

# REPORT

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# PRUDENT RECALIBRATION REQUIRED: THE ECB'S RESPONSE TO THE 2022 PRICE SHOCKS

## Monetary Policy Challenges 2023

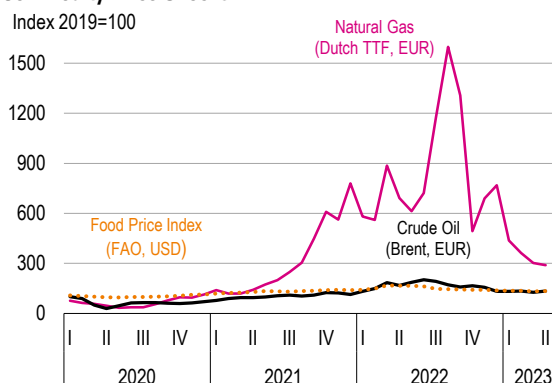
Silke Tober and Thomas Theobald

### AT A GLANCE

The ECB was not slow to react to the rising inflation, but rather reacted very strongly as the price shocks escalated and the supply bottlenecks persisted longer than widely expected. The ECB raised rates later and less forcefully than the Federal Reserve because the inflation dynamics in the euro area differ significantly from those in the United States. The U.S. economy was robust on the eve of the pandemic, the unemployment rate had reached historic lows, and the key policy rate was above 2 %, whereas the ECB's policy rate was below zero, unemployment high and the economy still recovering from previous crises. During the post-pandemic recovery, high U.S. aggregate demand boosted global inflation, whereas the European economy struggled to cope with the extensive fallout of the Ukraine war. In themselves, price shocks cannot cause inflation to remain persistently above target. Although wage increases are currently not com-

patible with the inflation target, monetary policy restriction is not necessary because falling energy prices and lower extra profits should compensate for the slight overshooting of wages and inflation expectations are anchored.

### Commodity Price Shocks



Sources: EIA; ECB; FAO; Macrobond.



### AUDIO COMMENT

Silke Tober on monetary policy challenges 2023

<https://bit.ly/imkreport181e>

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## INTRODUCTION

Under the impact of massive successive price shocks, inflation in the euro area skyrocketed from -0.3% in December 2020 to a historic high of 10.6% in October 2022. In Germany, the increase was even steeper, from -0.7% in December 2020 to 11.6% in October 2022. Gradually, the price shocks are abating and inflation, which stood at 7.0% in April (Germany: 7.6%), should decline to close to the ECB's inflation target of 2% in the course of 2024, assuming no further price shocks.

The high inflation episode is not a consequence of the long period of expansionary monetary policy. Such a causal link presupposes aggregate excess demand, for which there is little evidence in the euro area.

The key factor to propel euro area inflation to record highs was the external shock of rising gas prices. The Dutch exchange price for natural gas (TTF) peaked at a year-on-year increase of 638% in March 2022 and in August 2022 stood 1498% higher than in 2019.<sup>1</sup> This was compounded by the equally temporary, sharp rise in the price of crude oil, with the price increase of North Sea Brent peaking at 94% year-on-year in March 2022. In addition, global food prices rose sharply as supply from Ukraine declined and the cost of energy, fertilizers and transport soared, causing food prices in April 2023 to increase by 15.0% in the euro area and 17.4% in Germany.<sup>2</sup>

## PANDEMIC AFTERMATH AND WAR-RELATED ENERGY PRICE SHOCKS DRIVE INFLATION

Analyzing the high current inflation is challenging because various price shocks and supply bottlenecks overlap. Therefore, even at the ECB, the protracted price shocks are sometimes interpreted as inflation persistence (Schnabel 2022a). The price shocks and supply bottlenecks can be divided into four phases.

In the first phase, lasting until May 2021, the price of crude oil recovered from the pandemic-related slump in spring 2020. In May 2021, it had returned to its pre-pandemic level of around 65 USD/barrel (Brent), which, given the low of 18 USD/barrel in April 2020, was accompanied by price increases of 253% in April 2021 and 113% in May 2021. At this point, the European gas price had already exceeded its pre-pandemic level by 73% as a result of reduced gas flows from Russia.<sup>3</sup>

The second phase lasted until Russia's invasion of Ukraine in February 2022. This phase was characterized by massive shortages of intermediate products due to pandemic-related production shortfalls, the strong recovery, especially in the USA,<sup>4</sup> and an increase in the demand for goods relative to services. Crude oil prices continued to rise, partly because OPEC lowered production volumes, with Brent crude reaching a price of just under 87 euros per barrel in January 2022. As the euro depreciated by almost 7% between May 2021 and January 2022, this hit the euro area harder than the United States and imports across the board became more expensive. Against the backdrop of supply cuts in response to geopolitical tensions concerning Crimea, the Donbas and the Nordstream 2 pipeline, the European gas price reached a level of almost 85 EUR/MWh in January 2022, 4.2 times higher than a year earlier and 5.8 times higher than in pre-pandemic 2019.

The third phase saw further price surges after Russia invaded Ukraine. Between January 2022 and March 2022, the price of crude soared by 35.5%, the price of natural gas by 52.7% and global food prices by 17.8%. Whereas global food prices thus peaked, oil prices continued to rise until June 2022 (to 123 USD/barrel, Brent) and the European gas price until August 2022 (to an average of 234 EUR/MWh). Moreover, as the euro depreciated by 13% between January 2022 and October 2022 due to the geographical proximity to the war and concerns about a gas shortage, the price jump for crude oil had an even stronger impact and all other imports also became noticeably more expensive. October 2022 marked the peak of euro area inflation at 10.6% (Germany 11.6%), with energy contributing 4.4 percentage points (Germany 5.3 percentage points) to inflation and food including beverages and tobacco 2.7 percentage points (Germany 2.6 percentage points) (Figure 1). Since hardly any good or service can be produced without energy, the massive increase in the price of energy had a delayed effect on the prices of almost all compo-

1 The exchange price for natural gas Dutch TTF increased from 14.61 EUR/MWh in the pre-pandemic year 2019 to 129.54 EUR/MWh in March 2022 and 233.51 EUR/MWh in August 2022. In April 2023, the exchange price of 42.22 EUR/MWh was 58% lower than a year earlier and exceeded the pre-pandemic level by 189%.

