly increased subsequently but failed to keep pace with rising demand. Technical issues and logistical problems such as the lack of sea freight capacity and labour shortages in the United States are likely to have been relevant here. Moreover, **Russia's war of aggression in Ukraine** reduced Russia's oil production by about one million barrels per day in April 2022 (IEA, 2022; OPEC, 2022a). In addition, Russia's oil supplies to Europe declined, which is likely related to the European Union's partial embargo coming into effect in December 2022. However, these shortfalls have so far been partially offset by other sources. Global oil production returned to its pre-war level of 99.8 million barrels in June 2022 (OPEC, 2022b). In its Oil Market Report the New York Fed uses empirical oil market models to show that, between the beginning of the pandemic and the summer of 2021, oil prices were primarily determined by positive **demand shocks**, while in 2022 oil supply shocks have raised oil prices particularly sharply (Groen et al., 2013; New York Fed, 2022a). [↪ BOX 6](#)

102. Empirical evidence for the euro area shows that, despite wide-ranging supply-side disruptions in 2021 and 2022, **aggregate demand also explains a significant amount of the inflation increase** since the beginning of 2021 (Alonso et al., 2021; Celasun et al., 2022; Gonçalves and Koester, 2022). Although estimates vary, aggregate demand caused at least half of this increase in inflation. An analysis by Deutsche Bundesbank (2022a) shows that foreign demand had greater explanatory power for euro area inflation than domestic demand in the winter half-year 2021/22. Furthermore, Deutsche Bundesbank demonstrates that the rise in inflation in the US can also be explained to a considerable extent by positive demand shocks. In contrast to the euro area, however, domestic factors were largely responsible for the rise in inflation in the United States.

103. **Empirical analysis** by the GCEE up to the second quarter of 2022 confirms the considerable importance of foreign demand for inflation in the euro area but also finds a strong price-driving effect of adverse energy supply shocks. This finding results, among other things, from the fact that this analysis uses a **comprehensive energy price index**, which in the current situation is likely to be significantly more informative than the oil price usually used for such analyses. [↪ BOX 6](#)

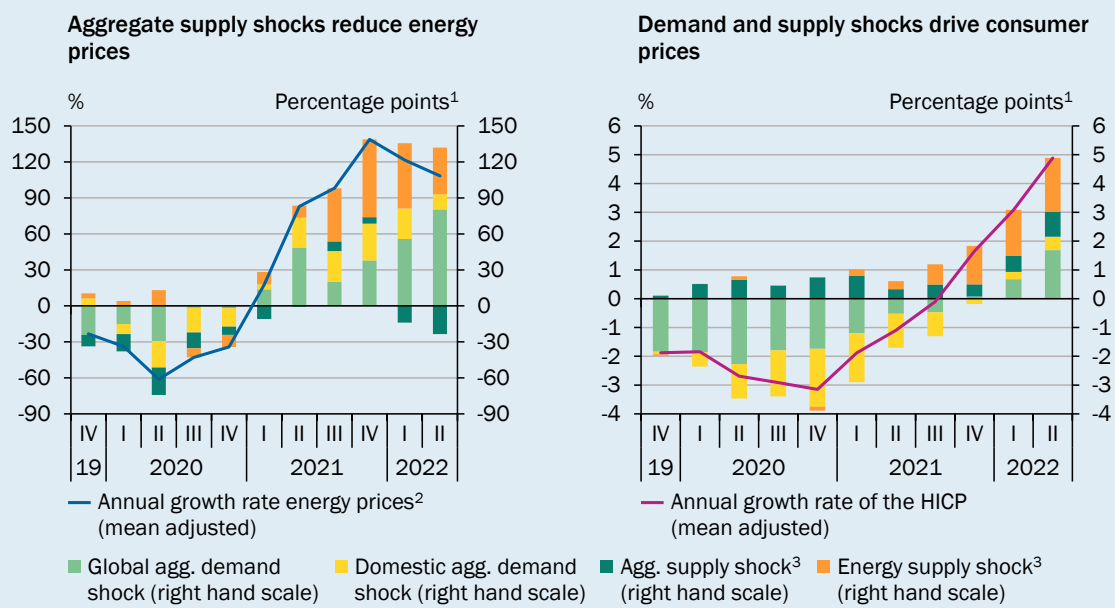
[↪ BOX 6](#)

### A decomposition of inflation in the euro area into demand- and supply-side factors

Price dynamics in the euro area have been affected by various supply- and demand-side factors in recent years. A **structural vector autoregressive model** can be used to determine their quantitative significance. This includes gross domestic product (GDP) and the HICP as a measure of consumer prices in the euro area as well as an energy commodity price indicator [↪ CHART 31 TOP RIGHT](#) and global industrial output. The model is estimated for the period 1980 to 2022. The **sign restrictions needed for identification** follow prior literature (Peersman, 2005; Conti et al., 2017; Grant, 2017) and are defined as follows. An aggregate positive demand shock in the euro area pushes up consumer prices and GDP. An aggregate positive supply shock in the euro area lowers consumer prices but raises GDP and energy prices. A positive energy supply shock reduces prices but increases euro area GDP and global industrial output. A positive global demand shock raises all variables in the model. To distinguish the global demand shock from a

[↪ CHART 33](#)

### Demand and supply-driven inflation in the euro area



1 – Growth contributions in percentage points. 2 – The HWWI energy commodity price index includes the fossil energy commodities oil, natural gas and coal with weightings of 75 %, 19 % and 6 %. The percentages are based on the import shares of the euro area member states in the period 2017–2019. 3 – In 2022, the aggregate demand shocks had a positive sign, raising consumer and energy prices. The energy supply shocks had a negative sign in 2022. They also increased consumer and energy prices. The aggregate supply shocks also had a negative sign in 2022. They thus lowered energy prices and increased consumer prices.

Sources: AWM, Eurostat, HWWI, own calculations  
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euro area-only demand shock, it is assumed that euro area GDP responds more sensitively to the domestic demand shock than to the global demand shock. In addition, global industrial output is assumed to react more sensitively to the global demand shock than to the euro area demand shock.

The results show that in the second quarter of 2022, high euro area inflation and high energy prices were largely driven by **positive foreign demand shocks and adverse energy supply shocks**. Their contributions to the growth in the deviation of inflation from its mean were 1.7 and 1.9 percentage points respectively. [↘ CHART 33 RIGHT](#) These energy supply shocks have gained importance since mid-2021. Domestic demand played only a moderate role in the deviation of inflation from its mean in the second quarter of 2022, amounting to 0.5 percentage points. As pandemic-related subdued demand was largely responsible for the low level of inflation in 2020 and 2021, however, it also explains much of the subsequent rise in inflation. This is particularly true of foreign demand. The dynamics of the demand component can probably be explained, among other things, by the gradual lifting of pandemic-related restrictions and the normalisation of demand for services.

The discrepancy between energy price inflation and consumer price inflation can be partly explained by adverse aggregate supply shocks. Diverse **disruption to international supply chains and labour shortages** due to pandemic-related restrictions constrained output. The resulting increase in production costs raised consumer prices. At the same time, lower output reduced demand for energy commodities and, consequently, their prices. The growth contributions from adverse aggregate supply shocks amounted to 0.9 percentage points of the inflation rate in the second quarter of 2022. Furthermore, energy price inflation was reduced by 23 percentage points. [↘ CHART 33 LEFT](#)

### 3. Medium-term drivers and persistence of inflation

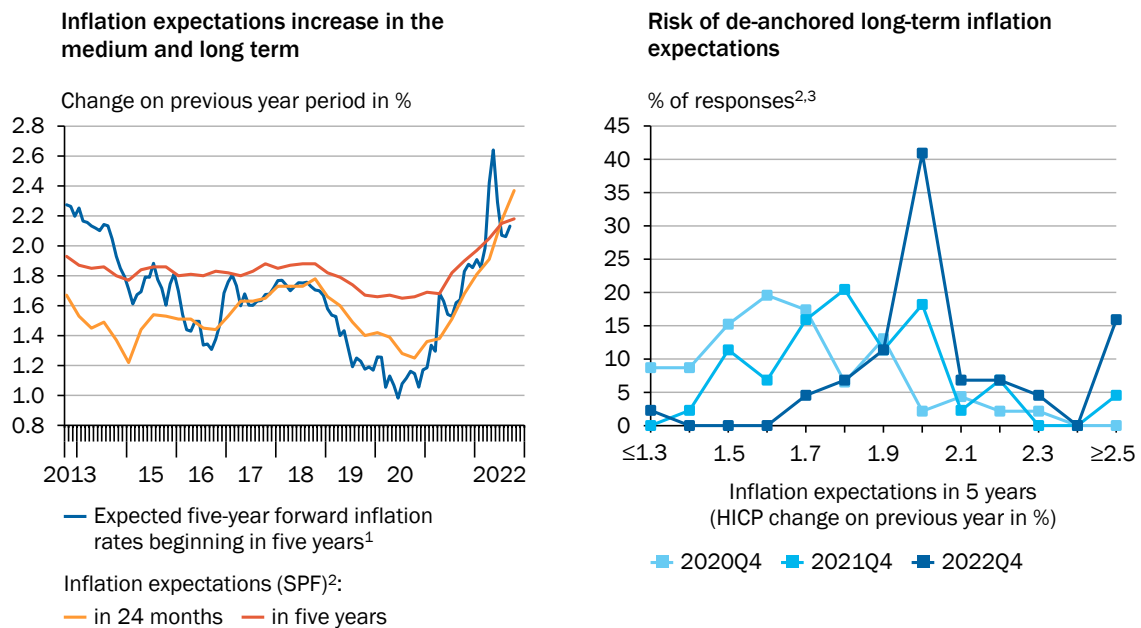
104. **Forward-looking monetary policy requires** an assessment of the **medium-term inflation dynamics** over the coming years. Developments over the medium term are likely to be essentially determined by two driving forces: first, inflation expectations and the question of whether they remain anchored at the ECB's inflation target; and, second, wage dynamics and the question of whether there will be second-round effects or even wage-price spirals. Furthermore, medium-term money growth must be kept under review. Even if inflation is expected to subside in the medium term, the question of inflation persistence – i.e. the expected duration of the phase of elevated inflation above the ECB's inflation target – is relevant.

#### Inflation expectations are rising but remain anchored

105. The recent rise in inflation has increased **inflation expectations**. According to the ECB's Survey of Professional Forecasters, the mean value of inflation expectations for the HICP inflation rate over the next twelve months in the euro area rose from 1.1 per cent in the mid-2020 survey to 4.8 per cent most recently. Expectations for the annual inflation rate over the next 24 months rose over the same period from 1.3 per cent to 2.4 per cent most recently, while longer-term expectations for the annual inflation rate in five years' time edged up from 1.6 per cent to

↘ CHART 34

### Long-term inflation expectations in the euro area



1 – Market-based long-term inflation expectations starting in five years for five years. Derived from the fixed payment stream of inflation swaps, which is exchanged for the annual realised inflation rates of the next five or ten years. 2 – SPF (Survey of Professional Forecasters), expectations of the annual inflation rate in five years or in 24 months. 3 – Respondents are asked to provide point estimates of the expected annual inflation rate in five years. This chart shows the distribution of the point estimates provided.

Sources: ECB, Refinitiv Datastream, own calculations  
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2.2 per cent. ↘ CHART 34 LEFT Therefore, **despite this increase, long-term inflation expectations are close to the inflation target, suggesting that they remain anchored.** However, the distribution of survey responses shows that the proportion of participants expecting a long-term inflation rate of at least 2.5 per cent has steadily increased from 0 per cent to 16 per cent between the fourth quarter of 2020 and the fourth quarter of 2022. This could pose a **rising risk of de-anchoring inflation expectations** (Hilscher et al., 2022). ↘ CHART 34 RIGHT

106. **Inflation expectations are relevant for wage negotiations and for firms' price-setting behaviour.** Price adjustments thus incur costs, for example through the printing of price tags. These costs are likely to have decreased in the digital age. However, there are also costs associated with obtaining information and making decisions (Stella, 2013; Anderson et al., 2015; Gorodnichenko and Weber, 2016). To keep their adjustment costs low, firms set their prices today in anticipation of future inflation. If inflation expectations rise, therefore, this partly already materialises today. In addition, higher inflation expectations at constant nominal interest rates result in **lower real interest rates** (Economic Forecast 2022 item 31) which, assuming rational expectations, stimulates capital formation by firms and private consumption by households. Aggregate demand is thus likely to increase – all other things being equal – which, in turn, fuels the inflation process (GCEE Annual Report 2021 item 174; Economic Forecast 2022 item 31). However, elevated inflation expectations could also be accompanied by

falling consumption. Supply-side shocks therefore give rise to higher inflation expectations, on the one hand, and to losses of purchasing power and wealth, on the other (Candia et al., 2020). Moreover, as household inflation expectations are often biased, their real economic effect is uncertain (D'Acunto et al., 2022).

In order to ensure price stability, it is, in any case, essential that **market participants'** medium- to long-term inflation expectations are aligned **with the central bank's target** and that this target is **perceived to be credible** (Bernanke, 2007; Draghi, 2014; Corsello et al., 2019).

## Wage dynamics and inflation

107. **Wage dynamics** are also likely to play a role in inflation in **the euro area** over the **medium term**. Wages in the euro area have, in the past, tracked the inflation rate. Collectively bargained wages in the euro area rose by only 1.5 per cent in 2021, which – given the inflation rate of 2.6 per cent – meant a real-terms pay cut (Economic Forecast 2022 items 29 ff.). [↘ ITEM 33](#) [↘ CHART 35 RIGHT](#) Year-on-year pay growth in the euro area increased to 3 per cent in the first quarter of 2022 and 2.4 per cent in the second quarter of 2022. Large one-off payments in Germany were mainly responsible for the rise in the first quarter. [↘ BACKGROUND INFO 4](#) The ECB (2022a) expects employees' per-capita remuneration in the euro area to grow by 4.0 per cent this year and by 4.8 per cent next year. The GCEE expects to see wage growth of 5.4 per cent and 5.8 per cent respectively in Germany. [↘ ITEM 78](#) Wage growth this year and next year is thus likely to be significantly below inflation in both the euro area and Germany.



### [↘ BACKGROUND INFO 4](#)

#### On the importance of one-off payments to compensate for inflation

Non-income-related one-off payments enable firms to **strike a balance between the interests of the various collective bargaining parties**. On the one hand, they do not place a **permanent financial burden on firms** during economically challenging times for the entire term of collective bargaining agreements and beyond. The average duration of collective bargaining agreements in Germany was 24 months in 2021 (Schulten, 2022). On the other hand, they temporarily take account of increases in the cost of living for workers (Bispinck, 2010; IG BCE, 2022). In addition, they reduce the cost pressures on **lower-income groups** in particular. For these reasons, one-off payments are also likely to have **lower inflationary effects** than regular collectively bargained wage increases. On the one hand, this is because they do not automatically continue to apply the following year, which in itself has a wage-reducing effect, and on the other hand, because future percentage wage increases are based on a lower benchmark and can therefore be smaller in absolute terms. However, this could create catch-up effects, thereby making future percentage wage increases larger. The collective bargaining negotiations for the chemical sector in spring 2022 reached agreement on a non-income-related one-off payment of €1,400 and a renegotiation round in the autumn. In October 2022, agreement was reached on wage rises of 3.25 per cent plus one-off payments of €1,500 each for both 2023 and 2024, corresponding to an average increase of 12.9 per cent over the entire term of the agreement until the end of June 2024. According to a survey conducted by the ifo Institute, around 60 per cent of firms took measures in

the second quarter of 2022 to compensate for their employees' loss of purchasing power (Freuding and Garnitz, 2022). One-off payments were used by 22 per cent of these firms. Other compensation measures included petrol vouchers and the option of remote working.

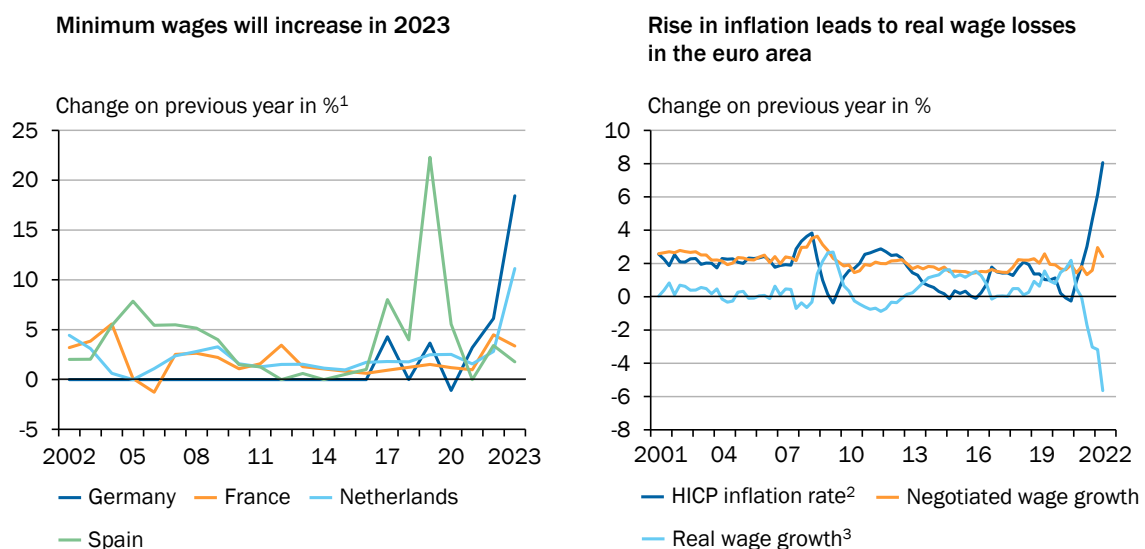
**108. Wages are one of the most important permanent cost factors for firms.**

Workers' remuneration accounted for around 48 per cent of GDP in the euro area in 2021. Against this background, below-inflation wage growth is likely to have **second-round effects** [↘ GLOSSARY](#) on core inflation (Economic Forecast 2022 box 2). In addition, given average labour productivity growth of 1 per cent in the euro area between 2010 and 2022, expected wage growth is well above productivity-based wage setting (Lane, 2022). Furthermore, the link between **wage growth and inflation** could **strengthen in a high inflationary environment**. Firstly, the estimated inflationary effects of wage increases are more pronounced owing to the greater pass-through of cost pressures (Borio et al., 2021; BIS, 2022). Secondly, current inflation rates and inflation expectations are likely to play a more prominent role in wage negotiations. For example, there might be stronger incentives to reduce the duration of collective bargaining agreements or for workers to organise more effectively, thereby strengthening their negotiating position (BIS, 2022).

