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The ECB's monetary tightening: a belated start under uncertainty

Policy Department for Economic, Scientific and Quality of Life Policies
Directorate-General for Internal Policies
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Abstract

This paper contrasts macroeconomic developments and monetary policy measures of the European Central Bank with the Federal Reserve, Bank of England, and Bank of Japan, assesses the ECB policy errors that occurred in the last year, and the appropriateness of the current monetary policy stance of the ECB.

This paper was provided by the Policy Department for Economic, Scientific and Quality of Life Policies at the request of the Committee on Economic and Monetary Affairs (ECON) ahead of the Monetary Dialogue with the ECB President on 26 September 2022.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs (ECON).

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CONTENTS

LIST OF ABBREVIATIONS

APP	Asset purchase programme
CPI	Consumer price index
ECB	European Central Bank
GDP	Gross domestic product
HICP	Harmonised index of consumer prices
PCE	Private consumption expenditures
PEPP	Pandemic emergency purchase programme
TLTRO	Targeted longer-term refinancing operations
TPI	Transmission protection instrument
UK	United Kingdom
US	United States

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EXECUTIVE SUMMARY

- **Inflation pressures emerged in the United States (US) and the United Kingdom (UK) earlier than in the euro area**, while there is hardly any pressure in Japan. Inflation in the euro area mainly results from supply shocks, while in the US and UK there is a strong demand component. The European Central Bank (ECB) raised interest rates some months after the Bank of England and Federal Reserve, which is in line with the macroeconomic differences. Nevertheless, **all three central banks have tightened belatedly**.
- Even if inflation is primarily supply-driven in the euro area, it might result in persistent medium-term inflation. **A central bank with a price stability mandate should end its expansionary monetary policy when inflation moves significantly above target.** The question is the ultimate value of the central bank interest rate.
- No forecasters predicted a strong and long-lasting increase in euro area inflation in late 2021, nor the energy supply problems resulting from Russia's invasion of Ukraine. **It would be unfair to blame the ECB for not raising rates already in 2021**. However, our analysis suggests **the ECB made mistakes** at its December 2021 monetary policy meeting, which have been corrected only slowly:
  - The **claim that monetary accommodation was still needed** when inflation was well above target and rising, the growth outlook was strong, and risks were balanced, **was not well justified** in our view.
  - **The forward guidance on the level of interest rates was data-dependent, but another condition for an interest rate increase was the termination of asset purchase programme (APP) net purchases, which was date-dependent.** Forward guidance on asset purchases should have been data-dependent as well.
  - The **forward guidance on APP net purchases was extended beyond October 2022** at a time of high and rising inflation and strong growth.
  - Interest rate forward guidance put **too much emphasis on ECB staff forecasts**, even though staff forecasts had a poor track record in the 5-year period prior to the COVID-19 pandemic, when no major shock hit the economy.
  - Even though the July 2021 monetary policy strategy review underlined the importance of **owner-occupied housing cost inflation**, this was not taken into account in the inflation forecast. Including it could have brought the December 2021 inflation forecast above 2% in 2023 and 2024.
  - Following the planned end of pandemic emergency purchase programme (**PEPP**) net purchases in March 2022, **APP** net purchases were to increase from April, suggesting a kind of **compensation**, even though the two instruments had different goals.
  - **Fears of market fragmentation** might have partially motivated the extension of APP asset purchases; instead, it would have been preferable to introduce earlier a transmission protection instrument.
- Looking ahead, many factors suggest slowing economic activity, and a recession is likely in case of an eventual complete stop in Russian gas supply. We **recommend a gradual pace of interest rate hikes** until the economic fallout from the war becomes observable.

- We recommend the ECB to ease the adverse inflationary impact of energy-supply bottlenecks at a time of monetary tightening by designing a **special longer-term refinancing operation** aimed at providing favourable conditions for investments in **energy** efficiency improvements and clean energy generation.