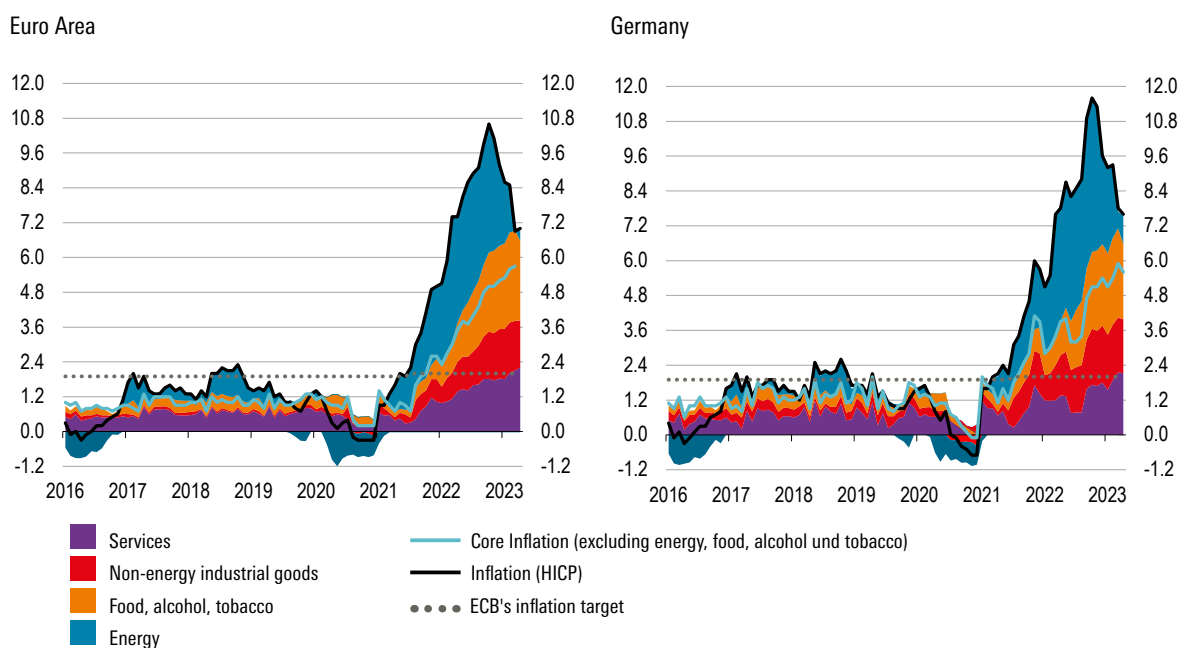
2 The term food is used in different definitions: In April 2023, the HICP increase for food excluding beverages was 15.1% (Germany: 18.0%), for food and nonalcoholic beverages 15.0% (Germany: 17.4%), and for food, alcohol, and tobacco 13.5% (Germany: 15.5%). The corresponding rates in the German national consumer price index were 17.2%, 16.8%, and 15.1%.

3 The U.S. natural gas price (Henry Hub) was only 13% above 2019 pre-pandemic levels at that time.

4 In the fourth quarter of 2021, U.S. GDP exceeded the pre-pandemic level of the fourth quarter of 2019 by 4.1%, personal consumption expenditures were 5.7% above it, and imports were 10.5% higher, while exports were 4.1% lower.

## Harmonised Consumer Price Index: Inflation and Item Contributions

annual percentage changes and percentage point contributions, January 2016 – April 2023



Sources: Eurostat; Federal Statistical Office; IMK calculations.

IMK

nents of the consumer price index. Transport costs and the persistence of supply bottlenecks for intermediate products such as semiconductors exerted additional upward pressure on prices.<sup>5</sup>

The fourth phase started in spring 2023 with the indirect effects of the energy and food price shocks fading and the core inflation rate peaking.

## THE ECB REACTED VERY STRONGLY, NOT HESITANTLY

The ECB initially reacted prudently and in line with its monetary policy strategy to the elevated price increases, all the more so as – until Russia's invasion – the tension on energy markets was generally expected to ease in the near future (Figure 2).

In December 2021, the ECB began to scale back its highly expansionary monetary policy, initially reducing the volume of securities purchases and an-

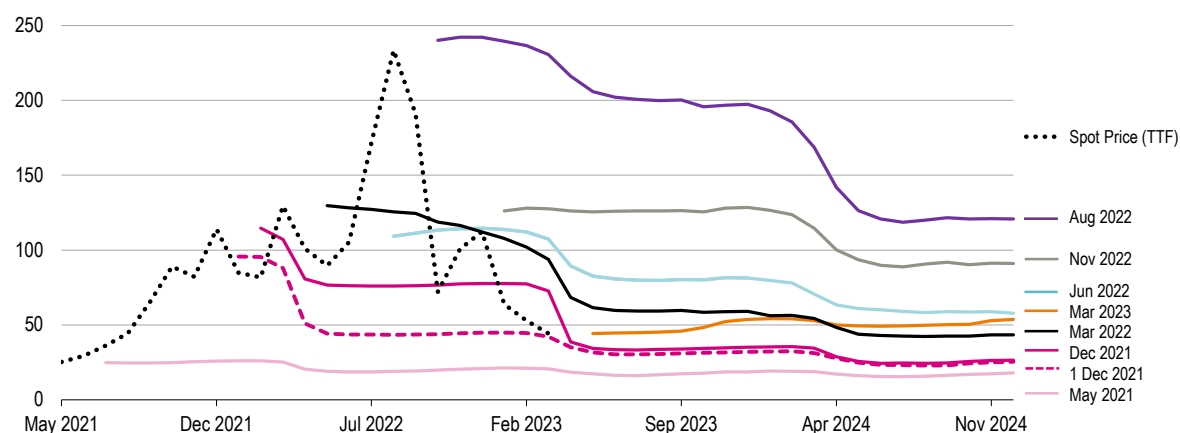
nouncing the end of the PEPP emergency purchase program. In June 2022, the ECB also ended the regular securities purchase program. Given significant undershooting of the inflation target in the years 2014 to 2020, the ECB rightly upheld its support of the weakened economy, so that inflation would reach the 2% inflation target on a sustainable basis and not just temporarily due to price shocks. In early December 2021, it was widely expected that natural gas prices would decline markedly over the course of 2022. Accordingly, the futures contracts for natural gas on 1 December 2021 for delivery in June 2022 were at 43.59 EUR/MWh, less than half the quotation subsequently realized (95.60 EUR/MWh). The price of crude oil (Brent) in December 2021 was 74 USD/barrel and 7 US-dollars lower than in November 2021. The prevailing expectation at the time was that the economy, which had been severely weakened by the pandemic, would recover relatively quickly and that monetary policy could be gradually normalized.

The Ukraine war changed the picture fundamentally, albeit not abruptly, but in several steps. Figure 2 shows the European prices for natural gas that applied at various times for delivery in individual months of 2023 and 2024. In December 2021, when the ECB began to phase out its highly expansionary monetary policy, the natural gas price averaged 114 EUR/MWh but only 76 euros and 78 euros for delivery scheduled for June 2022 and December 2022, respectively. After Russia invaded Ukraine, spot and futures prices shot up in March 2022, al-

<sup>5</sup> Although the number of manufacturing companies reporting a shortage of intermediate products in Germany has fallen steadily since September 2022, in April 2023 39.2% of companies still stated that their production was held back by supply shortages according to the ifo scarcity indicator. The bottlenecks remain particularly pronounced for producers of data processing equipment (73.5%), in the automotive industry (68.7%) and in mechanical engineering (62.9%) (Destatis 2023).