**109. Skills and labour shortages** and, in some cases, substantial **minimum wage increases** in the euro area are boosting wage dynamics. This is expected to strengthen wage growth in the medium term (Economic Forecast 2022 item 29 and box 2). Empirical evidence suggests that minimum wage rises have significant

[↘ CHART 35](#)

**Negotiated wage and minimum wage growth in the euro area**



1 – Rate of change in annual average minimum wages. Minimum wages are based on data for January and July of each year. 2 – Harmonised Index of Consumer Prices, seasonally adjusted values. 3 – Difference between negotiated wage growth and the inflation rate.

Sources: ECB, Eurostat, own calculations

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inflationary effects. For example, surveys show that 58 per cent of firms in Germany plan to respond to the country's minimum wage increase of 14.8 per cent (from €10.45 to €12) on 1 October 2022 by raising their prices (ifo Institute, 2022a). In contrast, Deutsche Bundesbank (2022b) reckons that there will be only minor effects overall. It expects to see gross wages and salaries rise by a further 0.8 per cent and 0.9 per cent in 2023 and 2024, which should push up consumer prices by an additional 0.1 per cent in each case. Alongside Germany, many other euro area member states have introduced minimum wage increases in 2022 (Koester and Wittekopf, 2022). [↪ CHART 35 LEFT](#) For example, a 10 per cent rise is expected in the Netherlands in 2023. [↪ ITEMS 33 AND 28](#)

## Greater persistence of the inflation process

- 110.** Empirical and theoretical models postulate that the observed inflation rate is driven both by temporary influences – such as temporary relative changes in the prices of individual goods, or measurement errors in price statistics – and by an inflation trend. Once temporary effects recede in the medium term, the observed inflation rate should converge to this **trend inflation rate**. Accordingly, trend inflation is a **measure** of the **structurally induced inflationary pressures** in an economy. In addition to developments in the real economy resulting from demographic change and the costs incurred by digitalisation and decarbonisation, monetary developments such as money growth impact on trend inflation. Furthermore, the central bank's inflation target and long-term equilibrium relationships between nominal and real interest rates as well as inflation expectations, as implied by Fisher's rule play a role (Cochrane, 2016; Uribe, 2017; GCEE Annual Report 2021 box 16). Second-round effects in the labour market, temporarily elevated inflation expectations and the lagged pass-through of cost increases are likely to delay the re-approximation of inflation to trend after the current inflation shocks (Smets and Wouters, 2003; Altissimo et al., 2006; Cogley et al., 2010; Fuhrer, 2010; GCEE Annual Report 2021 background info 2).
- 111.** Various analyses conducted by the GCEE show that the **persistence of inflation in the euro area** has strengthened recently, partly because the current high inflation rates are no longer being driven solely by the sharp rise in energy and food prices. [↪ BOX 7](#) [↪ ITEM 97](#) This is particularly problematic for the inflation outlook going forward, as second-round effects may intensify during periods of high inflation (BIS, 2022; p. 41. ff.). [↪ ITEM 107](#) In particular, persistently high inflation driven by more than just changes in the prices of a few goods can trigger behavioural changes in wage- and price-setting, which can create self-reinforcing effects.

### [↪ BOX 7](#)

#### Empirical estimation of the persistence of the inflation process in the euro area

The persistence of **the inflation process** can be measured by the autocorrelation of the inflation rate. According to the literature, although the persistence of inflation in the US and the euro area has **weakened compared with the 1980s** (Altissimo et al., 2006; Watson, 2014), greater persistence has been found in high-inflation environments than in low-inflation ones (Cogley



and Sargent, 2002; BIS, 2022). For example, the GCEE's autocorrelation analysis of inflation rates in the euro area for the years 1984 to 2022 shows that in periods when inflation exceeds 2 per cent, the sum of the autocorrelation parameters for various lags is 0.7. This was consistently the case during the period between 1984 and 1996 with just a few exceptions. In periods when inflation is lower than 2 per cent, the corresponding persistence statistic is only 0.2. The **low-inflation period between 2013 and 2019** was characterised not only by a fall in trend inflation [↪ ITEM 110](#) but also by slightly **higher persistence compared with** other low-inflation periods (Ciccarelli et al., 2017). The corresponding persistence statistic for this period is 0.3.

**Trend-cycle decompositions** of the inflation rate enable a semi-structural analysis of the persistence of the inflation process to be conducted. The observed inflation rate is explained by an unobserved inflation trend, an inflation gap and a surprise component. The estimated inflation trend can be interpreted as a measure of medium-term inflationary pressures and should ideally reflect the central bank's inflation target (Chan et al., 2013). The inflation gap, i.e. the difference between observed inflation and the inflation trend, is modelled as a stationary process. It is thus assumed that the observed inflation rate returns to trend, provided that no model-exogenous shocks cause further deviations from trend. How long this deviation lasts depends, among other things, on the persistence of the gap estimated in the model. Using the estimated model to extrapolate observed inflation can give an indication of the expected duration of the currently elevated level of inflation. Crucially, estimates of the persistence of the inflation gap take account of the historically observed central bank response to inflation but not the specific drivers of the current inflation environment.

The **estimation results provide** little evidence of any increase in trend inflation in the euro area as measured by the headline HICP. [↪ CHART 36 TOP LEFT](#) However, the estimated persistence of the inflation gap has increased considerably – and statistically significantly – since the early 2000s. [↪ CHART 36 TOP CENTRE](#) In addition, the size of model-exogenous shocks is likely to have increased sharply recently. [↪ CHART 36 TOP RIGHT](#)

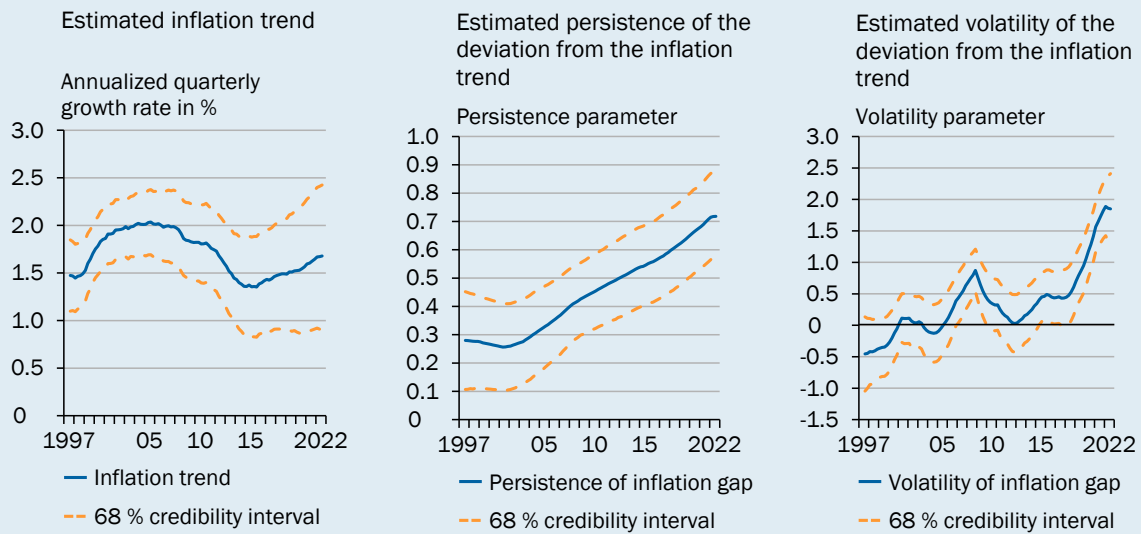
This greater persistence has direct implications for monetary policy analysis, as it implies a significantly delayed return to trend inflation and to the ECB's inflation target respectively. [↪ ITEM 132 F](#). Consequently, an **extrapolation of the inflation gap** – on the assumption that trend inflation and the persistence of the gap remain at the level estimated for the third quarter of 2022 – have shown that inflation does indeed return steadily to trend. However, this gap is expected to **remain positive at the end of 2024**. At around 3.0 per cent year on year in the fourth quarter of 2024, the inflation rate projected in this way is still well above the ECB's inflation target and the latest macroeconomic projections by the ECB and Eurosystem experts (ECB, 2022b). When interpreting this projection, it should be noted that the return to trend owing to the stationarity assumption is inherent in the method – similar to other empirical estimation procedures (Economic Forecast 2022 box 4). Above all, this reflects the inflation-dampening effect of systematic monetary policy observed during the estimation period. Information over and above this – such as the drivers of the current energy crisis or a stronger monetary policy response – is not taken into account in the model projection, unlike in the GCEE's economic forecast. [↪ ITEM 46](#)

An alternative decomposition of the all-items HICP inflation rate is based on the distinction between idiosyncratic and, potentially, temporary changes in the prices of individual products and commodities as well as structural changes that are reflected in the prices of many product groups. When analysing medium-term inflationary pressures in this context, the ECB observes various measures that remove particularly volatile prices from the overall index (Ehrmann et al., 2018). In case of the core inflation rate of the HICP the usually highly volatile energy and food components are removed on an ad-hoc basis. In other procedures individual components with a currently particularly high or low rate of change are not taken into account at any point in time. In addition, empirical methods can be used to identify transitory and persistent signals in the changes in prices of individual components and then to aggregate them (Fröhling and Lomm-

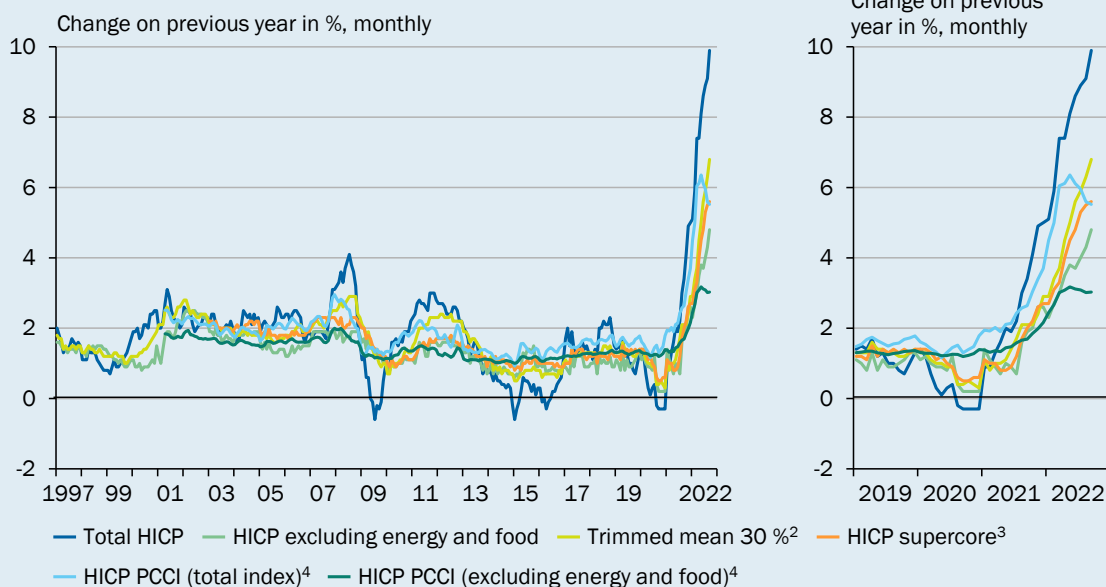
▾ CHART 36

### Different measures of underlying inflation dynamics in the euro area<sup>1</sup>

#### Estimation of inflation trend and deviations from it



#### Different measures of the core HICP inflation rate



1 – Bayesian estimation of the inflation trend and the deviation therefrom for the seasonally and calendar-adjusted headline HICP using an unobserved components model according to Chan et al. (2013). Estimation period: 1997Q2 to 2022Q3. 2 – When calculating the trimmed mean, 15% of the components (measured by their weighting in the overall index) with the lowest or highest price increases are excluded at each point in time. 3 – The supercore measure for the core rate corresponds to the part of the price increases of the respective components of the HICP excluding energy and food that can be explained by the output gap in a regression. Details on the calculation in Ehrmann et al. (2018). 4 – 3-month moving averages. The Persistent and Common Component of Inflation (PCCI) is a model-based measure of the core HICP rate in the euro area based on a dynamic factor model for the individual components of the total HICP and the total HICP excluding energy and food, respectively, in twelve euro area member states. For details on the calculation, see Bańbura and Bobeica (2020).

Sources: ECB, Eurostat, own calculations  
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atzsch, 2011; ECB, 2014; Bańbura and Bobeica, 2020). **Several of these measures** of underlying inflation have **hit highs at the current margin** for the period since 1997 and, ranging from 3.0 per cent to 6.8 per cent, are, without exception, above the ECB's inflation target of 2 per cent. [↪ CHART 36 BOTTOM](#) The breadth of current inflationary pressures suggests that inflation rates are unlikely to return to their target any time soon. [↪ ITEM 46](#)

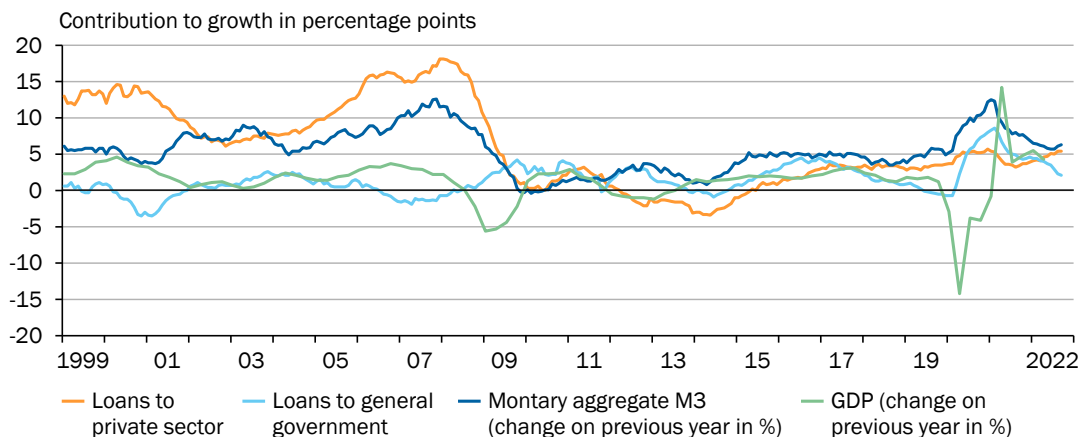
## Money growth and inflation

- 112.** There is a debate about whether the ECB's quantitative easing measures in the wake of the COVID-19 pandemic may have had an inflationary effect by expanding the money supply. These measures were stepped up at the beginning of the pandemic to ensure favourable financing conditions in the public and private sectors (GCEE Annual Report 2020 items 105 ff.). First, the Governing Council of the ECB started to expand the existing Asset Purchase Programme (APP) – which had resumed in November 2019 with a monthly volume of €20 billion – by €120 billion until the end of 2020. In addition, a further framework for purchasing securities totalling €1,850 billion was established in the form of the PEPP emergency programme (GCEE Annual Report 2021 item 157). Following the economic recovery, the monthly purchasing volume of €80 billion was gradually reduced from the fourth quarter of 2021 onwards and was finally discontinued at the end of March 2022. Net purchases under the APP were terminated at the end of June 2022. By this time, the **ECB's total assets** had reached **about €8,800 billion**, which represented an **increase of almost 90 per cent** compared with the period immediately before the pandemic. [↪ CHART 37 LEFT](#) The Eurosystem's consolidated total assets amount to just under 70 per cent of the euro area's GDP.
- 113.** These purchase programmes **expanded the aggregate M3 money supply considerably**. Double-digit growth rates were seen for the first time since 2007. While growth already averaged around 9 per cent year on year in 2020, it had reached **around 12.5 per cent** year on year by January 2021. Growth has since returned to a downward trend. [↪ CHART 37 RIGHT](#)
- 114.** The above-average money growth associated with balance sheet expansion could have an inflationary effect. Various empirical analyses show a **positive correlation** between **money growth and inflation** (Carstensen, 2007; Benati, 2009; Hofmann, 2009; Teles et al., 2016). This correlation varies over time and has become weaker since the 1990s. One reason for this could be that, in addition to the level of inflation in many OECD member states, their volatility has also declined, which makes it difficult to empirically identify a relationship between inflation and money growth (Teles et al., 2016). In 2020, however, the decline in economic output in the euro area resulted in a significant gap between money growth and output growth, which may have contributed to the rise in inflation. Further monitoring of money growth relative to economic growth could provide insights into possible future inflationary trends.
- 115.** The significant **expansion of bond purchases** during the pandemic has been **accompanied** by a large increase in **new government debt**, [↪ CHART 37 RIGHT](#)

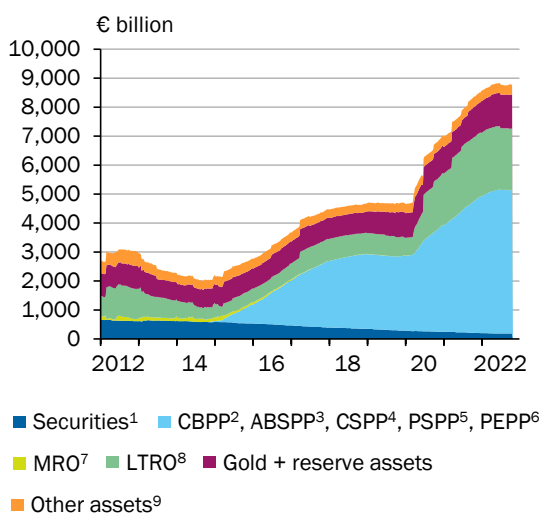
↳ CHART 37

Structure of Eurosystem assets and money growth in the euro area

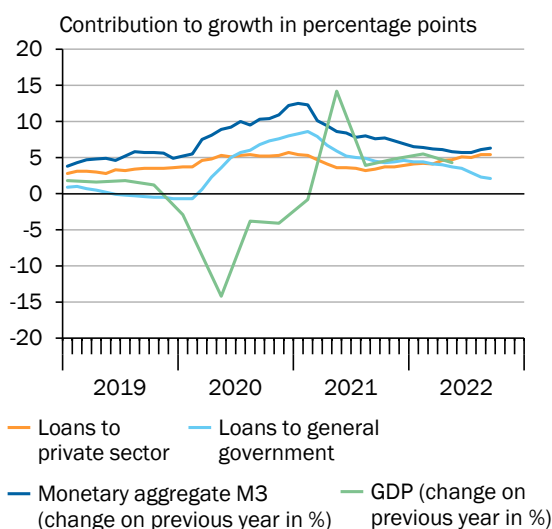
Selected contributions to growth of the monetary aggregate M3 and GDP growth since 1999



Eurosystem balance sheet: assets



Significant difference between money supply and GDP growth recently



1 - From euro area issuers, including purchases of government bonds and unsecured debt securities (Securities Markets Programme, CBPP1, CBPP2) held for monetary policy purposes. 2 - Covered Bond Purchase Programme. 3 - Asset-Backed Securities Purchase Programme. 4 - Corporate Sector Purchase Programme. 5 - Public Sector Purchase Programme. 6 - Pandemic Emergency Purchase Programme. 7 - Main refinancing operations. 8 - Long-term refinancing operations. 9 - Including other claims on euro area credit institutions.