1. INTRODUCTION

Euro area inflation reached 9.1% in August 2022, well above the European Central Bank's (ECB's) 2% target. Inflation is similarly high in the United Kingdom (UK) and United States (US), but much lower in Japan. Inflation rates well above the target raises two important questions. First, have the ECB, the Bank of England and the Federal Reserve made mistakes allowing inflation to accelerate so much, for instance by reacting belatedly and insufficiently so far? Even if one concludes, with the benefit of hindsight, that central banks acted belatedly, should they compensate by increasing interest rates fast or would a more gradual approach be preferable?

Monetary conditions were very expansionary during the pandemic and the current 0.75% ECB deposit facility interest rate is still expansionary. A central bank with a price stability mandate should end an expansionary monetary policy when inflation moves significantly above target, even if inflation is primarily supply-driven and monetary policy can best address demand shocks and influences the economy with a time lag. The issues to consider are, then, the level to which the policy rates should be raised, its timeframe, as well as the modalities of the reduction of ECB balance sheet. But a mix of factors complicated the ECB's task to take decisions to address inflation:

- the recovery of euro area private demand from the COVID-19 pandemic has been incomplete and inferior to the US and the UK;
- wage growth has hardly picked up in the euro area, in contrast to the US and the UK;
- core inflation (which does not include energy and food) reached 4.3% in August 2022, suggesting a broad-based inflation pressure, yet core inflation increased to a higher level in the US and the UK than in the euro area;
- the economic consequences of the Russian invasion of Ukraine have already started to weaken the euro area economy;
- the energy price shock (which is a supply shock) is much stronger in the euro area than in the US and the UK;
- energy supply shortages (in case of a complete stop in Russian gas supply) might generate a recession in the euro area, while the US and the UK would not face such shortages;
- financial markets and professional forecasters expect 2.1% euro area inflation in 2024 and around 2% inflation in later years. But this is possibly because these forecasters expect the ECB to take appropriate measures to control inflation, or they expect the current inflation shock to be temporary, or they believe high inflation without accelerated wage growth will depress demand;
- 3-year ahead inflation expectations by consumers increased, on average, from 3% in early 2021 to 4.7% in July 2022, thus these expectations are back to where they were in April 2020;
- Bottlenecks in the supply of various materials, components and food resulting from the war might persist and intensify.

The goal of this paper is to compare economic environments and monetary policy decisions over the past year in the euro area, the United States, the United Kingdom and Japan, to assess if the ECB made policy errors in the last year, and to make recommendations for the conduct of ECB monetary policy.

2. MONETARY POLICY AND MACROECONOMIC DEVELOPMENTS

2.1. Differences in monetary tightening by four major central banks

The four main advanced economies' central banks adopted different strategies for their monetary policy (Table 1). The Bank of England was the first to start raising rates, followed by the Federal Reserve, and both of these central banks raised rates a few times now. In contrast, the ECB's first rate increase was in July 2022 which brought the deposit facility interest rate from negative to zero, followed by an increase to 0.75% in September. The Bank of Japan has not yet started to raise rates.

On the balance sheet side, the three central banks that raised policy rates so far have previously stopped net asset purchases. The ECB is following a full reinvestment policy, which means that it will reinvest maturing asset holdings at least until the end of 2024 in the case of the pandemic emergency purchase programme (PEPP) and for "*an extended period of time past the date when it starts raising the key ECB interest rates*" in the case of the asset purchase programme (APP). The Bank of England and Federal Reserve, instead, announced that they will gradually reduce their monetary policy holdings.