### Natural Gas: Spot and Futures Prices 2021– 2024

ICE Dutch TTF, €/MWh, monthly averages, one daily value



Source: Macrobond.



beit not for the last time. In June 2022, prices for delivery during the next 18 months were again significantly higher, and they did not peak until August 2022. At 234 euros per megawatt-hour, natural gas in August 2022 was on average more than twice as expensive as in June 2022 and 16 times as expensive as in pre-pandemic 2019. Futures prices for December 2022 gas delivery had likewise doubled within the two-month period.

Figure 2 illustrates the multitude of price shocks in natural gas, presented here as a proxy for all the price shocks in energy and food. These shocks were not predictable and could not have been prevented by monetary policy in any case. They also explain why inflation continued to rise over the course of 2022 until its peak in October 2022.

The criticism that the ECB acted too hesitantly is therefore misplaced. On the contrary, the ECB reacted very strongly to the price shocks. By December 2022 alone, the ECB had raised the key policy rate, the deposit rate, by 2.5 percentage points from -0.5% to 2% within just 6 months (Figure 3). This was risky because price shocks were already a significant drag on the economy and a recession was widely expected in the winter half-year.

Despite the rate hikes, the economic slowdown turned out to be weaker than expected, largely due to the fiscal relief provided by euro-area governments and the brisker recovery in China following the end of the zero-covid policy, but also as a result of the sharp drop in the price of European natural gas by 47% in the course of December 2022 and by 63% between the beginning of December 2022 and the end of March 2023. Nonetheless, in the winter half-year 2022/23, GDP stagnated and exceeded the pre-pandemic level by only 2.4% in both quarters. Private consumption declined by 0.9% in the fourth quarter of 2022, taking it to 0.8% below the level of late 2019. Gross fixed capital

formation fell even more steeply, by 3.6% to 5.3% below the pre-pandemic level, thereby depressing the activity most crucial for the upcoming transformation towards climate neutrality.

## SIGNIFICANT DIFFERENCES IN INFLATION BETWEEN THE EURO AREA AND THE UNITED STATES

The Federal Reserve raised interest rates as early as March 2022 and thus four months before the ECB (Figure 3). The reason for this is that the U.S. economy was already more robust before the pandemic and inflation dynamics differed accordingly.

Whereas the euro area had not yet fully recovered from the aftermath of the 2008/2009 global financial crisis and the subsequent euro crisis, capacity utilization in the United States was high at the end of 2019 and the unemployment rate was at the historically low level of 3.6% last seen in the 1960s (euro area: 7.5%). In the years leading up to the pandemic, the Federal Reserve had raised the policy rate to the range of 2.25% to 2.5%, while the ECB continued to support the European economy operating at below capacity in an effort to overcome the long-lasting and significant undershooting of the inflation target (Figures 1 and 3).

The second important difference was the geographical proximity to the escalating conflict between Ukraine and Russia in 2021, that culminated in the Russian invasion in February 2022. The euro depreciated substantially because of the heightened uncertainty, and the euro area faced a massive gas price shock. Both contributed significantly to inflation in the euro area. Accordingly, US

inflation peaked at 8.9% as early as June 2022, the month in which the price of crude oil also peaked at just under USD 123/barrel. When inflation in the euro area peaked in October 2022 and energy (household energy and fuels) was 41.5% more expensive than one year earlier and 60.3% more expensive than in 2019, the energy price increase in the U.S. was only 17.6% year-on-year and energy was only 29.6%

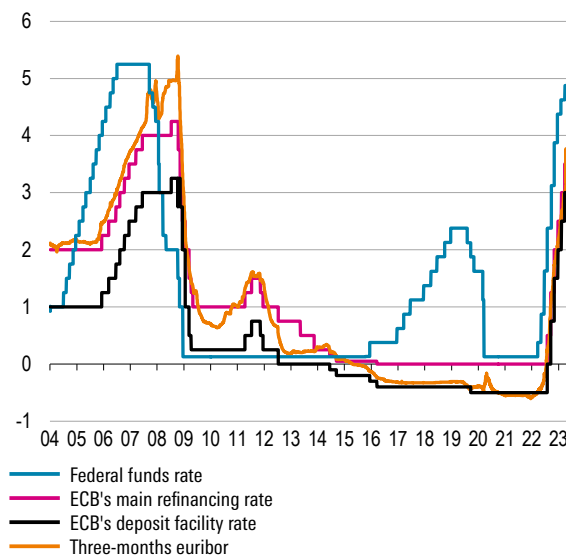
more expensive than in 2019. Consumer price inflation had fallen to 7.8% in the U.S. by that time.

For the United States, there is strong evidence that rising profit margins are currently contributing to inflation (Weber and Wasner 2023). In the euro area, rising profits in the exceptional market environment caused by the pandemic and the Ukraine war are also likely to have increased inflation. This

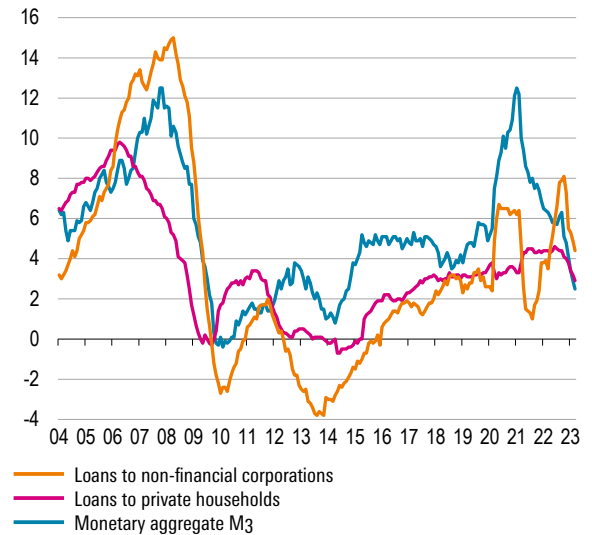
Figure 3

### Monetary Policy Indicators

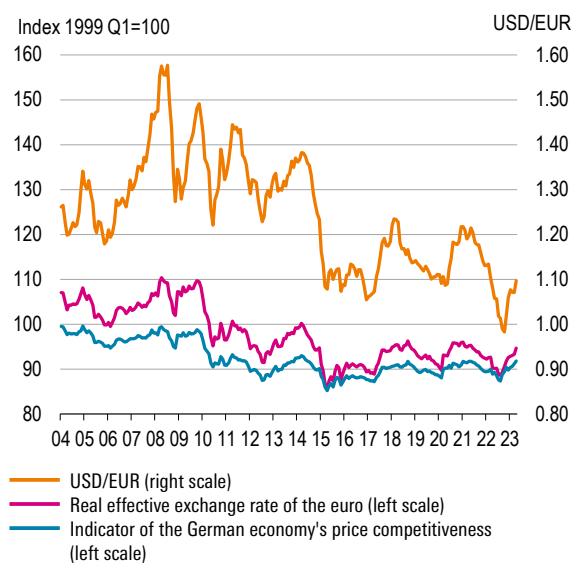
a) Policy Rates in the Euro Area and the United States, in %