Sources: ECB, Eurostat, own calculations  
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which may have had an inflationary effect (Leeper, 1991; Reinhart and Rogoff, 2010; Bordo and Levy, 2020). For example, the assets purchased under the PEPP contain a large proportion of government bonds. The corresponding expansion of public debt, in turn, stimulates aggregate demand. Transfers were made to the private sector as part of the pandemic support measures, for example, which fuelled aggregate demand.

- 116. In addition to the effect associated with aggregate demand, a sharp increase in the money supply and credit growth can help to **push up the prices of assets such as real estate and securities** (Poterba, 2000; Fratzscher et al., 2016; de Bondt

et al., 2020; Battistini et al., 2021). Residential property markets, for example, have recently seen steep price rises in the euro area. [▶ ITEM 41](#) This, in turn, may fuel consumer price inflation. The growth in asset prices may therefore lead to an improvement in credit security, which further increases demand for credit. In the case of the United States, for example, Gupta et al. (2022) find that when collateral values rise by 1 per cent, firms that post real estate as collateral experience a 12 basis point increase in bank loan growth. If companies raise their investment spending, this can further drive inflation. And, last but not least, higher asset prices have a positive impact on consumer demand, which in turn can be a driver of inflation.

### III. EFFECTS OF ELEVATED INFLATION

#### 1. Welfare cost of elevated inflation

- 117.** Highly **elevated inflation rates** can cause **substantial welfare losses** through inefficient allocation of resources, tax distortions and higher price adjustment costs – i.e. expenses incurred by the constant adjustment of prices and price notices as well as in connection with wage and price negotiations. [▶ BOX 8](#) In addition, periods of elevated inflation can influence the formation of expectations and the behaviour of actors in the long run. [▶ ITEM 126](#) On the other hand, excessively low inflation rates can also incur welfare costs, which are caused by reaching the zero lower bound or the effective interest rate floor and the associated possibility of a liquidity trap. A wide range of analysis has therefore been undertaken in the academic literature to determine the **welfare-maximising inflation rate**. Since welfare losses increase with rising inflation, the welfare-maximising inflation rate is usually only **slightly above absolute price stability**.

#### [▶ BOX 8](#)

##### The welfare cost of elevated inflation

High inflation rates affect the **signalling and allocation function of prices**. In principle, relative prices signal the relative scarcity of goods, with rising relative prices acting as a signal of the excess demand for a good. This provides an incentive to use more production factors to manufacture goods that are in particularly high demand and, consequently, to **use the resources of an economy efficiently**.

Elevated inflation can lead to misguided investment decisions and inefficient use of resources, as disturbed signals about the demand for their good make it more difficult for producers to understand whether the change in demand is due to a change in preferences (Logue and Sweeney, 1981). The **signalling and control function of prices is therefore impaired**. Elevated inflation also affects macroeconomic growth as a result of rising price adjustment costs, which are called ‘**menu costs**’ in the literature. Menu costs describe the expenses incurred by constant inflationary adjustment of prices and price notices (Sheshinski and Weiss, 1977) that are large enough to be macroeconomically significant (Levy et al., 1997). In contrast, Burstein and Hellwig (2008) find that menu costs have negligible welfare effects. Furthermore, elevated

inflation may cause individual firms to make wrongly sized and, therefore, inefficient wage adjustments (Groschen and Schweitzer, 1996). In the labour market these wage changes alter the relative wages of one firm compared with the wages of other firms. Such changes can lead to unnecessary layoffs if wage rises are too large or can cause worker dissatisfaction or quits if wage adjustments are too low. They may also increase the amounts that firms spend to improve their level of information, or they may bring about more frequent wage adjustments. In addition, they can significantly increase the frequency and severity of strikes due to inflation uncertainty (Gramm et al., 1988).

More important is the **uncertainty** caused by inflation. One particular reason for this is that almost all economic activity is based on the **setting of nominal contract fees, assessment bases and prices**, which are seriously affected by inflation and by uncertainty about their future levels (Fischer and Modigliani, 1978). This therefore hampers effective long-term decision-making such as capital formation (Huizinga, 1993) and increases inflation-related tax distortions (Nowotny, 1980), while a tendency to accumulate physical capital causes **resources to be misallocated** (Fischer and Modigliani, 1978; Tommasi, 1999). Moreover, inflation expectations are distorted by experience effects in the long run. Malmendier and Nagel (2016) find that individuals overemphasise experienced inflation, thereby influencing key financial decisions such as land and house purchases, mortgage financing and bond investments. [▶ ITEM 126](#)

These diverse effects of inflation raise the question of whether even low inflation rates should be tolerated at all or whether absolute price stability is the preferred policy objective. One argument in favour of positive inflation rates could be the stabilising effect that slightly higher inflation has on the labour market in the short term. This is suggested by the **Phillips curve relationship**, which shows a negative correlation between inflation rates and unemployment rates (Phillips, 1958; Samuelson and Solow, 1960). However, permanently elevated inflation is likely to be priced in by workers in their wage negotiations. Higher wage costs cause a decline in employment levels, so there is no link between low unemployment and high inflation in the medium to long run (Friedman, 1968). **Persistently high inflation** can therefore go hand in hand with **high unemployment**.

There are three main reasons for **inflation being permanently positive and low**: greater credibility of central bank policy, rising labour market flexibility due to falling real wages despite downwardly rigid nominal wages, and **managing to avoid reaching the zero lower bound and the liquidity trap**. Monetary policy can thus react more flexibly in times of crisis and avoid deflationary spirals, for example due to a negative demand shock (Blanchard et al., 2010). Guerrero and Parker (2006) also find evidence of bidirectional causality between deflation and recession, noting that a higher deflation rate reduces the subsequent growth rate, even if this does not always lead to a recession.

The trade-off between the cost of excessively low and excessively high inflation suggests that a **welfare-maximising inflation rate** does exist. Billi and Kahn (2008), for example, find that the **cost of elevated inflation and the risk of reaching the zero lower bound** balance out at an inflation rate of 0.7 per cent to 1.4 per cent. Kim and Ruge-Murcia (2009) conclude that the welfare-optimal inflation rate – taking account of downwardly rigid nominal wages – is 0.35 per cent. Schmitt-Grohé and Uribe (2010) calculate the optimal inflation rate – **factoring in downwardly rigid wages**, quality improvements and an incomplete tax system – and reckon it to be just above zero. Coibion et al. (2012) consider the costs of inflation – which mainly arise from relative price distortions, inefficient resource allocation and higher inflation volatility as well as the costs of deflation, which mainly result from reaching the zero lower bound – to be balanced with inflation of up to 2 per cent. Slightly higher results are provided by the calculations done by Adam and Weber (2019), who aggregate a model with rigid prices and heterogeneous firms, causing productivity growth to vary across agents. They locate the **welfare-maximising historical inflation rate for the US at between 1 per cent and 3 per cent**. In another analysis, Adam et al. (2021) estimate the inflation rate that jointly maximises welfare for France, Germany and



Italy to be between 1.1 per cent and 1.7 per cent, allowing for relative price distortions with relative price trends over the product life cycle.

In addition to studies that quantify the optimal inflation rate, some of the literature is concerned with classifying the **cost of elevated inflation**. Early analyses are based on the classification of **real cash as a consumption good** and analysis of its demand function, where inflation is regarded as a kind of tax on this consumption good (Bailey, 1956; Cagan, 1956). Given this assumption, Fischer (1981) estimates that an increase in the inflation rate from 0 per cent to 10 per cent will result in a welfare loss of 0.3 per cent of gross national income, but he also considers a loss of between 2 per cent and 3 per cent of gross national income to be possible, especially owing to tax distortions. Lucas (2000) elaborates on these considerations, based on the M1 money supply, by using data for the period from 1900 to 1994 and estimates the growth in real income to be just under 1 per cent if the inflation rate falls from 10 per cent to 0 per cent. Ireland (2009), using a similar approach for the period from 1980 to 2006, calculates the welfare cost of 10 per cent inflation compared with a situation of price stability to be about 0.2 per cent of real income. Empirical analysis of **over 100 countries** for the period from 1960 to 1990 by Barro (2013) quantifies the *ceteris paribus* effect of a permanent increase of 10 percentage points in the average inflation rate. The **loss in real GDP per capita growth per year amounts to 0.2 to 0.3 percentage points**.

- 118. Price stability** is enshrined in law as an objective of monetary policy in many countries (Hammond, 2012) and has been declared the **primary objective of monetary policy** by many central banks (BIS, 2009; IMF, 2022). Nowadays it is usually achieved by setting a quantitative inflation target, with a tolerance band usually being defined. Most central banks have set a target in the positive, low single-digit percentage range. Firstly, this serves as a hedge against measurement errors and thus aims to avoid accidentally sliding into a deflationary environment. And, secondly, staying in the low single-digit percentage range anchors inflation expectations.

## 2. Impact of inflation on various household groups

- 119.** Besides the aggregate macroeconomic costs [↘ BOX 8](#) there are also potential **distributional effects of elevated inflation**. These essentially depend on three factors. First, an individual household's basket of goods typically differs from the representative basket of goods. For example, households on lower incomes spend a much larger proportion of their incomes on rent and food than households on higher incomes. This creates **differences in the inflation rates experienced by individuals**. On the other hand, the distributional effects of inflation depend on the heterogeneity of inflation-related **income growth**. If incomes rise at the same rate as prices, households' purchasing power does not change. If this is not the case, however, the level of financial burden varies relative to income if consumption rates differ. Moreover, inflation, especially unexpectedly high inflation, can trigger distributional effects as a result of **changes in asset values**. Unexpectedly high inflation reduces the real value of both nominal assets and nominal liabilities. In particular, cash deposits and fixed-income securities lose value when unexpectedly high inflation rates occur. Households with net (fixed-interest) debt, on the other hand, benefit from a reduction in their real liabilities. The



wealth effects of elevated inflation therefore depend primarily on whether the **household concerned is a net debtor or a net creditor.**



#### ▷ BACKGROUND INFO 5

##### Empirical evidence on inflation differentials by income group

In recent years the academic literature has examined the extent to which inflation rates differ by income group. Gürer and Weichenrieder (2020) have calculated that the **baskets of the lowest income decile** in Europe became **more than 10 percentage points more expensive** than the baskets of the highest decile between 2001 and 2015. Argente and Lee (2021) and Kaplan and Schulhofer-Wohl (2017) show that inflation in the US was significantly higher for low-income households than it was for high-income households over the period from 2004 to 2013. They also document a **substantial variation in the inflation rates** of retail goods across households, which is driven in large part by the different prices of identical goods. Jaravel (2019) shows how product innovation in the US has led to inflation inequality. The relatively stronger growth in the demand for products consumed by wealthy households has expanded the supply of these products, thereby increasing competition. Stronger competition has reduced profit margins and lowered inflation in higher-income groups. Wimer et al. (2019) estimate that the **different inflation rates** in the US mean that the actual **incidence of poverty** in the lowest income quintile is higher and real household incomes in this quintile are lower than calculations based on an average price index would suggest. Demary et al. (2021) conclude that inflation for **households on net incomes of less than €900 per month in Germany** since 1995 has been almost **6 percentage points higher** than it has for households on net incomes of €5,000 or more.

120. Initial analyses of the variations in inflation rates have shown a **mixed picture in the current inflation environment**. Dullien and Tober (2022) estimate a range of 2.4 percentage points in the inflation rates applicable to different sample household types in Germany in May 2022, although this range does not increase linearly with income. Priem et al. (2022) show that the financial support packages from the German government have reduced the financial burden in the lower income deciles, but the middle class is still severely affected by inflation. Claeys and Guetta-Jeanrenaud (2022) estimate that **inflation in Belgium, Italy and France** in December 2021 was between **0.3 and 1.7 percentage points higher in the lowest income groups** (the lowest quintile for Italy and France and the lowest quartile for Belgium) than it was in the highest income groups in each case. These differentials can mainly be attributed to the rise in energy prices, as expenditure on energy accounts for a larger proportion of poorer households' spending. Avtar et al. (2022) estimate that inflation rates in the US vary across demographic groups. Inflation rates for Hispanic and Black Americans are **0.2 to 0.6 percentage points** higher than the general inflation rate.



#### ▷ BACKGROUND INFO 6

##### Sample survey of household income and expenditure

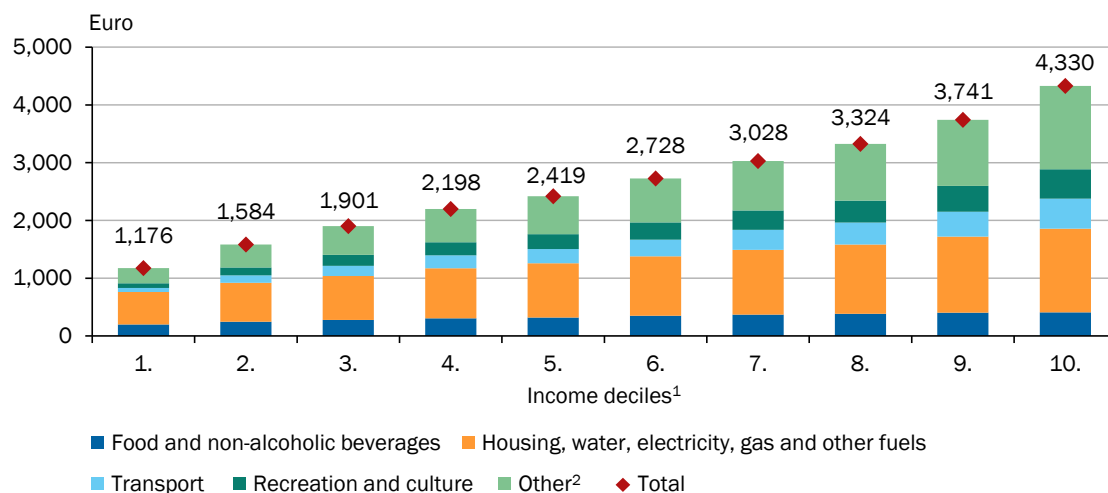
Analysis of the impact of current inflation on different household groups is based on the 2018 sample survey of household income and expenditure (EVS). The EVS

collects **detailed information about private consumption expenditure** on different groups of goods as well as some socio-demographic characteristics of households on monthly net incomes of up to €18,000. For this purpose, about 80,000 households are surveyed on a voluntary basis every five years. They keep a household ledger in which they document all of their expenditures over a period of one quarter. All spending on food, consumer goods and services is recorded. This survey forms the basis for the weighting scheme used in calculations of the consumer price index (CPI).

121. The extent to which households are directly affected by price increases depends on their personal shopping baskets. The weightings of the relevant products in the baskets of goods used to calculate the CPI are determined with the help of the sample survey of household income and expenditure. [↪ BACKGROUND INFO 6](#) The **weightings of the various consumer goods** included in the baskets of goods **vary significantly** according to the **needs-weighted net household income**. [↪ CHART 38](#) Housing and food account for 65 per cent of final consumption expenditure by households in the lowest income decile, while they account for only 43 per cent in the case of households in the highest decile. In contrast, transport, restaurants and accommodation services, and recreation, entertainment and culture account for a larger share in the higher income groups. Assuming that households have not changed their consumption patterns since 2018 against the backdrop of the COVID-19 pandemic and the currently high level of inflation, household-specific inflation rates based on individual baskets can be calculated for September 2022 compared with the same month of the previous year. How high realised inflation for households actually turns out to be depends

[↪ CHART 38](#)

#### Final consumption expenditure by income deciles in 2018<sup>1</sup>



1 – Based on the Sample Survey of Income and Expenditure (EVS) from 2018. Net household incomes are equivalence-weighted according to the modified OECD scale. Average values for income deciles. Based on the Systematic Index of Household Income and Expenditure, 2013 edition (SEA 2013). 2 – Alcoholic beverages, tobacco and narcotics; Clothing and footwear; Furnishings, household equipment and routine household maintenance; Health; Communications; Education; Restaurants and hotels and Miscellaneous goods and services.

Sources: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Einkommens- und Verbrauchsstichprobe 2018 (Grundfile 3), own calculations

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on how much they adjust their purchasing behaviour to reflect the changes in prices. The more households adjust their consumption behaviour in line with price changes, the lower the CPI will be after the weighting scheme has been adjusted.

▾ CHART 39

**Inflation rates of private households in September 2022<sup>1</sup>**  
by purpose of use<sup>2</sup> and household characteristics<sup>3</sup>



1 – Change on the same month of the previous year. Data weighted using extrapolation factors. 2 – Based on the Systematic Index of Household Income and Expenditure, classification in the version applicable to the consumer price index (SEA CPI, base year 2015 = 100). 3 – Based on the Sample Survey of Income and Expenditure (EVS) from 2018. 4 – Net household incomes are equivalence-weighted according to the modified OECD scale. Average values for income deciles. 5 – Classified as either agglomerations, urbanised areas or rural regions. Agglomerations are regions with a population density greater than 300 inhabitants per square kilometre or otherwise they are residential areas with a nearby regional centre that has more than 100,000 inhabitants. Urbanised areas are lower-density residential areas, possibly with a regional centre in the vicinity. Rural areas are residential areas with a low population density and without any regional centre nearby. 6 – Alcoholic beverages, tobacco and narcotics; Clothing and footwear; Furnishings, household equipment and routine household maintenance; Health; Communications; Education; Restaurants and hotels and Miscellaneous goods and services.

Sources: Federal Statistical Office, RDC of the Federal Statistical Office and Statistical Offices of the Länder, Einkommens- und Verbrauchsstichprobe 2018 (Grundfile 3), own calculations  
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122. **Inflation rates** vary between **income deciles** by up to **1.29 percentage points**. ↘ [CHART 39 TOP LEFT](#) The prices for the **baskets** of goods for households in the **lower- and middle-income deciles** have increased **the most**. Inflation rates in the lower-income groups are mainly driven by the higher cost of food and housing – especially higher energy costs. The increased prices of transport and recreation are more significant in the higher-income deciles.

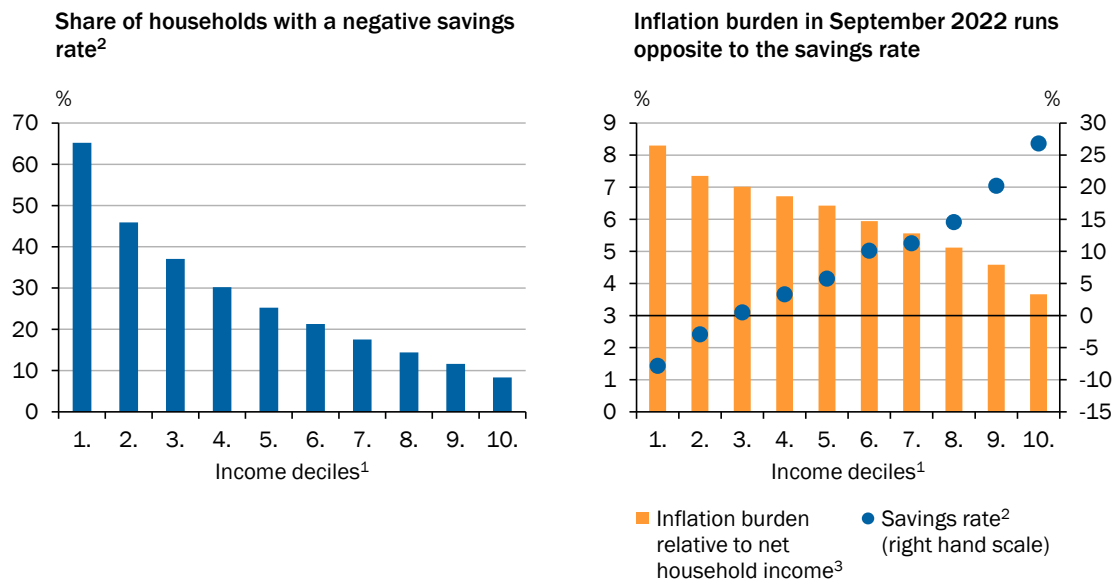
A breakdown by type of region shows that the higher prices of transport, especially fuel prices, have a larger impact on the inflation rate for households in rural areas. ↘ [CHART 39 TOP RIGHT](#) Households in agglomerations have lower inflation rates for residential energy than households outside of them do. Households in agglomerations more often use gas heating or district heating, the prices of which have risen more moderately in relative terms than those of heating oil and solid fuels. The inflation rate for single households is lower than that for households of two or more people. ↘ [CHART 39 BOTTOM LEFT](#) The lower cost of transport for single households outweighs increases in housing costs, so the overall inflation rate is lower than the inflation rate for larger households. The cost of a household's food bill increases in line with the household's size. Households that use **heating oil have to pay the highest energy costs**. These costs have roughly doubled. ↘ [CHART 39 BOTTOM RIGHT](#) **In contrast, the extreme price rises observed in the wholesale markets have not yet fully fed through to natural gas customers.**

123. The financial burden **relative to net disposable income** is **highest** for households on **low incomes**. ↘ [CHART 40 RIGHT](#) Assuming that household incomes increased by 2.9 per cent in line with nominal gross wages between the second quarter of 2021 and the second quarter of 2022, households in the lowest decile would have to spend **8.3 per cent more of their net household incomes** on the consumption of the same basket of goods. In contrast, households in the **highest income decile** would **only** have to spend an additional **3.7 per cent**. If all households faced the same inflation rate, the additional cost would fall to 8.0 per cent in the lowest decile and rise to 4.3 per cent in the highest decile. These variations are mainly due to households' different consumption ratios. For example, households that spend 100 per cent of their net income on consumption have additional expenditure relative to household income that is equal to inflation. According to the EVS, 65 per cent of households in the lowest decile have a saving ratio that is less than or equal to zero. In the top decile it is only 8 per cent. ↘ [CHART 40 LEFT](#) Estimates of the additional financial burden are made without taking relief measures into account. These should reduce the burden for households on lower incomes more in relative terms (Priem et al., 2022). At the same time, earned income accounts for only 21 per cent of gross household income for households in the lowest decile, while public transfer payments account for just under 70 per cent. This ratio is reversed in the case of households in the top decile. Assumptions of a 2.9 per cent increase in income for the lower deciles are therefore optimistic.

The **average disposable income** of households in Germany at the end of 2021 was €3,681 and private consumption expenditure came to €2,507. The additional cost of keeping their consumption constant, with inflation currently at 10 per cent, amounts to €250 per month. If, at the same time, a household receives an increase in disposable income in line with the average net wage rise of 2.9 per cent, this

↘ CHART 40

### Inflation burden and saving ratio of private households by income deciles<sup>1</sup>



1 – Net household incomes are equivalence-weighted according to the modified OECD scale. Average values for income deciles. 2 – Based on the Sample Survey of Income and Expenditure (EVS) from 2018. 3 – Income extrapolated according to change in nominal wages 2021Q2 to 2022Q2.

Sources: Federal Statistical Office, RDC of the Federal Statistical Office and Statistical Offices of the Länder, Einkommens- und Verbrauchsstichprobe 2018 (Grundfile 3), own calculations  
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household has to spend an additional €143 per month on the same basket of goods, which is not covered by wage increases.

- 124.** Households react to rising prices by **changing** their **purchasing behaviour**. They may **reduce the quality** of the products they buy or spend **more time** looking for lower prices. In addition, households buy more store brands from large retail chains, shop more at discounters and take advantage of bulk discounts (Griffith et al., 2009; Argente and Lee, 2021). Low-income households have fewer substitution options to limit the increase in their cost of living, as they already spend a higher proportion of their income on lower-quality products (Argente and Lee, 2021). Moreover, given their low saving ratios, these households have no financial leeway to keep their consumption constant.
- 125.** The greatest **variations in the inflation rates affecting different households** in the current environment can be seen **in the types of heating** used. Inflation is likely to increase further for natural gas customers over the coming months, as the higher prices have not yet been fully passed on to final consumers owing to still running contracts. However, the gas price cap proposed by Germany's Expert Commission on Gas and Heat should provide significant relief for these households. A household with a typical consumption of 20,000 kilowatt hours (kWh) and an energy price of 20 ct/kWh would pay only €2,720 per year instead of €4,000 at a reduced price of 12 ct/kWh on the basic tariff.

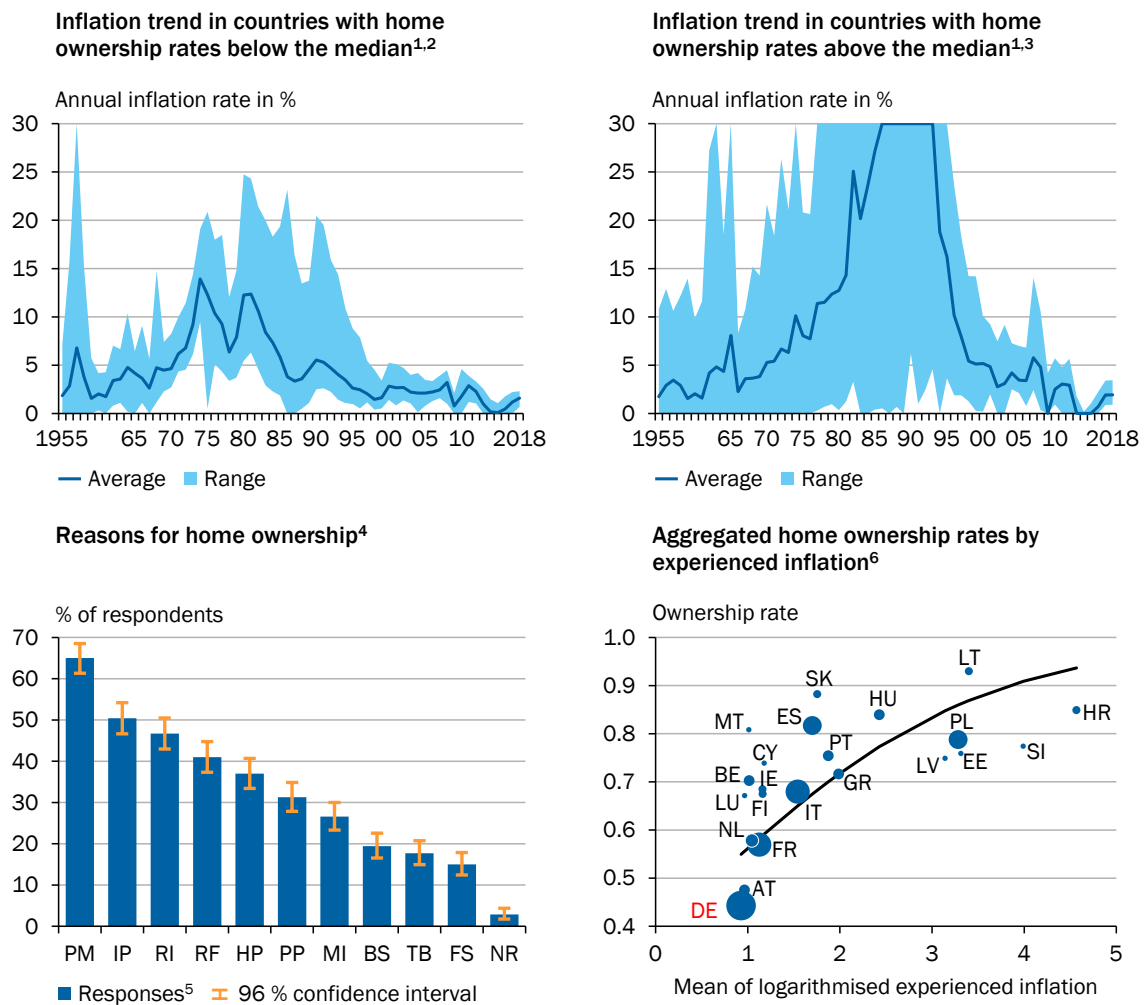
### 3. Long-term behavioural effects of high-inflation phases

126. The current **high inflation** is likely to have **long-term effects** on consumers' **expectations and propensity to consume**. Analysing survey respondents from various EU member states as well as Norway and Turkey between 1973 and 2006, Blanchflower (2007) finds that having experienced periods of higher inflation lowers people's overall satisfaction in the long run.
127. A growing literature also shows that **personal experiences** based on past economic developments **influence** households even years later (Malmendier, 2021). Malmendier and Nagel (2016) find that individual **inflation expectations** are persistently shaped by the inflation rates that people have experienced over their lifetimes. It is true that people give greater weight to more recent experiences. However, the long-term effects of inflation experienced decades ago, such as the oil price shocks of the 1970s and 1980s, have also been demonstrated. In general, the inflation expectations of younger people in particular are likely to be more strongly influenced by current inflation dynamics because of their shorter life experience to date.
128. Previous **experience of inflation** also **influences long-term investment decisions**. Botsch and Malmendier (2020) find in the United States, for example, that people's decision on whether to take out variable-rate or fixed-rate mortgages depends on the long-lasting effects of high inflation in the 1970s and 1980s. Experience of high inflation makes borrowers wary of variable-rate mortgages, which is particularly disadvantageous for poorer and younger households who have limited access to fixed-rate loans. Furthermore, Malmendier and Steiny Wellsjo (2022) show that past experience of inflation is highly relevant to home ownership decisions both within and across countries. Household data from 22 European countries show that inflation has been significantly higher in countries where the home ownership rate is higher than the median home ownership rate in the group of countries considered. ↘ [CHART 41 TOP LEFT AND RIGHT](#) Asked in recent surveys, homeowners often cite protection against inflation as a key motive for buying a home. ↘ [CHART 41 BOTTOM LEFT](#) Fitting a logit regression to country averages confirms that there is a positive relationship between experienced inflation and home ownership within countries. ↘ [CHART 41 BOTTOM RIGHT](#) Immigrants' experience of inflation in their home country seems to influence their decision to buy a home in the country to which they emigrate, even if there is no relationship between the macroeconomic conditions in the countries concerned. Overall, there is a risk of a significant misallocation of resources.
129. Phases of high inflation also influence **people's attitudes towards inflation-stabilising policy measures**. Malmendier et al. (2021) find, for example, that personally experiencing periods of high inflation influences central bankers' opinions in the long run. In general, Shiller (1997) and Ehrmann and Tzamourani (2012) find that people who have experienced higher inflation rates have a greater preference for inflation-stabilising policy measures. While the impact on preferences decreases after ten to fifteen years for moderately high inflation rates, periods of high inflation have lasting effects.

This fear of inflation may be an expression of the experience gained from the hyperinflation during the Weimar Republic in 1923, which in turn shaped the monetary policies pursued by Deutsche Bundesbank (Hayo, 1998; Issing, 2005; Beyer et al., 2013). Having analysed how the collective memory of hyperinflation has impacted on Germans' fear of inflation, however, Haffert et al. (2021) find that the hyperinflation of 1923 is also associated with other economic crises of the time, such as the high level of unemployment during the Great Depression.

CHART 41

Higher home ownership rates in EU member states with higher experienced inflation



1 - Based on the average country-specific home ownership rate across all three Household Finance and Consumption Survey (HFCS) waves. 2 - Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands. 3 - Croatia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia, Slovenia, Spain. 4 - Survey of 700 owners in Germany, Ireland, Italy, Portugal and Spain. 5 - Responses to the question: „What do you think are good reasons for buying a home?“. PM-Peace of mind, IP-Inflation protection, RI-Rent increase, RF-More remodelling flexibility, HP-House price increase, PP-Predictable payments, MI-Low mortgage interest rates, BS-Better selection, TB-Tax benefits, FS-Forced savings, NR-None of the above reasons. 6 - AT-Austria, BE-Belgium, CY-Cyprus, DE-Germany, EE-Estonia, ES-Spain, FI-Finland, FR-France, GR-Greece, HR-Croatia, HU-Hungary, IE-Ireland, IT-Italy, LT-Lithuania, LU-Luxembourg, LV-Latvia, MT-Malta, NL-Netherlands, PL-Poland, PT-Portugal, SI-Slovenia, SK-Slovakia. Size of dots are relative to population. The line shows the population-weighted logit fit of a regression of the home ownership on the country average of log experienced inflation.

Source: Malmendier and Steiny Wellsjo (2022)  
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130. Balderston (1985) claims that one major consequence of **hyperinflation** was people's **uncertainty** about **future price stability**. Uncertainty about the future values of assets and contracts caused wage growth to surge between 1924 and 1929. According to the author, this considerable uncertainty impaired the performance of the stock market, which contributed to the severity of the 1929 depression as the result of a low investment ratio. Galofré-Vilà (2021) finds that hyperinflation affected **voting behaviour** in the late 1920s and early 1930s and had a **negative impact on health**, primarily by raising mortality among the population. This increased the share of the vote for the Social Democrats and for the People's Rights Party, which was a party for victims of inflation. Although the high inflation during this period fuelled anti-Semitism, Galofré-Vilà (2021) finds no evidence that hyperinflation increased the number of votes cast for the National Socialist party. Whilst the current inflation dynamics are not comparable to hyperinflation, these estimation results suggest potential effects in other key areas such as healthcare and political attitudes. These are likely to be relevant to any decisions on the decisiveness of the response to rising inflation.

## IV. MEASURES TO COMBAT INFLATION

131. Monetary policy faces the challenge that the current high level of inflation is partly due to supply-side disruptions. These disruptions have a negative impact on economic performance, and the adoption of restrictive monetary policy to contain inflation places an additional strain on the real economy. Nevertheless, a **firm monetary policy response** is **necessary** to reduce inflationary pressures, prevent any de-anchoring of inflation expectations and maintain the ECB's credibility. [▶ ITEM 139](#) Economic policy options at the **national level** are likely to be rather limited in terms of their lasting influence towards inflation reduction. Fiscal measures should be moderate and targeted so as not to exacerbate inflationary pressures. The primary objective of fiscal policy should therefore be to cushion the **financial burden on lower- and middle-income households and to support firms that are viable in the medium term**. [▶ ITEM 153](#)

### 1. Monetary policy assessment

132. According to the ECB's latest projections (2022a), inflation is likely to remain **high** for some time, driven mainly by supply-side disruptions and foreign demand. [▶ BOX 6](#) Negative supply shocks, which partly result from the deterioration in the terms of trade, pose a challenge for monetary policy as they increase prices while reducing output. Unlike a demand shock, which raises prices and output, a supply shock makes the central bank's response more difficult as it will further reduce aggregate demand, and thus negatively impact the real economy. Given its **mandate** [▶ BACKGROUND INFO 7](#), the **ECB** must nevertheless take decisive action to **maintain price stability** in order to move inflation rates back to its inflation target of 2 per cent over the medium term.