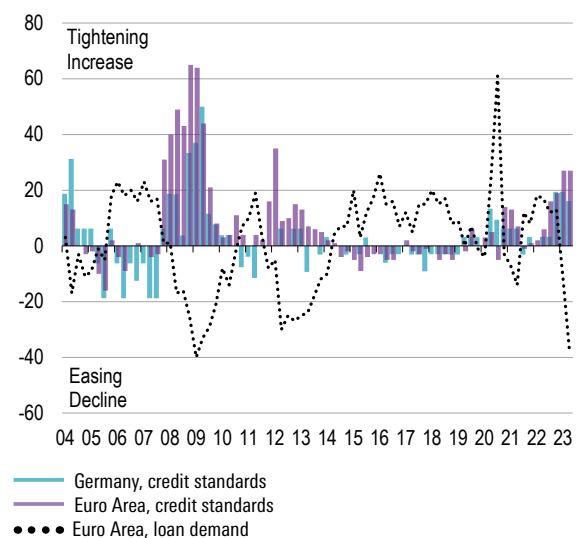
b) Monetary Aggregate M3 and Loans annual percentage changes, in %



c) Exchange rates<sup>1</sup>



d) Credit Standards and Credit Demand net percentages of banks reporting a tightening or increase



<sup>1</sup> Based on consumer prices, vis-à-vis 40 countries (Euro Area) and 60 countries (Germany). Lower values imply an increase in competitiveness.

should be a temporary phenomenon resulting primarily from the energy price shocks and the organization of the electricity market, on the one hand, and supply bottlenecks in conjunction with generous short-time working arrangements, on the other. Recent analyses of profit levels based on national accounts data (Arce et al. 2023) provide some clues. However, they allow only for limited conclusions regarding sectoral and economy-wide profits since the functional income measure of corporate and property income (profits) in the national accounts is a residual that includes, inter alia, depreciation, interest costs and income from abroad.<sup>6</sup> Moreover, the time lag between imports, production and sales may cause the deflators to provide a temporally distorted picture in times of substantial price shocks.<sup>7</sup> Additionally, offsetting factors may overlap, further complicating the analysis. It should also be noted that companies able to pass on cost increases to consumers earn higher profits even if their profit margins remain the same. That said, as the direct and indirect effects of the energy price shocks recede, so should profit margins and sectoral extra profits in the euro area. Otherwise, one of our premises would indeed have to be critically questioned – be it competitive markets or the absence of excess demand in the euro area.

## NEITHER WAGES INCREASES NOR INFLATION EXPECTATIONS IMPLY INFLATION PERSISTENCE

Price shocks do not in themselves cause inflation persistence as they drop out of the inflation rate twelve months after they occur. If the affected prices subsequently fall, inflation will even be temporarily lower than before the original price shock (other things being equal). One-off shocks occur frequently in food and energy prices. In less turbulent times, core inflation rates that strip out volatile components generally provide information about underlying inflation as an indicator of future inflation, a prominent example being the HICP excluding energy, food, alcohol, and tobacco (Figure 1).

At present, however, the pandemic, the Ukraine war and the emergence of new geopolitical blocks are having profound effects on the global economy that significantly lower the predictive power of core inflation for future medium-term inflation. For example, the pandemic-related shortages of intermediate goods substantially increased the price of vehicles, which are included in core inflation. Furthermore, the size and duration of the energy price hikes have sharply increased the costs of production, transportation and even packaging, thereby raising the prices of practically all goods and services.

Given the broad impact of energy prices, efforts to calculate more informative core rates are not very promising.<sup>8</sup> However, indirect effects of price shocks in themselves also only temporarily affect inflation, which is why the core rate – at 5.6% in the euro area and in Germany in April 2023 – currently overstates underlying inflation and thus medium-term inflation.

However, high inflation could become entrenched because of second-round effects. The Bundesbank and the ECB identify two possible second-round effects: rising inflation expectations and rising wage growth (Deutsche Bundesbank 2023a: 57). If employees manage to realize wage settlements that at least partly compensate for excessive inflation, production costs rise accordingly and exert upward pressure on prices. Wage settlements thus do not only affect real wages, but also inflation. According to the ECB's latest forecast, euro area wages will increase at rates that include second-round effects and, strictly speaking, are not compatible with the inflation target of 2%, specifically by 5.3% in 2023 and 4.4% in 2024 (ECB 2023a). By contrast, 3% is the increase compatible with the inflation target, given medium-term productivity growth of around 1%, a view shared by the ECB (Lane 2023b).

<sup>6</sup> Specifically, the category “profits” includes not only profits but also labor income of freelancers, sole proprietors, working owners of partnerships and corporations as well as solo self-employed persons and family members assisting without employment contracts; depreciation; taxes on production paid to the state minus subsidies received from the state; remuneration for capital employed including interest payments; and income received from investments abroad minus payments made to foreign countries (Adler et al 2022: 78ff).

<sup>7</sup> For example, if a chemical company sold products in the fourth quarter of 2022 the production of which started in August 2022 when import prices for natural gas were at their peak, the national accounts record a high profit because the import price for natural gas is significantly lower in the quarter of sale. Even if only 90% of the high gas price at the time of production is passed on, statistically there is an increased profit margin even though the company in fact suffered a profit loss. Another example is provided by agriculture, where potatoes were planted in the spring of 2022 when fertilizer and fuel were very expensive. If potatoes harvested in September were then stored and sold in the winter of 2022, when the prices of fertilizer and diesel were already substantially lower, the significantly higher GDP deflator compared with the spring would statistically result in high profits.

<sup>8</sup> Lane (2023b) provides an overview of the different concepts and calculation methods.

Generally, a central bank would have to act restrictively in the event of excessive wage increases to be able to meet its inflation target in the medium term. The transmission mechanism runs from rising interest rates to lower consumption and investment, resulting in higher unemployment and lower bargaining power of workers. Since price stability is indispensable for the stability of a monetary market economy, there is usually no alternative to such a stabilization crisis.

In the present context, however, such a course of action would appear excessive given the complexity and strength of the shocks, on the one hand, and the relatively moderate wage reaction, on the other. Declining energy prices and receding profits in line with easing bottlenecks should compensate for the mild wage overshoot. As inflation falls, the pressure to demand high wages in an effort to maintain real wages will be reduced. In addition, several euro countries feature one-off payments that do not permanently increase wage costs. In Germany, the one-off inflation compensation premium is moreover free of taxes and social security contributions which means labor costs increase less than employees' net incomes and price pressure is further reduced.