133. Overly **hesitant action by the ECB could require** an even **stronger response in the future** if inflation expectations become unanchored and the risk of a wage-price spiral grows. The pricing and wage-setting behaviour of firms and workers changes during phases of high inflation. This can trigger self-reinforcing processes that increase the persistence and dynamics of the inflation process (BIS, 2022; pages 41 ff.). The economic costs of fighting inflation rise with the duration of the phase of high inflation. In contrast, if monetary policy is too restrictive in the short term, additional successive easing in the medium term will be an option. Consequently, a swift and decisive response by the central bank is likely to be the preferred option rather than hesitant tightening of monetary policy. [↪ ITEM 139](#)



[↪ BACKGROUND INFO 7](#)

### Mandates of the ECB and the Federal Reserve (Fed)

According to Article 127 of the Treaty on the Functioning of the European Union (TFEU), the primary objective of the European System of Central Banks (ESCB), and thus of the ECB, is to **maintain price stability**. Without prejudice to the objective of price stability, monetary policy shall support the general economic policies of the European Union with a view to contributing to the achievement of the objectives laid down in Article 3 of the Treaty on European Union (TEU), such as balanced economic growth, full employment and environmental protection. The ECB is therefore **not allowed to pursue any other objectives at the expense of price stability** (Ioannidis et al., 2021). The ECB's mandate thus differs from the dual mandate of the US Fed. While for the ECB price stability has priority and other objectives are subordinate to it, the Fed's job is to guarantee both price stability and a high level of employment in the long term (Ivanac-Lillig, 2020).

134. The rise in inflation rates started earlier in the United States than in the euro area as a result of the faster re-opening of the US economy after the pandemic and the swifter economic recovery. [↪ BOX 9](#) [↪ ITEM 4](#) Accordingly, the **US Federal Reserve** adjusted its communication as early as autumn 2021 in response to ongoing inflationary pressures and the strength of the labour market. Despite its dual mandate [↪ BACKGROUND INFO 7](#), **the Fed raised its key policy rate** and discontinued its net asset purchases in **March 2022**, even though the output gap, i.e., the difference between GDP and potential output, was still estimated to be negative (BEA, 2022; CBO, 2022). The Fed emphasized its commitment to the **unconditional restoration of price stability**, as a necessary step to maintain a robust labour market (Fed, 2022). In addition, the Fed emphasises that high inflation puts the greatest burden on those who are most vulnerable.

[↪ BOX 9](#)

### Comparison of economic recovery and inflation in the US and the euro area

After the first wave of the pandemic in spring 2020, **inflation in the US rose faster than in the euro area**. The overall inflation rate, as measured by the consumer price index for all urban consumers, exceeded 2 per cent in the United States as early as March 2021. This was not the case in the euro area, as measured by the HICP, until July 2021. Since rising inflation in the US is driven more by domestic demand, the core rate has exceeded 2 per cent since April 2021,

whereas in the euro area this occurred only in November 2021. More recently, however, the level of overall inflation has differed only slightly between the US and the euro area. While, in September 2022, it was higher in the euro area (9.9 per cent year on year) than in the US (8.2 per cent) [↪ ITEM 15](#), most recently, the core inflation rate was significantly higher in the US, at 6.6 per cent, than in the euro area, where it was 4.8 per cent.

One **reason** for the **different inflation dynamics** is the euro area's heavy **reliance on Russian energy carriers**, especially natural gas. Supplies of this gas have been squeezed as a result of Russia's invasion of Ukraine. [↪ ITEMS 22 AND 283](#) [↪ CHART 42 TOP LEFT](#) The higher level of core inflation in the **US** can partly be explained by the more acute **labour shortage** compared to the euro area, which has translated into higher wage growth (Fed, 2022; Ferguson, 2022). For example, wage growth in the US was around 5.2 per cent in the second quarter of 2022, [↪ CHART 42 BOTTOM LEFT](#), whereas wages in the euro area rose by only 4.0 per cent. [↪ ITEM 33](#) In addition, unit labour costs per person in the US in the second quarter of 2022 were 15.2 per cent above their pre-pandemic level (fourth quarter of 2019), while the corresponding increase in the euro area was only 6.1 per cent.

The acute **labour shortage** in the **US** is probably partly due to the fact that **fewer employment protection measures were taken** in the US than in the euro area, especially in 2020. Owing to changes in general economic conditions, some workers withdrew from the labour market altogether after the pandemic-related restrictions were lifted. Small firms were provided with loans amounting to almost 800 billion US dollars under the Paycheck Protection Program (PPP). This was intended to enable them to continue paying wages, rehire laid-off workers and cover overhead costs (SBA, 2021). Nonetheless, many jobs were terminated, which pushed up the unemployment rate in the US to 13 per cent in the second quarter of 2020. [↪ CHART 42 TOP RIGHT](#) Granja et al. (2020) conclude that firms often used these loans to make non-wage fixed payments and build up a financial cushion rather than to protect jobs. Another much-discussed reason is the 600 US dollars (per week) increase in unemployment benefits for workers affected by the COVID-19 pandemic from April to July 2020 (Garnadt et al., 2021). Once the pandemic-related restrictions had been lifted, the unemployment rate in the US fell sharply and is now back to its pre-pandemic level of around 3.5 per cent (as of September 2022). However, employment and participation rates are still slightly below their pre-pandemic levels, and **job vacancy rates are significantly higher** than they were before the pandemic, which is a clear sign of labour shortages. [↪ ITEM 15](#) The reduced labour supply is mainly due to higher savings, more early retirements during the pandemic, a shortage of attractive jobs, low pay and lack of access to childcare (Ferguson, 2022). In addition, between 1.8 million and 4.1 million workers are expected to be inactive owing to long-term effects of coronavirus infection (Bach, 2022).

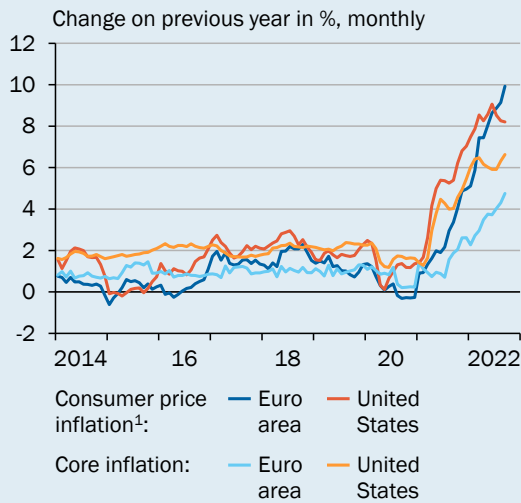
In contrast, EU member states introduced or expanded job retention programmes. In particular, short-time working schemes were widely implemented, significantly reducing the increase in the unemployment rate. [↪ CHART 42 TOP RIGHT](#) The number of people in employment in the euro area is now actually slightly above its pre-pandemic level from the fourth quarter of 2019. Nevertheless, there are signs of labour shortages in the euro area as well, albeit with substantial regional variations. Following the economic recovery in the wake of the COVID-19 pandemic, unemployment fell to its **lowest level since the monetary union began**, and job vacancy rates are at their highest level since data were first collected in 2006.

In addition, **fiscal policy** in the US has provided much stronger demand stimuli than in the euro area to stabilise incomes, which is likely to have been a significant **driver of inflation** in the US (Agarwal and Kimball, 2022; Cochrane, 2022). For example, there has been a substantial increase in spending on unemployment assistance, which totalled about 894 billion US dollars in 2020 and 2021 (U.S. Department of Labor, 2021). Furthermore, the government made direct transfer payments, about 1,200 US dollars per person in April 2020, 600 US dollars per person in December 2020 and January 2021, and 1,400 US dollars per person in March 2021. In total,

CHART 42

Economic recovery started earlier in the United States than in the euro area

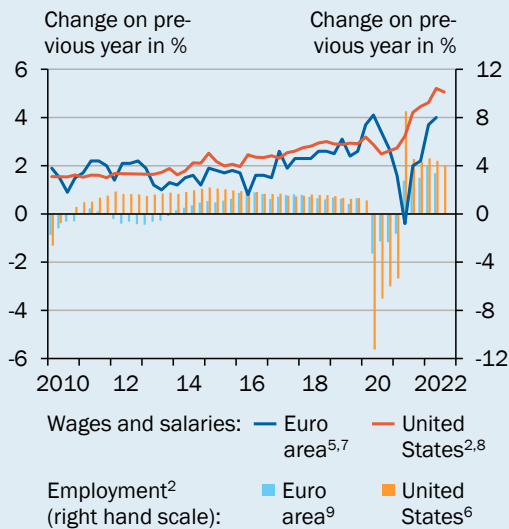
Inflation at a high level



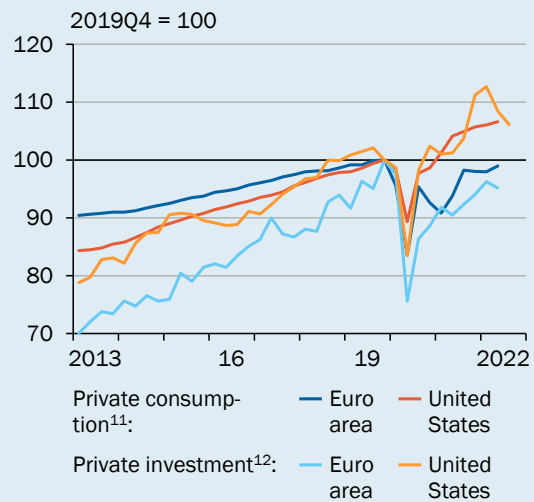
Falling unemployment rates and high job vacancy rates<sup>2</sup>



Employment growth and significant wage increases



Differing recovery of private expenditure<sup>10</sup>



1 - HICP for the euro area; CPI for All Urban Consumers for the United States. 2 - Seasonally adjusted. 3 - Unemployed aged 15 to 74 years as a share of the total labour force. 4 - Unemployed aged 16 years and over as a share of all civilian labour force not residing in institutions e.g. penal and mental facilities, homes for the aged. 5 - In industry, construction and services (except activities of households as employers and extra-territorial organisations and bodies). 6 - Excluding agriculture, private household employees, employees at non-profit organisations and non-civilian employees of the military (nonfarm). 7 - Seasonally and calendar-adjusted. 8 - For all civilian workers in all sectors and occupations. 9 - Aged 15 to 74. 10 - Seasonally and calendar-adjusted for the euro area, seasonally-adjusted for the United States. 11 - Final consumption expenditure of households and non-profit institutions serving households. 12 - Capital formation of corporations and non-profit institutions serving households.

Sources: BLS, Eurostat, Fed, own calculations  
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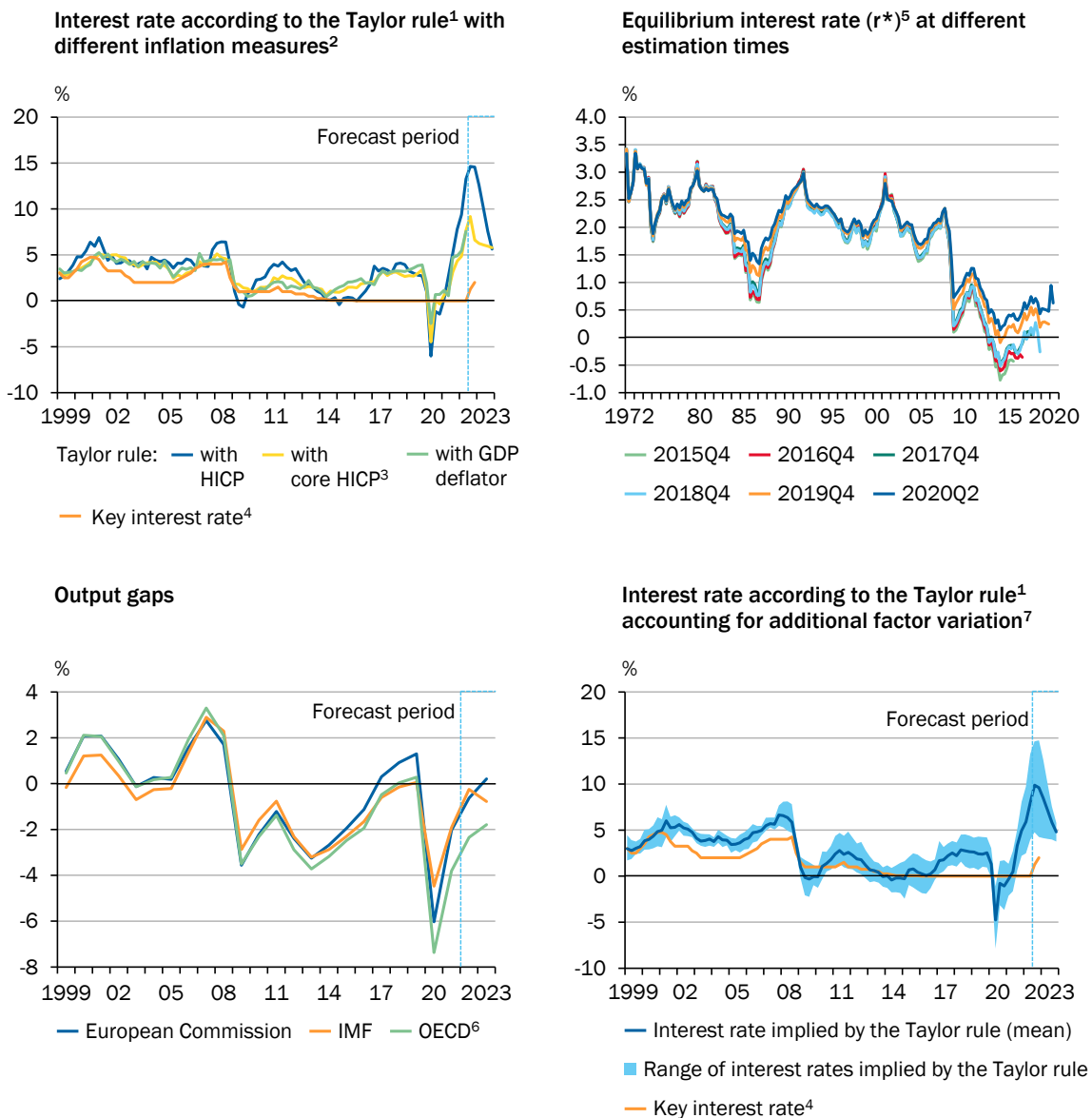
some 4.6 trillion US dollars has been made available in the US for measures to combat the consequences of the COVID-19 pandemic, 4.0 trillion US dollars of which have already been spent (USAGov, 2022; USAspending, 2022). Total US government spending as a share of GDP rose from 35.7 per cent in 2019 to 45.3 per cent and 42.4 per cent in 2020 and 2021, respectively. In the euro area, total government expenditure as a share of GDP increased from 46.9 per cent to 53.4 per cent and 52.3 per cent respectively over the same period. Overall, these factors likely contributed to a **much sharper recovery** in **private consumption** and **capital formation in the US** than in the euro area, [↘ CHART 42 BOTTOM RIGHT](#) but also to the stronger increase in core inflation in the US than in the euro area.

### Interest rate rules imply the need for decisive monetary policy response in the euro area

- 135.** Simple central bank reaction functions (**interest rate rules**) provide benchmarks for the extent of **monetary policy tightening** that would be sufficient to combat high inflation. Interest rate rules relate the key policy rate to key economic variables. The US Federal Reserve uses various reaction functions as indicators of its monetary policy stance, such as the Taylor rule, the balanced-approach rule and the first-difference rule (Fed, 2022). Simple interest rate rules have also been used in the past to analyse monetary policy in the euro area (Blattner and Margaritov, 2010; Orphanides and Wieland, 2013; GCEE Annual Report 2016 items 410 ff; GCEE Annual Report 2017 items 355 ff; GCEE Annual Report 2019 items 56 ff). Back in 2013, the then ECB President Mario Draghi emphasised the role played by reaction functions in the ECB's interest rate decisions (Draghi, 2013).
- 136.** The best-known interest rate rule – the **Taylor rule** (Taylor, 1993) – has been used in the past to describe monetary policy in the US between 1987 and 1992 and is currently part of the interest rate rules used by the US Federal Reserve for monetary policy analysis (Fed, 2022). It relates the key policy rate to some key economic variables. Taylor (1993) points out that in a multi-country macroeconomic model where monetary policy follows the Taylor rule, fluctuations in inflation and output are comparatively small. Furthermore, Taylor (2012) argues that following an interest rate rule roughly equivalent to the Taylor rule has generally resulted in good economic performance with few and only mild recessions and lengthy economic expansions in the US between 1985 and 2003.
- 137.** The Taylor rule justifies an interest rate hike for the euro area already during the economic recovery in the second half of 2021. [↘ CHART 43 TOP LEFT](#) Because Russia's war of aggression has further fuelled inflation, there was a significant discrepancy between the Taylor interest rate and the key policy rate in the first half of 2022. Consequently, the discontinuation of asset purchases and the **normalisation of monetary policy – as well as the subsequent interest rate hikes** totalling 200 basis points – are consistent with the prescription of the interest rate rules. Looking ahead, the interest rate rules suggest that additional rate hikes are likely to be necessary to ensure that inflation returns to its target. [↘ CHART 43 TOP LEFT AND BOTTOM RIGHT](#) The decline in the Taylor interest rate over the forecasting period is mainly due to the fall in inflation rates forecast by the ECB. Should the euro area

CHART 43

Monetary policy rules and equilibrium interest rate in the euro area



1 - Equation:  $i = 2 + \pi + 0,5(\pi - \pi^*) + 0,5y$ .  $i$  is the interest rate implied by the Taylor rule for the money market; it depends on the real interest rate in long-term equilibrium (estimated at 2%), the current inflation rate in deviation from the central bank's target,  $(\pi - \pi^*)$ , and the output gap,  $y$ . 2 - Based on data from ECB real-time database and AMECO. 3 - HICP excluding energy and unprocessed food. 4 - Main refinancing operations rate. 5 - Equilibrium interest rate according to the method of Hoston et al. (2017); source New York Fed (2022b). No estimates have been published since 2020Q3, therefore the assumption has been made that the equilibrium interest rate has been 0.5% since then, which is roughly the average since 2015Q1. 6 - Refers to 17 member states (excluding Malta and Cyprus). 7 - Refers to the euro area with 19 member states. The calculation is based on all combinations of three inflation measures (HICP, core HICP and GDP deflator), three output gaps (AMECO, IMF and OECD) and two different equilibrium interest rates (2% constant and floating  $r^*$  following Holston et al. (2017)). The core HICP was approximated by the HICP excluding energy and unprocessed food (time-varying country composition) for the period between 1999 and 2001.