The nature of inflation expectations as second-round effects is quite different, as they can only lead to persistent inflation if they induce a rise in wages that is not compatible with the inflation target. Otherwise, higher inflation expectations may initially cause higher prices and profits, but these would rapidly disappear in the absence of rising wages. Higher inflation expectations can only produce a price jump, not inflation characterized by cascading wages and prices.<sup>9</sup>

Given the absence of excess demand in the euro area, which would promote excessive profit and wage increases even after the price shocks and supply bottlenecks have dissipated, there is no need for monetary restriction aimed at reducing aggregate demand and increasing unemployment.

## FISCAL OR FINANCIAL MARKET DOMINANCE UNLIKELY

The empirical finding of longer-term inflation expectations being anchored to the ECB's inflation target is not only the result of the ECB's credible efforts to ensure price stability in line with its mandate, but also due to the low risk of monetary policy being dominated by fiscal policy or financial markets (→Infobox 1).

<sup>9</sup> Theoretically, inflation expectations could give rise to profit inflation characterized by excess demand due to high investment allowing enterprises to maintain high profit margins.

The two types of dominance can arise when monetary policy tightening produces such adverse effects on government budgets or financial markets that the central bank must abandon its restrictive stance to avoid an economic meltdown. Fiscal dominance in this sense is the consequence of an insufficient ability of the government to raise its tax revenue sufficiently to meet its obligations, e.g. interest payments that have increased as a result of monetary policy tightening.<sup>10</sup> In extreme cases, monetary reform is inevitable, as in Germany after World War II, or the destruction of monetary assets through hyperinflation as in Germany after World War I or in Serbia after the collapse of Yugoslavia (Tober 1997).

Financial market dominance may result from a fragile, underregulated banking system, but also from speculative attacks. The banking system in the euro area is relatively robust given tighter regulation since the global financial crisis and the ECB's expanded and flexible macroprudential toolkit. Furthermore, member states would ultimately backstop the banking system. To counter speculative attacks against individual euro countries, the ECB is able to selectively reinvest maturing bonds of the pandemic purchase program (Figure 6) and activate the new instrument for safeguarding monetary policy transmission (TPI, Transmission Protection Instrument) introduced in July 2022. Especially in times of war, neither fiscal-policy nor financial market dominance can be categorically ruled out, but by international comparison, the euro area is well positioned.

## PRUDENT MONETARY POLICY WITH A VIEW TO PRICE STABILITY, EMPLOYMENT AND CLIMATE CHANGE

The ECB has already raised interest rates by 3.75 percentage points – by 2.5 percentage points in 2022 and by a further 1.25 percentage points in the first five months of 2023. This occurred in an environment where most of the other central banks also raised rates and fiscal policy globally is shifting to a restrictive stance. In addition, the price shocks themselves are exerting downward pressure on the economy.

Uncertainty about the combined effect of the energy price shocks and monetary policy tightening in the current economic and geopolitical environment strongly suggests a more prudent approach.

<sup>10</sup> In contrast, Cochrane (2022) argues that fiscal dominance is the general case and fiscal policy ultimately determines the level of inflation.



This applies all the more as rate hikes have lagged effects and the ECB has so far primarily reacted to risks, in particular the risk of inflation expectations de-anchoring and of excessive wage settlements preventing a return to price stability. Since inflation expectations remain close to target in the medium term and wage settlements, although currently excessive, include a downward trend, it would be wise to refrain from further rate hikes for the time being.

The ECB itself assumes that the key policy rate, the deposit rate, at 3.25% is already well in restrictive territory. The neutral level is estimated at below 2.5% (Lane 2023a). The International Monetary Fund also estimates the nominal equilibrium interest rate to be only slightly above the inflation target (IMF 2023: 45ff.).

The ECB is in a difficult position in that wage settlements are currently too high to be compatible with the inflation target and profits have also risen sharply in some sectors. Both could be signs of excess demand, requiring restrictive monetary policy to keep inflation from becoming entrenched above 2%.

However, the fact that wage increases, especially in the larger countries, have one-off components which are likely to contain future increases, suggests that inflation will not get stuck above target. Secondly, the economy already stagnated in the winter half-year. The expected recovery is weak, with GDP rising by around 1% this year and around 1.5% in 2024 (Dullien et al. 2023, IMF 2023, ECB 2023a). Compared with the pre-pandemic level in the fourth quarter of 2019 – i.e. in more than three years – GDP in the euro area increased by only 2.4% (Q1 2023; USA: 5.3%). Private consumption in the fourth quarter of 2022 was 0.8% below pre-pandemic levels (U.S.: +7.5%), and gross fixed capital

formation was 5.3% lower (U.S.: +6.9%). Although the standard unemployment rate in the euro area has reached a historic low, at 6.5% it is almost twice as high as in the United States (3.5%). Moreover, it is primarily the reduction in Germany's unemployment that merits the label historic: The unemployment rate in the euro area was pulled up by Germany with a rate of 7.8% at the previous low of 7.3% in March 2008 and is currently being pushed down by Germany with a rate of only 2.8%. At 7.8%, the unemployment rate for the euro area excluding Germany is currently well above the historic low of 7.1% reached at the turn of 2007/2008. Moreover, at 13.5% or 23.5 million people, underemployment in the euro area as a whole is more than twice the usual standardized unemployment rate (Q4 2022; Germany: 6.8% or 3.1 million) (Figure 4).<sup>11</sup>

There is no doubt that wage pressure has increased, even if negotiated wages increased by only 2.9% in the last two quarters of 2022. Compensation of employees including extra payments was 5.1% higher in the fourth quarter of 2022 compared to one year earlier, after 3.0% in the third quarter.

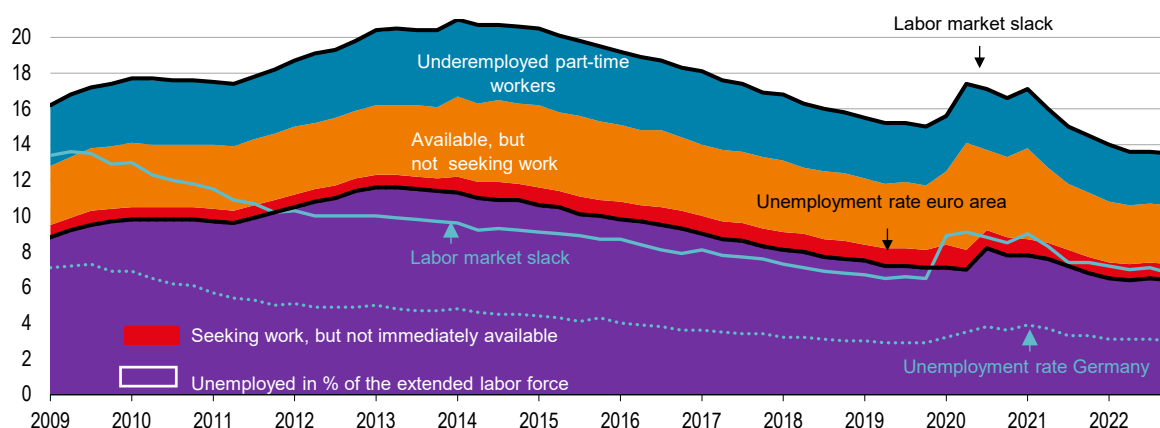
Monetary policy is already restrictive, the energy price shocks have largely receded, food prices are starting to decline – in part because of lower energy costs –, and profits should decline in the wake of lower energy prices and the resolution of supply bottlenecks. As a result, not only will the price shocks drop out of the inflation rate, but there is

11 The rate of underemployment or labor market slack as measured by Eurostat includes the unemployed as well as persons involuntarily working part-time, persons seeking work, but temporarily unavailable and those who are available, but not actively seeking work.