Sources: ECB, European Commission, Fed, IMF, OECD, own calculations  
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economy indeed weaken and reduce domestic inflationary pressures over the coming quarters, this would also result in a lower Taylor interest rate.



138. Another factor in Taylor rule calculations is the equilibrium interest rate used. In the past it has been argued that the real equilibrium interest rate has fallen owing to demographic trends, slowing productivity growth and global factors (Holston et al., 2017), thereby implying a lower Taylor interest rate (Yellen, 2016). Indeed, estimates show that the **equilibrium interest rate for the euro area** may have **fallen** since the beginning of the financial crisis (New York Fed, 2022b). However, over time, these numbers had to be revised significantly. ↘ CHART 43 TOP RIGHT That is, the equilibrium interest rate is likely to have fallen less than estimates based on real-time data suggest. Furthermore, estimation uncertainties with respect to the output gap also affect the Taylor interest rate. ↘ CHART 43 BOTTOM LEFT If the HICP is used as a potential determinant, the Taylor interest rate rises immediately and steeply. If the GDP deflator and core inflation are used, the increases are more moderate and, in some cases, slightly delayed. ↘ CHART 43 TOP LEFT However, **despite considerable quantitative**

**variations in the factors used to apply the Taylor rule**, all three measures of inflation – the HICP, the GDP deflator and core HICP – indicate a significant rise in the Taylor interest rate into the 4.8 per cent to 14.6 per cent range even with a lower equilibrium interest rate and larger negative output gap, suggesting the need for **strong monetary policy tightening**. ↘ CHART 43 BOTTOM RIGHT

139. The massive quantitative easing measures taken as a monetary policy response to the slump in economic performance during the COVID-19 pandemic are also consistent with the interest rate rules. Given the strong recovery from the second quarter of 2020 onwards, however, the rules would have justified a **tightening of monetary policy** as early as the **first half of 2021**. Nonetheless, there may be reasons to deviate from the interest rate rules. This was the case, for example, in October 1987, when the Fed provided additional liquidity to the banking system after the stock market collapsed (Taylor, 1993), and during the financial crisis that began in 2008. In general, however, too weak a monetary policy response to rising inflation has had negative macroeconomic consequences in the past. Taylor (2007, 2013) shows, for example, that in both the 1970s and the period before the financial crisis the key policy rate in the US was significantly below the Taylor rate. Following the de-anchoring of inflation expectations in the 1970s owing to the inadequate response to rising inflation, the central bank had to react in the early 1980s by raising its key policy rate all the more sharply in order to stabilise inflation.

### Current monetary policy decisions in the euro area

140. Given the high inflation, the **ECB began to raise its key interest rates sharply in July 2022**. This ended the negative interest rate policy that had been in place for about eight years. At 50 basis points the increase was larger than had been announced. The ECB justified this move by citing the materialisation of inflation risks since the June 2022 meeting. At the same time, the ECB switched to a meeting-by-meeting approach to interest rate decisions and abandoned the principle of forward guidance. The ECB raised its key interest rates by 75 basis points at each of its two subsequent meetings in September and October 2022. It has therefore substantially reduced its degree of monetary policy accommodation,

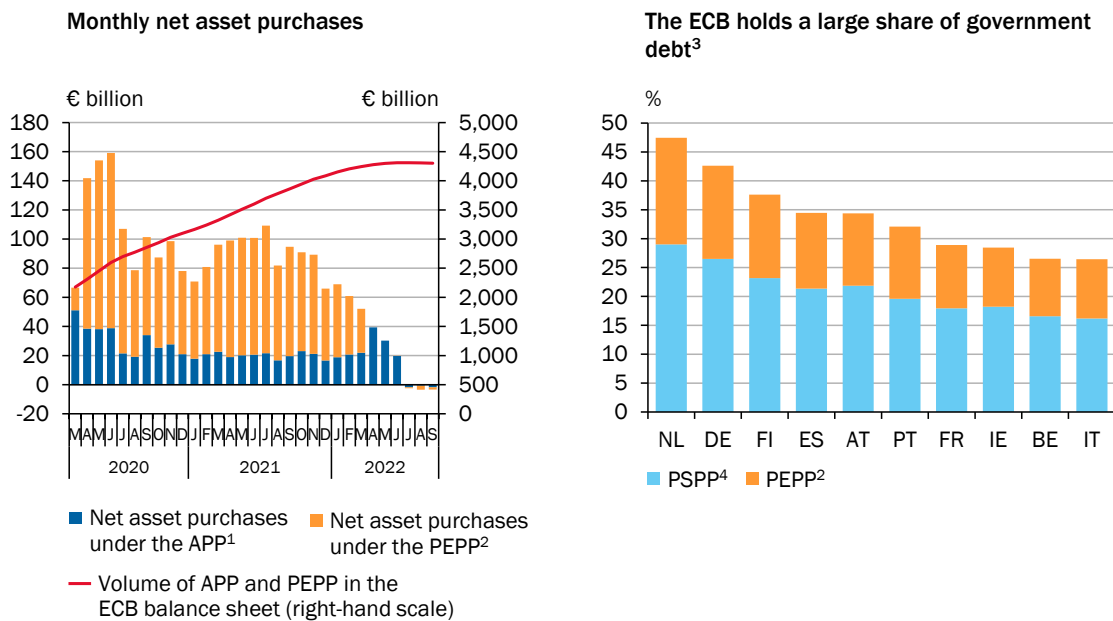


which should ensure a timely return to its inflation target of 2 per cent. Furthermore, the Governing Council of the ECB expects further interest rate hikes to follow. At its October meeting the Governing Council also decided to adjust the interest rates applicable to the third series of targeted longer-term refinancing operations (TLTRO III) and to index them to the average of the ECB's relevant key policy rates. Moreover, the ECB is offering banks additional dates for voluntary early repayment. The minimum reserves that credit institutions hold with the Eurosystem are remunerated at the ECB's deposit facility rate in order to better align them with money market conditions.

141. At its June 2022 meeting the Governing Council of the ECB confirmed that it intended to continue to reinvest the principal payments of securities purchased under the PEPP at maturity until at least the end of 2024 (ECB, 2022c). In addition, the Governing Council decided to **invest the principal payments** of the securities purchased under the PEPP **flexibly across** asset classes and **member states** in the event of renewed market fragmentation due to the pandemic (ECB, 2022c). When net securities purchases under the PEPP were discontinued at the end of March 2022, the PEPP portfolio amounted to just under €1,700 billion, of which slightly less than €1,650 billion was in public-sector bonds. Including the securities purchased under the Public Sector Purchase Programme (PSPP), the total volume of public-sector bonds as at 1 July 2022 – when all securities purchase programmes were discontinued – amounted to a total of €4,287 billion, which was equivalent to just under 35 per cent of euro area GDP. [↪ CHART 44 LEFT](#)
142. The total consolidated volume of public-sector bonds purchased by Eurosystem central banks under the PSPP and PEPP **exceeds 33 per cent of the total public debt** of each of **several** euro area **member states** and has continued to grow year on year across all countries. [↪ CHART 44 RIGHT](#) In terms of the total volume of public-sector debt securities eligible for purchase the proportion might be even higher (GCEE Annual Report 2021 item 159).
143. The volume of government bonds held by the ECB as a proportion of a country's total debt is highest for the Netherlands at around 47.5 per cent and lowest for Italy at around 26.5 per cent. Moreover, the volume of securities held by the ECB under the PSPP and PEPP exceeded more than 33 per cent of total public debt for more than just comparatively low-debt countries such as the Netherlands, Germany and Finland. A relatively high proportion of public debt held by the central bank could indicate a risk posed by the **dominance of fiscal policy over monetary policy ('fiscal dominance')**. In that case, the central bank would be under pressure to accommodate fiscal deficits by using additional monetary policy easing to ensure the sustainability of public debt. This could prevent any necessary monetary policy tightening and would run counter to the ECB's mandate and its primary objective of price stability (GCEE Annual Report 2021 item 152).
144. In 2015, the ECB set the limit for government bonds held by the Eurosystem under the PSPP at 33 per cent of a country's total debt (ECB, 2015). This **limit is intended to** ensure the **smooth functioning of the bond market and to remove** any **obstacles to** member states' potential **debt restructuring programmes**. The reason for this limit is that, since 2013, government bonds issued

↳ CHART 44

Share of euro area member states government debt held by the ECB increased further



1 – Asset Purchase Programme. 2 – Pandemic Emergency Purchase Programme. 3 – Euro area member states government debt held by the Eurosystem central banks under the PSPP and PEPP as a share of general government debt of each member state. The general government debt is based on Eurostat data referring to the consolidated general government debt. Since the amount of government debt of a country that is eligible for purchase under the PSPP and PEPP is not provided by the central banks, there may be deviations from the information shown here. Data as at 2022Q2. NL-Netherlands, DE-Germany, FI-Finland, ES-Spain, AT-Austria, PT-Portugal, FR-France, IE-Ireland, BE-Belgium, IT-Italy. 4 – Public Sector Purchase Programme.

Sources: ECB, Eurostat, own calculations  
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in the euro area have had uniform debt restructuring clauses that require a majority of at least two-thirds of the bondholders. The ECB’s consent would therefore be required for the debt restructuring of any member state in which the ECB holds more than 33 per cent of its debt. However, such consent to the restructuring of a member state’s debt could be considered illegal monetary government financing on the part of the ECB (Grund and Grle, 2016).

145. In March 2020 the Governing Council of the ECB stated that, under the PEPP, it might be **necessary to exceed these self-imposed limits in order to** fulfil its own mandate and ensure symmetric monetary policy transmission (ECB, 2020). Grund (2020) concludes that, from a legal perspective, the programme is compatible with current EU law. In contrast, Whelan (2022) argues that the large proportion of government bonds held by the Eurosystem – in addition to new legal disputes over the legality of the purchase programmes – could impair the effectiveness of the Outright Monetary Transactions (OMT). Consequently, there might be a risk that the ECB – either in reality or in the expectations of financial market participants – would not be able to purchase a member state’s government bonds during a sovereign debt crisis for legal reasons. This could jeopardise the expectation-stabilising effect of the OMT programme as a last resort (GCEE Special Report 2020 item 184) during future sovereign debt crises.

146. The establishment of a new **Transmission Protection Instrument (TPI)** was announced (ECB, 2022d) at the same time as the frontloaded, higher than announced interest rate hike in July 2022. The wording of the ECB's explanatory notes stated that, as monetary policy continues to return to normal, monetary policy transmission in the euro area might potentially be disrupted by 'unwarranted or disorderly' market dynamics. In particular, the interest rate on public-sector securities issued by an affected member state could rise higher than would appear justified on the **basis of current key policy rates and the macroeconomic performance** of the member state concerned. If the ECB considers the transmission mechanism to be impaired, the newly created **TPI** can be used to make net securities purchases in affected member states. This could reduce the interest rate payable on securities and increase the financing options available to highly indebted countries.

The TPI enables the ECB to purchase unlimited amounts of euro area member states' government debt securities with a residual maturity of one to ten years in the **secondary market. However, use of the TPI is subject to certain conditions.** In addition to a number of discretionary criteria, these include the requirement that the European Commission must not have initiated proceedings against the respective member state owing to fiscal deficits or macroeconomic imbalances (ECB, 2022d). Furthermore, the ECB does not rule out the possibility that corporate bonds will be purchased as well. However, flexibility in reinvesting the principal payments of maturing securities purchased under the PEPP is to remain the primary tool for mitigating pandemic-related risks to the transmission mechanism.

147. Should the government debt securities of individual member states become the object of unwarranted or disorderly market dynamics as a result of speculative attacks, the TPI could in principle be a **useful instrument** for stabilising the euro area. However, it must be ensured that **this does not compromise the ECB's price stability objective.** Nonetheless, the ECB announced in 2021 that **bonds would not be purchased** in parallel with the **normalisation of monetary policy** (ECB, 2021). Considering the use of this option now might affect the ECB's **credibility.** Furthermore, both the unclear characterisation of the impairment of monetary policy transmission and the design of the TPI raise questions that might need to be answered if the instrument were to be used. In particular, the exact conditions under which the ECB would use the instrument are not transparent.

In addition, further net public-sector bond purchases could increase the risk of **fiscal dominance.** The prospect of the ECB purchasing further government bonds issued by highly indebted euro area member states might reduce the incentive for national governments to cut their public debt. In order to make the TPI incentive-compatible, the ECB has held out the prospect of conducting bond purchases under the TPI only under certain conditions.

148. Use of the TPI should be carefully weighed against the risks mentioned above. Currently there is no discernible departure from fundamentally justified public funding conditions in the euro area (Bernoth et al., 2022). Should an unjustified

funding situation arise in individual euro area member states, for example owing to **debt sustainability concerns**, all national and European measures intended for this purpose must first be taken to improve funding conditions.

Use of the TPI seems particularly worth considering if the euro area's continued existence or fundamental composition were at risk. The mere **announcement of the TPI** may have helped to **prevent speculation** about individual euro area member states. There is evidence that the announcement of a similar instrument – the OMT programme in 2012 – had comparable effects (Ehrmann and Fratzscher, 2017; Afonso et al., 2018).

## Interim monetary policy summary

149. The ECB's **strong monetary policy response** since July 2022 is **justified** in order to lower inflationary pressures, prevent a de-anchoring of inflation expectations and maintain the ECB's credibility. The ECB has, **substantially reduced** its degree of **monetary policy accommodation** by deciding to raise key interest rates recently. Given the prospect of continued significantly elevated core inflation rates, further interest rate hikes are likely to be necessary. In the event of an insufficiently strong monetary policy response or a de-anchoring of inflation expectations, an even more decisive central bank response would be needed in future to stabilise inflation. On the other hand, there is a risk of excessive tightening given an expected economic slowdown and the potentially earlier disappearance of supply-side disruptions, which have so far had moderate second-round effects. Monetary policy should therefore also **take cyclical trends into account as long as this can be reconciled** with the primary objective of **price stability**. Given the high level of inflation and the uncertain economic environment, it seems sensible to make interest rate decisions on a meeting-by-meeting basis depending on the data situation.
150. The ECB's recently created **Transmission Protection Instrument** for the euro area (TPI) could prove **helpful** in preventing unwarranted or disorderly market dynamics, as long as it does not compromise the price stability objective. It remains an open question whether the TPI is the most appropriate solution for this.

## 2. Accompanying measures

151. To cushion the impact of sharp **rises in energy prices**, all member states in the EU have implemented **fiscal relief measures**. [↘ TABLE 15](#) Most member states have reduced energy taxes or VAT on energy, or have made transfer payments to vulnerable groups. [↘ ITEM 211](#) A significant number of member states have also regulated the prices of individual goods. Most of these measures have been applied to retail prices. However, France, Portugal, Spain and Malta have introduced wholesale price regulations.

152. In Germany, too, a number of wide-ranging measures were adopted to reduce the financial burden on households and firms. [▶ ITEM 181](#) For example, the **final prices of fuels** used in road transport were temporarily **reduced** from June to August 2022 in the form of a tax cut. At the same time, the introduction of the **nine-euro ticket** subsidised the **use of public transport** nationwide from June to August 2022. In addition, individuals received transfer payments as part of several relief packages. [▶ ITEM 181](#) Although there were significant risks, based

▶ TABLE 15

EU member states react to inflation with different relief measures<sup>1</sup>

	Reduced energy tax/VAT	Retail price regulation	Wholesale price regulation	Transfers to vulnerable groups	Mandate to state-owned firms	Windfall profits tax/regulation	Business support	Other
Austria	■	■		■			■	■
Belgium	■	■		■		■	■	■
Bulgaria	■	■		■		■	■	
Croatia	■			■			■	■
Cyprus	■			■	■			
Czechia	■	■		■	■	■	■	■
Denmark	■	■		■				■
Estonia	■	■		■			■	
Finland	■			■			■	■
France	■	■	■	■	■		■	■
Germany	■	■		■		■	■	■
Greece	■			■	■	■	■	
Hungary	■	■				■	■	
Ireland	■			■			■	■
Italy	■			■		■	■	
Latvia	■			■			■	
Lithuania		■		■			■	■
Luxembourg	■	■		■			■	
Malta			■		■			
Netherlands	■	■		■		■		
Poland	■	■		■			■	
Portugal	■		■	■	■	■	■	
Romania	■	■		■		■	■	
Slovakia	■	■		■	■	■		
Slovenia	■			■		■	■	
Spain	■	■	■	■		■	■	
Sweden	■			■				■

1 - ■ = Measures have been discussed by important actors in civil society, such as political parties, but no formal action has been taken to implement them. ■ = Measures have been publicly announced by high government officials, such as ministers. ■ = Measures have already been implemented. As at 26 October 2022

Source: Updated version of Sgaravatti et al. (2021)

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on past experience, that some of the **fuel tax cuts** would not be passed on to consumers (Montag et al., 2021), various studies came to the conclusion that the **tax reduction** was **largely passed on** (Dovern et al., 2022; ifo Institute, 2022b; Montag et al., 2022; RWI, 2022). However, these findings should be interpreted with caution for two reasons. First, the tax cut was so significant that this could have had a positive impact on prices in neighbouring European countries. Comparisons of prices before and after the tax cut in Germany and neighbouring countries (as was done in the studies cited) would therefore result in an overestimation of the pass-through of these price reductions. Second, the precision of the estimate is crucial in the case of such a significant tax cut. For example, even a very large pass-through of 90 per cent of the tax cut would lead to a significant increase in profit margins. Consequently, it is impossible to conclusively determine whether the tax cut has yielded a large widening of margins.

This **tax cut** has nevertheless **relieved some of the financial burden** on consumers **in the short term** and brought about a **temporary reduction** in the **inflation rate** on transport services. Because of its temporary nature, it did not reduce inflation in a lasting manner. Another limitation is that high-income households have benefited more from the **tax cut**, as those on lower incomes often do not own a vehicle. Also, lower prices generate stronger demand, undermining the market signalling function of prices. Greater consumption is also a concern for environmental reasons. At the same time, however, the introduction of the nine-euro ticket has significantly boosted demand for public transport (German Federal Statistical Office, 2022), which is likely to have pushed up operating costs (Süddeutsche Zeitung, 2022). On the other hand, a study by the German Association of Transport Companies (VDV, 2022) reveals that around 10 per cent of the journeys made using the nine-euro ticket replaced a journey that would otherwise have been made by car. However, it remains unclear to what extent this outweighs the environmentally questionable impact of the fuel discount.

153. The Federal Government (2022a) announced at the end of September that the Economic Stabilisation Fund (WSF) would be authorized to borrow up to **€200 billion**. [▶ ITEM 167](#) This economic **support package** aimed at cushioning the impact of Russia's war of aggression will be used to finance the electricity and gas price caps as well as financial assistance for businesses. Although these relief measures appear necessary **to mitigate social hardship** and remedy liquidity shortages, their **inflationary effect** is **not clear**. For example, the subsidisation of natural gas prices, as envisioned by the Expert Commission on Gas and Heat (2022) from spring 2023 onwards, should directly reduce the energy component of consumer prices. In addition, firms' lower production costs should lessen the pressure to pass on costs to consumers. However, the credit financing of these measures is likely to increase aggregate domestic demand. The relevant market prices, which have risen massively in some cases, indicate supply-side shortages – especially of energy carriers – which cannot be remedied by these measures, or at least not in the short term. Consequently, any overly broad-based demand stabilisation would **fuel inflation further**. In this context it is important to provide swift and compelling answers to the questions about funding. The Federal Government is currently considering levying a windfall tax to finance



the electricity price cap. ↘ ITEM 337 Another proposal is to fund part of these measures by temporarily raising taxes on higher-income earners. ↘ ITEM 198

154. In the medium to long term **increasing supply and limiting demand** should be the main measures to be taken that help cushion the negative effects of the supply shock and bring down high inflation in a lasting manner. For example, government measures that increase energy supplies by procuring natural gas and activating additional available power plant capacity ↘ ITEM 333 F., **create incentives** for households and public institutions to **save energy**, could reduce the price pressures around energy carriers. In contrast, a **fiscal supply-side policy** that accelerates the shift away from fossil fuels and encourages the use of renewable energy by means of additional capital formation would initially boost aggregate demand. This could further **fuel inflation in the short term** and is only likely to lower energy prices in the long term.
155. According to section 1 of the **Act on the Promotion of Stability and Growth of the Economy** ('Stability Act', StabG), economic policy measures should simultaneously encourage price stability, high levels of employment and external balance through steady and appropriate economic growth. Section 3 StabG also states that if one of these objectives is at risk, the Federal Government shall provide guidance, including an exposition of the macroeconomy, and facilitate coordinated behaviour on the part of regional authorities, trade unions and business associations in order to achieve these objectives ('**Concerted Action**'). To this end, a first meeting involving **trade unions, business associations, Deutsche Bundesbank, the GCEE and the Federal Government** took place on 4 July 2022 with the aim of mitigating high inflation and the resulting income losses (Federal Government, 2022b). The second meeting was held on 15 September 2022 (Federal Government, 2022c).
156. Blanchard and Pisani-Ferry (2022) argue that such **coordination on wage developments** between workers, firms and the government can help reduce **second-round effects** and thus lower medium-term inflationary pressures. This could, in principle, ease the burden on the central bank in fighting inflation. For workers to accept lower nominal wage rises – and thus real income losses – despite high inflation, however, a change in wage-setting behaviour would be needed. Changes to the tax system could help. For example, tax concessions could make one-off payments more attractive than permanent wage increases, which would temporarily reduce the financial burden on employees.
157. However, such temporary relief is not sufficient compensation in the event of a sustained rise in prices. Moreover, **one-off payments** – instead of **permanent wage increases** in the context of regular collective bargaining – could fuel uncertainty about future wage developments. In contrast, excessive pay settlements as part of the collective bargaining process could prompt the central bank to react more strongly, which would have an additional dampening effect on economic output. Another possibility would be to mitigate the risk of unexpectedly high inflation next year by announcing financial relief for those particularly affected in this case. This would reduce uncertainty, thereby providing insurance to society

as a whole. This can create incentives for the duration, design, and level of pay settlements.

158. On the whole, the **Concerted Action** could help conduct an economic policy dialogue, make the debate more objective, and **prevent economic policy measures that are in conflict with each other** and could thus have an adverse effect on inflation. Given the autonomy of collective bargaining, however, it cannot produce concrete collective bargaining results. At best, it can influence this process indirectly.
159. Even if the Concerted Action were to result in a mutually acceptable reduction of wage inflation in Germany, this would contribute only relatively little to containing inflation across the euro area as a whole as long as there are no similar efforts in other member states. Nevertheless, it is of **great importance to institutionalize dialogue** among economic policymakers via the Concerted Action during challenging times.

## REFERENCES

- Adam, K., E. Gautier, S. Santoro and H. Weber (2021), The case for a positive Euro area inflation target: Evidence from France, Germany and Italy, CEPR Discussion Paper DP16828, Center for Economic and Policy Research, London.
- Adam, K. and H. Weber (2019), Optimal trend inflation, *American Economic Review* 109 (2), 702–737.
- Afonso, A., M.G. Arghyrou, M.D. Gadea and A. Kontonikas (2018), “Whatever it takes” to resolve the European sovereign debt crisis? Bond pricing regime switches and monetary policy effects, *Journal of International Money and Finance* 86, 1–30.
- Agarwal, R. and M. Kimball (2022), Will inflation remain high?, *IMF Finance and Development* June 2022, 24–27.
- Alonso, I., I. Kataryniuk and J. Martínez-Martín (2021), The impact of supply and demand shocks on recent economic developments and prices, *Economic Bulletin* 4/2021, Banco de España, Box 3, 28–30.
- Altissimo, F., M. Ehrmann and F. Smets (2006), Inflation persistence and price-setting behaviour in the euro area – A summary of the IPN evidence, ECB Occasional Paper 46, European Central Bank, Frankfurt am Main.
- Anderson, E., N. Jaimovich and D. Simester (2015), Price stickiness: Empirical evidence of the menu cost channel, *Review of Economics and Statistics* 97 (4), 813–826.
- Argente, D. and M. Lee (2021), Cost of living inequality during the great recession, *Journal of the European Economic Association* 19 (2), 913–952.
- Avtar, R., R. Chakrabarti and M. Pinkovskiy (2022), Was the 2021-22 rise in inflation equitable?, *Liberty Street Economics* 30 June 2022, Federal Reserve Bank of New York.
- Bach, K. (2022), New data shows long COVID is keeping as many as 4 million people out of work, Report, Brookings Institution, Washington, DC.
- Bailey, M.J. (1956), The welfare cost of inflationary finance, *Journal of Political Economy* 64 (2), 93–110.
- Balderston, T. (1985), Links between inflation and depression: German capital and labour markets, 1924-1931, in: Feldman, G. D. (Eds.), *Die Nachwirkungen der Inflation auf die deutsche Geschichte 1924 - 1933*, Vol. 31, Social Science Research Council, London, 157–185.
- Bañbura, M. and E. Bobeica (2020), PCCI – a data-rich measure of underlying inflation in the euro area, ECB Statistics Paper 38, European Central Bank, Frankfurt am Main.
- Barro, R.J. (2013), Inflation and economic growth, *Annals of Economics and Finance* 14 (1), 121–144.
- Battistini, N., M. Falagiarda, J. Gareis, A. Hackmann and M. Roma (2021), The euro area housing market during the COVID-19 pandemic, ECB Economic Bulletin 7/2021, European Central Bank, Frankfurt am Main, Article 3, 115–132.
- BEA (2022), Real gross domestic product [GDPC1], <https://fred.stlouisfed.org/series/GDPC1>, retrieved 10 October 2022.
- Benati, L. (2009), Long run evidence on money growth and inflation, ECB Working Paper 1027, European Central Bank, Frankfurt am Main.
- Bernanke, B. (2007), Inflation expectations and inflation forecasting, Speech, Monetary Economics Workshop of the National Bureau of Economic Research Summer Institute, Cambridge, MA, 10 July.
- Bernoth, K., S. Dietz, G. Ider and R. Lastra (2022), The ECB’s transmission protection instrument: a legal & economic analysis, Study requested by the ECON committee, Monetary Dialogue Paper PE 733.979, European Parliament, Committee on Economic and Monetary Affairs, Strasbourg.
- Beyer, A., V. Gaspar, C. Gerberding and O. Issing (2013), Opting out of the Great Inflation: German monetary policy after the breakdown of Bretton Woods, in: Bordo, M. D. and A. Orphanides (Eds.), *The Great Inflation: The Rebirth of Modern Central Banking*, University Of Chicago Press, Cambridge, MA, 302–356.
- Billi, R.M. and G.A. Kahn (2008), What is the optimal inflation rate?, *Federal Reserve Bank of Kansas City Economic Review* 93 (Q2), 5–28.

- Bispinck, R. (2010), Tarifliche Pauschal- und Einmalzahlungen: Praxis, Risiken und Nebenwirkungen, WSI-Tarifarchiv, Elemente qualitativer Tarifpolitik 69, Institute of Economic and Social Research of the Hans-Böckler-Stiftung, Düsseldorf.
- BIS (2022), BIS Annual Economic Report 2022, Bank for International Settlements, Basel.
- BIS (2009), Roles and objectives of modern central banks, in: BIZ, Issues in the Governance of Central Banks, Bank for International Settlements, Basel, 17–55.
- Blanchard, O., G. Dell’Ariccia and P. Mauro (2010), Rethinking macroeconomic policy, *Journal of Money, Credit and Banking* 42, 199–215.
- Blanchard, O. and J. Pisani-Ferry (2022), Fiscal support and monetary vigilance: Economic policy implications of the Russia-Ukraine war for the European Union, Policy Contribution 06/22, Bruegel, Brussels.
- Blanchflower, D. (2007), Is unemployment more costly than inflation?, NBER Working Paper 13505, National Bureau of Economic Research, Cambridge, MA.
- Blattner, T.S. and E. Margaritov (2010), Towards a robust monetary policy rule for the euro area, ECB Working Paper 1210, European Central Bank, Frankfurt am Main.
- Bodnár, K. and T. Schuler (2022), The surge in euro area food inflation and the impact of the Russia-Ukraine war, ECB Economic Bulletin 4/2022, European Central Bank, Frankfurt am Main, Box 6, 74–80.
- de Bondt, G., A. Gieseck and M. Tujula (2020), Household wealth and consumption in the euro area, ECB Economic Bulletin 1/2020, European Central Bank, Frankfurt am Main, 46–61.
- Bordo, M.D. and M.D. Levy (2020), Do enlarged fiscal deficits cause inflation? The historical record, *Economic Affairs* 41 (1), 59–83.
- Borio, C., P. Disyatat, D. Xia and E. Zakrajšek (2021), Second-round effects feature less prominently in inflation dynamics, Quarterly Review September 2021, Bank for International Settlements, Basel, Box A, 23–24.
- Botsch, M.J. and U. Malmendier (2020), The long shadows of the great inflation: evidence from residential mortgages, Working Paper, Revise and resubmit at the Journal of Financial Economics, University of California, Berkeley, CA.
- Bundesregierung (2022a), Wirtschaftlicher Abwehrschirm gegen die Folgen des russischen Angriffskrieges, 29. September 2022, Berlin.
- Bundesregierung (2022b), Auftakt Konzertierte Aktion – Gemeinsam die Inflation bewältigen, <https://www.bundesregierung.de/breg-de/suche/konzertierte-aktion-2059532>, retrieved 4 July 2022.
- Bundesregierung (2022c), Teuerung gemeinsam bekämpfen, <https://www.bundesregierung.de/breg-de/aktuelles/massnahmen-gegen-inflation-2126558>, retrieved 15 September 2022.
- Burstein, A. and C. Hellwig (2008), Welfare costs of inflation in a menu cost model, *American Economic Review* 98 (2), 438–443.
- Cagan, P. (1956), The monetary dynamics of hyperinflation, in: Friedman, M., *Studies in the Quantity Theory of Money*, The University of Chicago Press, Chicago, 25–117.
- Candia, B., O. Coibion and Y. Gorodnichenko (2020), Communication and the beliefs of economic agents, NBER Working Paper 27800, National Bureau of Economic Research, Cambridge, MA.
- Carstensen, K. (2007), Is core money growth a good and stable inflation predictor in the euro area?, Kieler Working Paper 1318, Kiel Institute for the World Economy (IfW).
- CBO (2022), Budget and economic data – 10-Year economic projections, Congressional Budget Office, <https://www.cbo.gov/data/budget-economic-data#4>, retrieved 10 October 2022.
- Celasun, O., N.-J. Hansen, A. Mineshima, M. Spector and J. Zhou (2022), Supply bottlenecks: Where, why, how much, and what next?, IMF Working Paper WP/22/31, International Monetary Fund, Washington, DC.
- Chan, J.C.C., G. Koop and S.M. Potter (2013), A new model of trend inflation, *Journal of Business & Economic Statistics* 31 (1), 94–106.
- Ciccarelli, M. et al. (2017), Low inflation in the euro area: Causes and consequences, ECB Occasional Paper 181, European Central Bank, Frankfurt am Main.
- Claeys, G. and L. Guetta-Jeanrenaud (2022), Who is suffering most from rising inflation?, <https://www.bruegel.org/2022/02/who-is-suffering-most-from-rising-inflation/>, retrieved 1 February 2022.

- Cochrane, J. (2022), Inflation past, present and future: Fiscal shocks, Fed response, and fiscal limits, NBER Working Paper 30096, National Bureau of Economic Research, Cambridge, MA.
- Cochrane, J.H. (2016), Do higher interest rates raise or lower inflation?, mimeo.
- Cogley, T., G.E. Primiceri and T.J. Sargent (2010), Inflation-gap persistence in the US, *American Economic Journal: Macroeconomics* 2 (1), 43–69.
- Cogley, T. and T.J. Sargent (2002), Evolving post-world war II US inflation dynamics, in: Bernanke, B. S. and K. Rogoff (Eds.), *NBER Macroeconomics Annual 2001*, Vol. 16, University of Chicago Press, 331–388.
- Coibion, O., Y. Gorodnichenko and J. Wieland (2012), The optimal inflation rate in new Keynesian models: Should central banks raise their inflation targets in light of the zero lower bound?, *Review of Economic Studies* 79 (4), 1371–1406.
- Conti, A.M., S. Neri and A. Nobili (2017), Low inflation and monetary policy in the euro area, ECB Working Paper 2005, European Central Bank, Frankfurt am Main.
- Corsello, F., S. Neri and A. Tagliabracci (2019), Anchored or de-anchored? That is the question, <https://cepr.org/voxeu/columns/anchored-or-de-anchored-question>, retrieved 23 August 2022.
- D’Acunto, F., U. Malmendier and M. Weber (2022), What do the data tell us about inflation expectations?, Chicago Booth Research Paper 22-09, Fama-Miller Working Paper 2022-41, Becker Friedman Institute for Economics, University of Chicago.
- Demary, M., C. Kruse and J. Zdrzalek (2021), Welche Inflationsunterschiede bestehen in der Bevölkerung? Eine Auswertung auf Basis der Einkommens- und Verbrauchsstichprobe, IW-Report 46, German Economic Institute, Cologne.
- Deutsche Bundesbank (2022a), Monatsbericht August 2022, Monatsbericht 74 (8), Frankfurt am Main.
- Deutsche Bundesbank (2022b), Monatsbericht Februar 2022, Monatsbericht 74 (2), Frankfurt am Main.
- Dovern, J., J. Frank, A. Glas, L. Müller and D. Perico (2022), Estimating pass-through rates for the 2022 tax reduction on fuel prices in Germany, CESifo Working Paper 9963, CESifo Network, Munich.
- Draghi, M. (2014), Monetary policy in the euro area, Speech, Frankfurt European Banking Congress, Frankfurt am Main, 21 November.
- Draghi, M. (2013), Introductory statement to the press conference (with Q&A), Speech, Pressekonferenz der Europäischen Zentralbank, Frankfurt am Main, 1 August.
- Dullien, S. and S. Tober (2022), Belastungsschere geht im Mai 2022 weiter auf, IMK Policy Brief 124, Macroeconomic Policy Institute of the Hans-Böckler-Stiftung, Düsseldorf.
- ECB (2022a), ECB staff macroeconomic projections for the euro area, September 2022, European Central Bank, Frankfurt am Main.
- ECB (2022b), Eurosystem staff macroeconomic projections for the euro area, June 2022, [https://www.ecb.europa.eu/pub/projections/html/ecb.projections202206\\_eurosystem-staff~2299e41f1e.en.html](https://www.ecb.europa.eu/pub/projections/html/ecb.projections202206_eurosystem-staff~2299e41f1e.en.html), retrieved 1 July 2022.
- ECB (2022c), Monetary policy decisions, Press release, European Central Bank, Frankfurt am Main, 9 June.
- ECB (2022d), Monetary policy decisions, Press release, European Central Bank, Frankfurt am Main, 21 July.
- ECB (2021), Monetary policy decisions, Press release, European Central Bank, Frankfurt am Main, 28 October.
- ECB (2020), ECB announces €750 billion Pandemic Emergency Purchase Programme (PEPP), Press release, European Central Bank, Frankfurt am Main, 18 March.
- ECB (2015), Decision (EU) 2015/774 of the European Central Bank on a secondary markets public sector asset purchase programme (ECB/2015/10), L 121/20, Nikosia, 4 March.
- ECB (2014), The responsiveness of HICP items to changes in economic slack, ECB Monthly Bulletin September 2014, European Central Bank, Frankfurt am Main, Box 5, 65–67.
- Ehrmann, M., G. Ferrucci, M. Lenza and D. O’Brien (2018), Measures of underlying inflation for the euro area, ECB Economic Bulletin 4/2018, European Central Bank, Frankfurt am Main, 94–115.