Figure 4

### Labor Market slack in the Euro Area

percentages of the extended labor force, Q1 2009 – QIV 2022



Source: Eurostat, Unemployment statistics according to the ILO concept.

also a tendency for some prices to fall. Hence, inflation should decline to close to target during 2024 despite the elevated wage pressure. This is important because the second-round effects in the euro area emerged primarily a consequence of the real wage losses caused by the historic price shocks, in contrast to the United States, where they resulted from both prices shocks and tight labor markets (Bernanke and Blanchard 2023).

Reaching near-target inflation in the course of 2024 is in line with the ECB's medium-term orientation since the largest gas price increase took place only in August 2022, long after the first price shocks in 2021.

The risks of overly restrictive monetary policy are considerable. The financial market turmoil triggered by the distress of Silicon Valley Bank and Credit Suisse recently highlighted the risks for the banking sector, which could lead to a tightening of credit (ECB 2023c). Another risk consists in further depressing the already weak economy. The lower the growth rate, the more difficult it will be to overcome the loss of household purchasing power caused by the terms-of-trade shock, and the stronger the pressure for unions to secure real wages.

The economic risks are particularly high for those euro countries that suffered the greatest economic slump during the euro crisis and shoulder a correspondingly high government debt ratio. The Greek government, whose ten-year bond yields soared to above 20% in 2011 and above 30% in 2012, had to pay 4.2% interest on a ten-year government bond in April 2023 compared with 1.6% in January 2022 and 2.4% for Germany (January 2022: -0.1%). Italy has an equally high yield differential of 1.9 percentage points; at the beginning of 2022, it was only

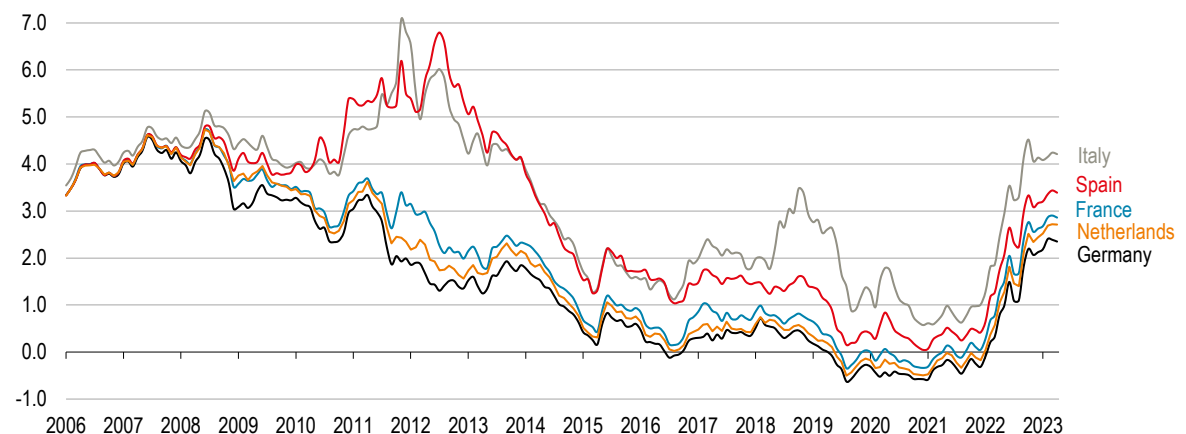
1.3 percentage points, and in the first nine years of monetary union until the global financial crisis, the yield differential was 0.2 percentage points on average (Figure 5). High yields weigh heavily, especially since they affect not only the government's financing conditions but also those of the private sector, thereby reducing investment, and in particular capital-intensive investment required for the transition to zero emissions (Theobald and Tober 2020).

Increased investment is a prerequisite for limiting global warming to 1.5 °C. As an official EU institution, the ECB is also committed to this goal of the Paris Agreement. Therefore, the ECB, whose activities are the basis of all lending, should introduce measures to ensure that the carbon footprint of investment activities is reflected in financing conditions. In fact, the ECB has already taken first steps, for example by favoring green bonds when reinvesting maturing securities under the APP purchase program and by announcing that at some point in the future, bonds will only be accepted as collateral if the issuer publishes relevant climate indicators. The vague timetable should be made specific and in the near future, bonds should only be accepted as collateral if they are not classified as climate-damaging according to the EU's taxonomy (Tober 2021). So far, this central bank eligibility has been granted solely based on the credit risk. As the stamp of central bank eligibility entails a reduction in financing costs, urgently required climate-friendly investments would benefit from relatively lower financing costs.

This is particularly important as from July 2023, the ECB will no longer reinvest maturing securities from its largest securities purchase program (APP) and the option of favoring green securities will

Figure 5

10-year government bond yields of the 5 large euro countries in %



Source: Macrobond.



therefore no longer be available. For the second half of 2023, the decision not to reinvest implies a reduction in total assets by an average of €24.8 billion per month, following a reduction in the volume of securities by €15 billion per month since March 2023. The volume of securities acquired for monetary policy purposes, excluding the PEPP pandemic emergency program, will decline by almost 10% per year, assuming a similar maturity structure as this year and implying a further tightening of the ECB's monetary policy (Figure 6).

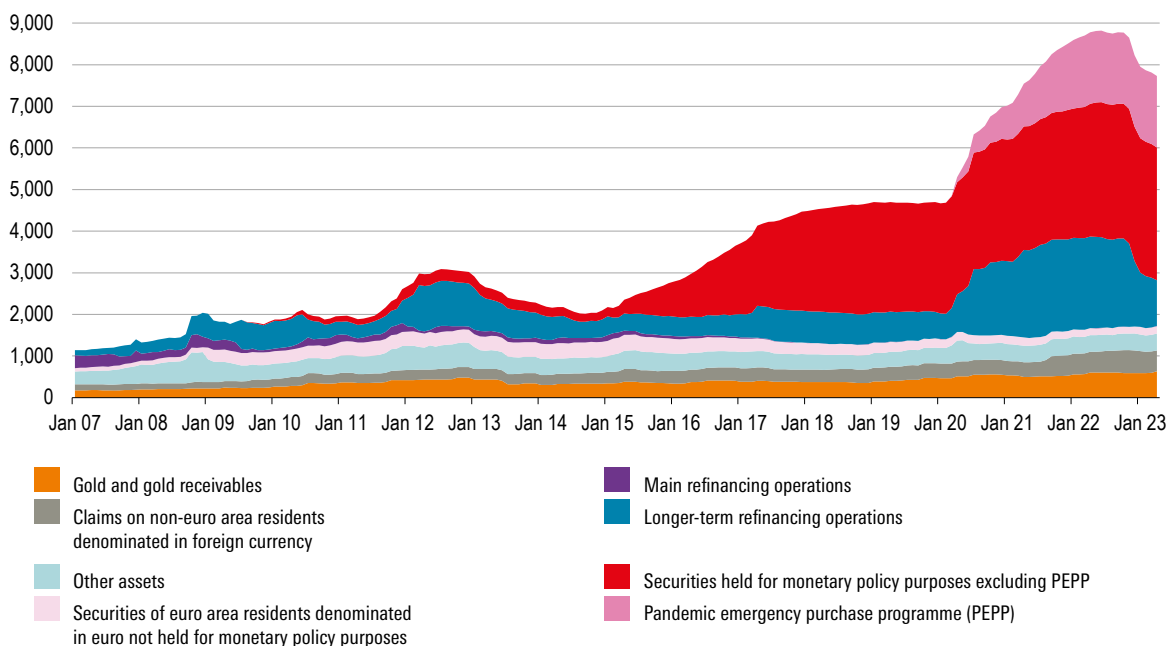
The ECB is currently on a risky course, also in light of its own strategy (Dullien und Tober 2021) and its own interpretation of inflation dynamics. Although the economy is weak and the economic outlook subdued, ECB President Lagarde already announced further rate hikes at the most

recent ECB meeting, where the key interest rates were raised by 0.25 percentage points, stating that “we know that we have more ground to cover” (Lagarde 2023). Bundesbank President Nagel also believes that further rate increases are necessary (Nagel 2023). However, the previous interest rate hikes of 3.75 percentage points take effect with a delay of several quarters, and already in the first quarter of 2023, according to the Bank Lending Survey, banks' lending standards have tightened more than at any time since the global financial crisis, the loan rejection rate has shot upward, and the demand for credit has declined much more than banks had expected (ECB 2023c).

Figure 6

### Consolidated Financial Statement of the Eurosystem (Assets)

bn. €, monthly averages, January 2007 – April 2023



Sources: European Central Bank; IMK calculations.





## Infobox 1: Inflation expectations

Central banks have to monitor medium- and long-term inflation expectations because inflation expectations that exceed the inflation target may generate overall price increases above 2%. In such a situation, one speaks of the de-anchoring of inflation expectations. Coleman and Nautz (2023) conclude from the high correlation between inflation expectations and actual inflation in survey-based inflation expectations of mid-2022 that inflation expectations have decoupled from the inflation target. A similar conclusion could be drawn from the March 2023 consumer survey conducted by the German Bundesbank (2023b), where the expected average inflation rate exceeds 6% over the next twelve months.

However, there are two important caveats when interpreting inflation expectations: First, the shorter the horizon inflation expectations, the more they mirror actual inflation (Blot 2022). Second, survey participants tend to overrate the importance of actual inflation for their medium-term expectations (extrapolation bias). The analysis presented here therefore uses market-based 5-year inflation expectations derived from swap transactions as it seems reasonable to assume that the individuals involved will be clear on the medium-term nature of their expectations given that the contracts are binding.

Market-based inflation expectations are derived from swap transactions using various time series like the fixed interest rate, the variable rate, the consumer price index, and the forward-rate formula that calculates the forward rate based on the no-arbitrage assumption and spot interest rates for different durations (Figure 7). Theoretically, a case

can be made for including time-varying risk premia to account for liquidity and inflation risks because studies have found the forecast quality of market-based inflation expectations to be better when thus specified (Kajuth and Watzka 2011). However, as far as we could ascertain, the two most popular time series presented here are not adjusted for risk premia.

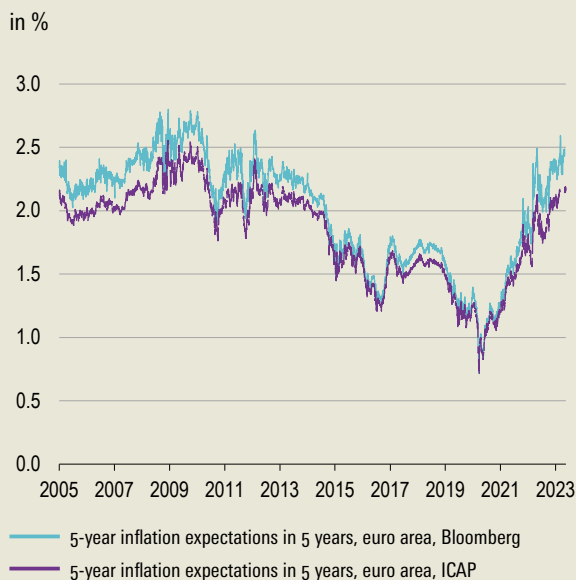
Figure 7 shows the market-based inflation expectations provided by Bloomberg and ICAP on a daily frequency since 2004. Although they are largely congruent over the years and indicate the same regimes with an elevated de-anchoring risk – with inflation expectations either high or low – the discrepancies between the two time series and their variation over time caution against overinterpreting small deviations in the order of up to 0.5 percentage points. The current level of the frequently cited Bloomberg data is only roughly at the level of before mid-2007, which is not generally viewed as a period with a pronounced risk of expectations de-anchoring (Wolmershäuser and Moehrlé 2020). Based on the historical differences between Bloomberg and ICAP data, we find no evidence for a fundamentally better informative value of the Bloomberg data regarding a possible de-anchoring, even if the Bloomberg data are more frequently used for this purpose and the number of swap transactions might be larger.

Tober and Theobald (2021) present a parsimonious autoregressive econometric specification for inflation expectations as a function of core inflation, as well as the change in the real price of crude oil and in real hourly wages (Table 1). On the part of the explanatory variables, the coefficient of the lagged inflation expectations stands out with a value close to 1 implying a high persistence of inflation expectations. According to the specification, a de-anchoring of inflation expectations is therefore only possible gradually or in the case of very large shocks to the other regressors (current core inflation and the change in the real price of crude oil or in real wages).

Figure 8 shows the historical values and the forecast assumptions for the explanatory variables until the end of 2024 based on Tober and Theobald (2021) and the IMK's spring forecast (Dullien et al. 2023). The latter assumes no further energy price shocks. However, the indirect effects of the energy price shocks in 2022 cause core inflation to initially move sideways in 2023 and to decline noticeably only in the second half of the year. In the course of 2024, core inflation reaches the inflation target and even falls slightly lower. The opposite is true for real wage changes, that are assumed to return to positive territory year-on-year from the second quarter of 2023 and then stabilize at a moderate level in 2024. As always, there is a considerable degree of forecast uncertainty about the future course of the explanatory variables as well as uncertainty about the data-generating (stochastic) process of infla-

Figure 7

### Market-Based Inflation Expectations Derived from SWAP Transactions



Sources: Bloomberg; ICAP; Macrobond.