- [Ehrmann, M. and M. Fratzscher \(2017\)](#), Euro area government bonds – Fragmentation and contagion during the sovereign debt crisis, *Journal of International Money and Finance* 70, 26–44.
- [Ehrmann, M. and P. Tzamourani \(2012\)](#), Memories of high inflation, *European Journal of Political Economy* 28 (2), 174–191.
- [ExpertInnen-Kommission Gas and Wärme \(2022\)](#), Sicher durch den Winter, Zwischenbericht, Stand 10 October 2022, Berlin.
- [Fed \(2022\)](#), Monetary policy report – June 2022, Board of Governors of the Federal Reserve System, Washington, DC.
- [Federal Statistical Office \(2022\)](#), Nach Ende des 9-Euro-Tickets: Bahnreisen zurück auf Vorkrisenniveau, Press release 377, Wiesbaden, 8 September.
- [Ferguson, S. \(2022\)](#), Understanding America’s labor shortage, <https://www.uschamber.com/workforce/understanding-americas-labor-shortage>, retrieved 19 August 2022.
- [Fischer, S. \(1981\)](#), Towards an understanding of the costs of inflation: II, *Carnegie-Rochester Conference Series on Public Policy* 15, 5–41.
- [Fischer, S. and F. Modigliani \(1978\)](#), Towards an understanding of the real effects and costs of inflation, NBER Working Paper 303, National Bureau of Economic Research, Cambridge, MA.
- [Fratzscher, M., M. Lo Duca and R. Straub \(2016\)](#), ECB unconventional monetary policy: Market impact and international spillovers, *IMF Economic Review* 64 (1), 36–74.
- [Freuding, J. and J. Garnitz \(2022\)](#), Personalpolitische Herausforderungen im Krisenjahr 2022, *ifo Schnelldienst* 75 (7), 36–39.
- [Friedman, M. \(1968\)](#), The role of monetary policy, *American Economic Review* 58 (1), 1–17.
- [Fröhling, A. and K. Lommatzsch \(2011\)](#), Output sensitivity of inflation in the euro area: Indirect evidence from disaggregated consumer prices, Series 1: Economic Studies, Discussion Paper 25/2011, Deutsche Bundesbank, Frankfurt am Main.
- [Fröhling, A., D. O’Brien and S. Schaefer \(2022\)](#), A new indicator of domestic inflation for the euro area, *ECB Economic Bulletin* 4/2022, European Central Bank, Frankfurt am Main, Box 7, 81–87.
- [Fuhrer, J.C. \(2010\)](#), Inflation persistence, in: Friedman, B. M. and M. Woodford (Eds.), *Handbook of Monetary Economics*, Vol. 3, Elsevier, Amsterdam, 423–486.
- [Galofré-Vilà, G. \(2021\)](#), The costs of hyperinflation: Germany 1923, Working Paper D.T. 2101, Universidad Pública de Navarra, Departamento de Economía.
- [Garnadt, N., C. von Rüden and E. Thiel \(2021\)](#), Labour reallocation dynamics in Germany during the COVID-19 pandemic and past recessions, Working Paper 08/2021, German Council of Economic Experts, Wiesbaden.
- [Gonçalves, E. and G. Koester \(2022\)](#), The role of demand and supply in underlying inflation – decomposing HICPX inflation into components, *ECB Economic Bulletin* 7/2022, European Central Bank, Frankfurt am Main, im Erscheinen, [https://www.ecb.europa.eu/pub/economic-bulletin/focus/2022/html/ecb.eb-box202207\\_07~8b71edbcf.en.html](https://www.ecb.europa.eu/pub/economic-bulletin/focus/2022/html/ecb.eb-box202207_07~8b71edbcf.en.html).
- [Gorodnichenko, Y. and M. Weber \(2016\)](#), Are sticky prices costly? Evidence from the stock market, *American Economic Review* 106 (1), 165–199.
- [Gramm, C.L., W.E. Hendricks and L.M. Kahn \(1988\)](#), Inflation uncertainty and strike activity, *Industrial Relations: A Journal of Economy and Society* 27 (1), 114–129.
- [Granja, J., C. Makridis, C. Yannelis and E. Zwick \(2020\)](#), Did the paycheck protection program hit the target?, NBER Working Paper 27095, National Bureau of Economic Research, Washington, DC.
- [Grant, A.L. \(2017\)](#), The early millennium slowdown: Replicating the Peersman (2005) results, *Journal of Applied Econometrics* 32 (1), 224–232.
- [Griffith, R., E. Leibtag, A. Leicester and A. Nevo \(2009\)](#), Consumer shopping behavior: How much do consumers save?, *Journal of Economic Perspectives* 23 (2), 99–120.
- [Groen, J.J.J., K. McNeil and M. Middeldorp \(2013\)](#), A new approach for identifying demand and supply shocks in the oil market, Liberty Street Economics 20130325, Federal Reserve Bank of New York.
- [Groshen, E.L. and M.E. Schweitzer \(1996\)](#), The effects of inflation on wage adjustments in firm-level data: Grease or sand?, Staff Report 9, Federal Reserve Bank of New York.



- Grund, S. (2020), Legal, compliant and suitable: The ECB's pandemic emergency purchase programme (PEPP), Policy Brief, Bertelsmann Stiftung and Jacques Delors Centre, Hertie School, Berlin.
- Grund, S. and F. Grlé (2016), The European central bank's public sector purchase programme (PSPP), the prohibition of monetary financing and sovereign debt restructuring scenarios, *European Law Review* 41 (6), 781–803.
- Guerrero, F. and E. Parker (2006), Deflation and recession: Finding the empirical link, *Economics Letters* 93 (1), 12–17.
- Gupta, A., H. Sapriza and V. Yankov (2022), The collateral channel and bank credit, Finance and Economics Discussion 2022–024, Board of Governors of the Federal Reserve System, Washington, DC.
- Gürer, E. and A. Weichenrieder (2020), Pro-rich inflation in Europe: Implications for the measurement of inequality, *German Economic Review* 21 (1), 107–138.
- Haffert, L., N. Redeker and T. Rommel (2021), Misremembering Weimar: Hyperinflation, the great depression, and German collective economic memory, *Economics & Politics* 33 (3), 664–686.
- Hammond, G. (2012), State of the art of inflation targeting, Handbook 29, Bank of England, Centre for Central Banking Studies, London.
- Hayo, B. (1998), Inflation culture, central bank independence and price stability, *European Journal of Political Economy* 14 (2), 241–263.
- Hilscher, J., A. Raviv, and Ricardo Reis (2022), How likely is an inflation disaster?, CEPR Discussion Paper DP17224, Center for Economic and Policy Research, London.
- Hofmann, B. (2009), Do monetary indicators lead euro area inflation?, *Journal of International Money and Finance* 28 (7), 1165–1181.
- Holston, K., T. Laubach and J.C. Williams (2017), Measuring the natural rate of interest: International trends and determinants, *Journal of International Economics* 108, 59–75.
- Huizinga, J. (1993), Inflation uncertainty, relative price uncertainty, and investment in U.S. manufacturing, *Journal of Money, Credit and Banking* 25 (3, Teil 2), 521–549.
- IEA (2022), Oil market report, May 2022, International Energy Agency, Paris.
- ifo Institut (2022a), Erhöhung des Mindestlohns lässt Preise steigen, Press release, Munich, 9 September.
- ifo Institut (2022b), Ölkonzerne geben Tankrabatt zu 85 bis 100 Prozent weiter, Press release, Munich, 14 June.
- IGBCE (2022), Brücke in den Herbst gebaut, <https://igbce.de/igbce/bruecke-in-den-herbst-gebaut-205890>, retrieved 5 April 2022.
- Insee (2022a), Insee economic outlook – June 2022, L'Institut national de la statistique et des études économiques, Paris.
- Insee (2022b), Insee economic outlook – March 2022, L'Institut national de la statistique et des études économiques, Paris.
- Ioannidis, M., S.J.H. Murphy and C. Ziliolli (2021), The mandate of the ECB: Legal considerations in the ECB's monetary policy strategy review, ECB Occasional Paper 276, European Central Bank, Frankfurt am Main.
- Ireland, P.N. (2009), On the welfare cost of inflation and the recent behavior of money demand, *American Economic Review* 99 (3), 1040–1052.
- Issing, O. (2005), Why did the great inflation not happen in Germany?, *Federal Reserve Bank of St. Louis Review* 87 (2), 329–336.
- Ivanac-Lillig, C. (2020), The federal reserve's dual mandate, Note, Stand: 20. Oktober 2020, Federal Reserve Bank of Chicago.
- IMF (2022), Annual report on exchange arrangements and exchange restrictions 2021, International Monetary Fund, Washington, DC.
- Jaravel, X. (2019), The unequal gains from product innovations: Evidence from the US retail sector, *Quarterly Journal of Economics* 134 (2), 715–783.
- Kaplan, G. and S. Schulhofer-Wohl (2017), Inflation at the household level, *Journal of Monetary Economics* 91, 19–38.

- Kim, J. and F.J. Ruge-Murcia (2009), How much inflation is necessary to grease the wheels?, *Journal of Monetary Economics* 56 (3), 365–377.
- Koester, G. and D. Wittekopf (2022), Minimum wages and their role for euro area wage growth, *ECB Economic Bulletin* 3/2022, European Central Bank, Frankfurt am Main, Box 4, 44–48.
- Kuik, F., J.F. Adolfsen, E.M. Lis and A. Meyler (2022), Energy price developments in and out of the COVID-19 pandemic – from commodity prices to consumer prices, *ECB Economic Bulletin* 4/2022, European Central Bank, Frankfurt am Main, 94–115.
- Lane, P.R. (2022), The euro area outlook: Some analytical considerations, Speech, Bruegel, Brussels, 5 May.
- Leeper, E.M. (1991), Equilibria under ‘active’ and ‘passive’ monetary and fiscal policies, *Journal of Monetary Economics* 27 (1), 129–147.
- Levy, D., M. Bergen, S. Dutta and R. Venable (1997), The magnitude of menu costs: Direct evidence from large US supermarket chains, *Quarterly Journal of Economics* 112 (3), 791–824.
- Logue, D.E. and R.J. Sweeney (1981), Inflation and real growth: Some empirical results: A note, *Journal of Money, Credit and Banking* 13 (4), 497–501.
- Lucas, R.E. (2000), Inflation and welfare, *Econometrica* 68 (2), 247–274.
- Malmendier, U. (2021), FBBVA Lecture 2020: Exposure, experience, and expertise: Why personal histories matter in economics, *Journal of the European Economic Association* 19 (6), 2857–2894.
- Malmendier, U. and S. Nagel (2016), Learning from inflation experiences, *Quarterly Journal of Economics* 131 (1), 53–87.
- Malmendier, U., S. Nagel and Z. Yan (2021), The making of hawks and doves, *Journal of Monetary Economics* 117, 19–42.
- Malmendier, U. and A. Steiny Wellsjo (2022), Rent or buy? Inflation experiences and homeownership within and across countries, CEPR Discussion Paper DP14935, Revise and resubmit at the *Journal of Finance*, Centre for Economic Policy Research, London.
- de Matos, L.P. and R. Murillo Gili (2022), The Iberian electricity market and the price rally in Spain, *CaixaBank Research Monthly Report* 463, 31–32.
- Montag, F., A. Sagimuldina and M. Schnitzer (2022), Does tax policy work when consumers have imperfect price information? Theory and evidence – Updated version, mimeo.
- Montag, F., A. Sagimuldina and M. Schnitzer (2021), Does tax policy work when consumers have imperfect price information? Theory and evidence, CESifo Working Paper 9138, CESifo Network, Munich.
- New York Fed (2022a), Oil price dynamics report, [https://www.newyorkfed.org/medialibrary/media/research/policy/oil\\_decomposition/oil-decomp\\_2022-1017.pdf?la=en](https://www.newyorkfed.org/medialibrary/media/research/policy/oil_decomposition/oil-decomp_2022-1017.pdf?la=en), retrieved 18 August 2022.
- New York Fed (2022b), Measuring the natural rate of interest, <https://www.newyorkfed.org/research/policy/rstar>, retrieved 31 October 2022.
- Nowotny, E. (1980), Inflation and taxation: Reviewing the macroeconomic issues, *Journal of Economic Literature* 18 (3), 1025–1049.
- OPEC (2022a), OPEC monthly oil market report June 2022, Organization of the Petroleum Exporting Countries, Vienna.
- OPEC (2022b), OPEC monthly oil market report July 2022, Organization of the Petroleum Exporting Countries, Vienna.
- Orphanides, A. and V. Wieland (2013), Complexity and monetary policy, *International Journal of Central Banking* 9 (1), 167–204.
- Peersman, G. (2005), What caused the early millennium slowdown? Evidence based on vector autoregressions, *Journal of Applied Econometrics* 20 (2), 185–207.
- Phillips, A.W. (1958), The relation between unemployment and the rate of change of money wage rates in the United Kingdom, 1861-1957, *Economica* 25 (100), 283–299.
- Poterba, J.M. (2000), Stock market wealth and consumption, *Journal of Economic Perspectives* 14 (2), 99–118.
- Priem, M., A.S. Kritikos, O. Morales and J.S. Düring (2022), Folgen der Inflation treffen untere Mittelschicht besonders: Staatliche Hilfspakete wirken nur begrenzt, *DIW Wochenbericht* 89 (28), German Institute for Economic Research, Berlin, 387-394.

- Rees, D. and P. Rungcharoenkitkul (2021), Bottlenecks: Causes and macroeconomic implications, BIS Bulletin 48, Bank for International Settlements, Basel.
- Reinhart, C.M. and K.S. Rogoff (2010), Growth in a time of debt, *American Economic Review* 100 (2), 573–578.
- RWI (2022), Tankrabbat wird bisher größtenteils weitergegeben, Press release, RWI – Leibniz Institute for Economic Research, Essen, 28 July.
- Samuelson, P.A. and R.M. Solow (1960), Analytical aspects of anti-inflation policy, *American Economic Review* 50 (2), 177–194.
- SBA (2021), Paycheck protection program (PPP) report, Version 19, U.S. Small Business Administration, Office of Capital Access, Washington, DC.
- Schmitt-Grohé, S. and M. Uribe (2010), The optimal rate of inflation, NBER Working Paper 16054, National Bureau of Economic Research, Cambridge, MA.
- Schulten, T. (2022), Tarifpolitischer Jahresbericht 2021 – Tarifpolitik im zweiten Jahr der Corona-Pandemie, WSI-Tarifarchiv, Berichte zur Tarifpolitik, Institute of Economic and Social Research of the Hans-Böckler-Stiftung, Düsseldorf.
- Sgaravatti, G., S. Tagliapietra and G. Zachmann (2021), National fiscal policy responses to the energy crisis, Update 21 October 2022, <https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices>, retrieved 28 October 2022.
- Sheshinski, E. and Y. Weiss (1977), Inflation and costs of price adjustment, *Review of Economic Studies* 44 (2), 287–303.
- Shiller, R. (1997), Why do people dislike inflation?, in: NBER (Eds.), *Reducing Inflation: Motivation and Strategy*, National Bureau of Economic Research, Cambridge, MA, 13–69.
- Smets, F. and R. Wouters (2003), An estimated dynamic stochastic general equilibrium model of the euro area, *Journal of the European Economic Association* 1 (5), 1123–1175.
- Stella, A. (2013), The magnitude of menu costs: A structural estimation, 2014 Meeting Paper 436, Society for Economic Dynamics.
- Süddeutsche Zeitung (2022), 9-Euro-Ticket sorgt für volle Züge: Nachbesserungsbedarf, Süddeutsche Zeitung, Munich, 28 September.
- Tauber, K. and W. Van Zandweghe (2021), Why has durable goods spending been so strong during the COVID-19 pandemic?, *Economic Commentary* 2021–16, Federal Reserve Bank of Cleveland.
- Taylor, J.B. (2013), Reviewing the “Too low for too long” evidence, <https://economicsone.com/2013/10/19/reviewing-the-too-low-for-too-long-evidence/>, retrieved 2 September 2021.
- Taylor, J.B. (2012), Monetary policy rules work and discretion doesn't: A tale of two eras, *Journal of Money, Credit and Banking* 44 (6), 1017–1032.
- Taylor, J.B. (2007), Housing and monetary policy, NBER Working Paper 13682, National Bureau of Economic Research, Cambridge, MA.
- Taylor, J.B. (1993), Discretion versus policy rules in practice, *Carnegie-Rochester Conference Series on Public Policy* 39, 195–214.
- Teles, P., H. Uhlig and J. Valle e Azevedo (2016), Is quantity theory still alive?, *Economic Journal* 126 (591), 442–464.
- Tommasi, M. (1999), On high inflation and the allocation of resources, *Journal of Monetary Economics* 44 (3), 401–421.
- Uribe, M. (2017), The Neo-Fisher effect in the United States and Japan, NBER Working Paper 23977, National Bureau of Economic Research, Cambridge, MA.
- U.S. Department of Labor (2021), Agency financial report – Fiscal year 2021, Washington, DC.
- USAGov (2022), Advance child tax credit and economic impact payments - Stimulus checks, <https://www.usa.gov/covid-stimulus-checks>, retrieved 11 October 2022.
- USAspending (2022), COVID relief spending, <https://usaspending.gov/disaster/covid-19>, retrieved 11 October 2022.
- VDV (2022), Bilanz eines Erfolgsmodells: Rund 52 Millionen verkaufte 9-Euro-Tickets, Press release, Association of German Transport Companies, Cologne, 28 September.

[Watson, M.W.](#) (2014), Inflation persistence, the NAIRU, and the Great Recession, *American Economic Review* 104 (5), 31–36.

[Whelan, K.](#) (2022), The past, present and future of euro area monetary-fiscal interactions, *International Economics and Economic Policy* 19 (3), 557–579.

[Wimer, C., X. Jaravel and S. Collyer](#) (2019), The costs of being poor: Inflation inequality leads to three million more people in poverty, Groundwork Collaborative, Center on Poverty & Social Policy at Columbia University, New York.

[Yellen, J.](#) (2016), The economic outlook and the conduct of monetary policy, Speech, Stanford Institute for Economic Policy Research, Stanford, 19 January.