Table 1

### Regression model for inflation expectations based on potential predictor variables

	(1)	(2)
Sample:	2008M1-2022M3	2008M1-2023M3
Dependent variable:	$\pi^e$	$\pi^e$
Inflation expectation 5Y5Y	0.973***	0.982***
(-1)	(0.009)	(0.005)
Core inflation	0.034**	0.018***
	(0.014)	(0.005)
$\Delta$ log Real crude oil price	0.001***	0.001***
	(0.001)	(0.001)
$\Delta$ log Real hourly wages	0.005*	0.005*
	(0.003)	(0.003)
Adjusted R <sup>2</sup>	0.971	0.969
Schwarz-Bayes criterion	-11.638	-11.633
BG-LM test (-1, ..., -12)	0.715	0.422
Breusch-Pagan-Godfrey test	0.001	0.458
Ramsey reset test	0.506	0.315

The table shows the results of the regression of long-term inflation expectations on their potential determinants (Tober / Theobald 2021). Standard errors are given in brackets. \*, \*\* and \*\*\* stand for significance based on an error probability of 10%, 5% and 1%. For the diagnostic tests, p-values are given. BG-LM test (-1, ..., -12) stands for the Breusch-Godfrey-Lagrange multiplier test with the null hypothesis that the residuals show no autocorrelation up to the 12th lag, Breusch-Pagan-Godfrey test for a test with the null hypothesis of homoscedasticity and Ramsey reset test for a test with the null hypothesis that the linear specification is stable.

Source: IMK calculations



tion expectations. Nevertheless, it is instructive to forecast inflation expectations according to such a specification and to compare this forecast with forecasts from earlier data publications, when, for example, core inflation was still rising significantly.

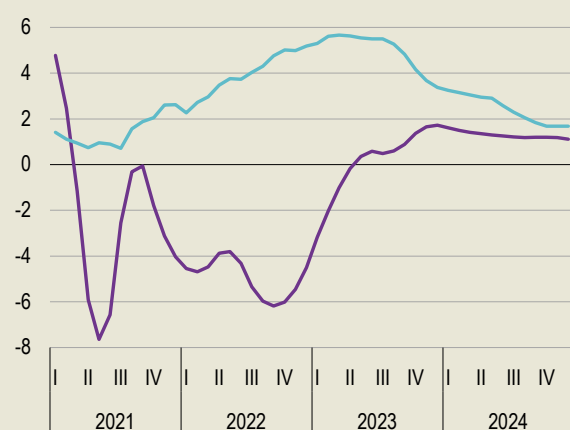
Figure 9 illustrates this simple, rolling forecast comparison of inflation expectations since early 2022 on the basis of ICAP data. Given the respective forecasts of inflation expectations, the ECB's monetary policy (policy rate increases, reduction of the reinvestment of maturing government bonds) can initially be fundamentally reconciled with the aim of preventing a de-anchoring of expectations. As of the summer of 2022, when the ECB began to raise interest rates, the peak of the predicted inflation expectation declines with each data vintage. Since the forecast assumptions for the explanatory variables are unchanged, this result is mainly due to the fact that market-based inflation expectations have essentially moved sideways since autumn 2022.

This effect is supported by the fact that the estimated coefficient of core inflation roughly halves between the forecast in April 2022 and the forecast in April 2023. Taking into account the above-mentioned 0.5 percentage point band around the inflation target in which inflation expectations can be considered to be anchored, the additional interest rate steps in 2023 are difficult to motivate with the risk of inflation expectations de-anchoring.

Figure 8

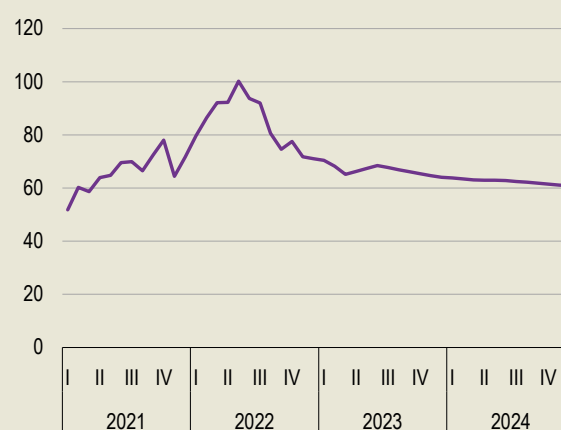
### Explanatory variables of inflation expectations, including forecasts

a) Change over previous year, in %



— HICP excluding energy, food, alcohol and tobacco  
— Real wages

b) USD/barrel



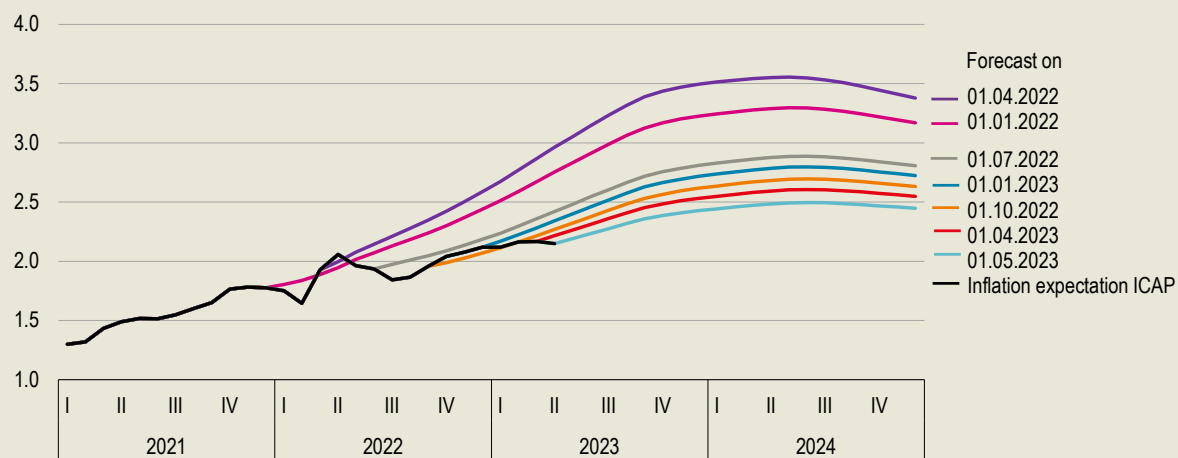
— Real crude oil price (Brent)

Sources: Eurostat; IEA; IMK calculations.



**Rolling forecast of inflation expectations**

in %



The inflation expectations are calculated based on the monthly average of daily market data (average quotations). Alternatively, inflation expectations could be calculated daily and then averaged over each month.

Source: IMK calculations.



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