Table 1: Monetary policy choices after the COVID-19 pandemic up to 8 September 2022

	Bank of England	Federal Reserve	European Central Bank	Bank of Japan
Main interest rate	Since 16 Dec 2022: Bank rate was raised 6 times from 0.1% to 1.75%	Since 16 March 2022: Fed funds target range was raised 4 times from 0%-0.25% to 2.25%-2.5%	27 July 2022: Deposit Facility Rate raised from -0.5% to 0% 8 September 2022: deposit rate raised to 0.75%	The Policy-Rate Balance remains at a -0.1%.
Asset purchases	Net asset purchases stopped in November 2020. Reduction of holdings from February 2022.	End of net asset purchases in early March 2022. Reduction of Fed holdings from beginning June 2022.	End of net asset purchases by 1 July 2022 (end of PEPP in end March 2022). Still keeping size of balance sheet with full reinvestment policy.	Reduction in commercial paper and corporate bond purchases (from April 2022), while continue buying other securities.
Other measures			The special conditions applicable under TLTRO III ended on 23 June 2022	

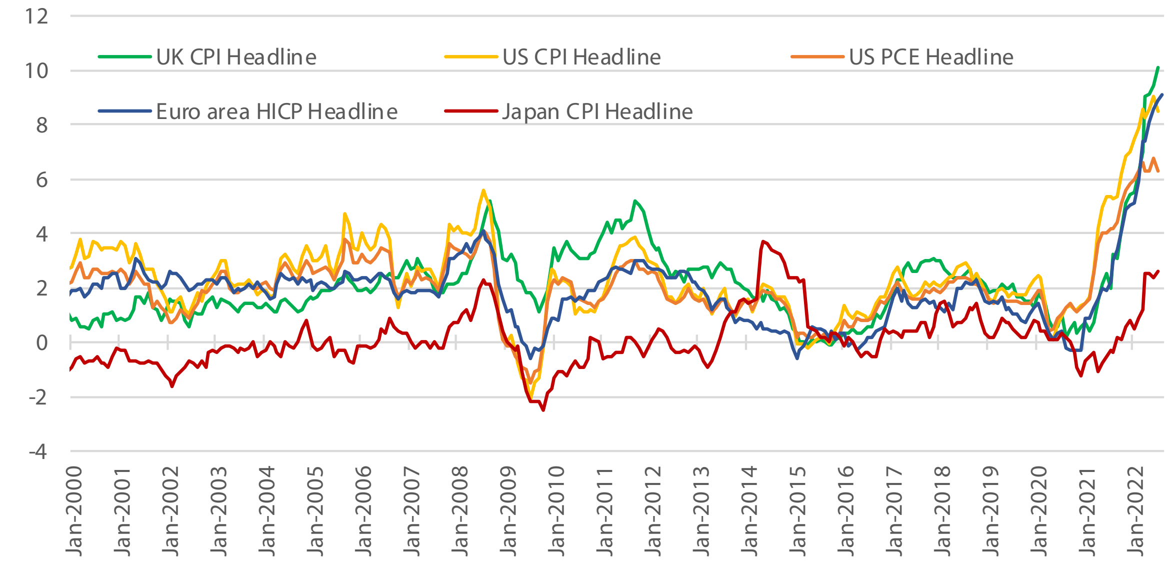
Source: ECB, Bank of England, Federal Reserve and Bank of Japan official websites.

2.2. Inflation dynamics

Before the global rise in inflation since 2021, the main narrative concerning inflation and interest rates was "low for long", arguing for the influence of structural reasons that keep real interest rates and inflation low. The situation has dramatically changed during 2021. Among advanced countries, inflation pressures emerged first in the United States in spring 2021, related to the recovery of the US economy and the massive fiscal stimulus that first President Trump and then President Biden implemented, while supply disruptions due to the COVID-19 pandemic resulted in shortages of key inputs.

Along with the global recovery from the COVID-19 pandemic, there was an increase in demand not matched by the supply in certain markets. This resulted in an increase in commodity prices in 2021. As the Russia's threat to invade Ukraine intensified during 2021, and especially after the invasion in February 2022, the increase of energy prices accelerated. Headline consumer price inflation reached 9-10% in the US, UK and euro area, though the increase of US private consumption deflator was slightly less (Figure 1)[1]. In Japan, the acceleration of inflation started even later, and the latest (July 2022) inflation rate was at a much lower level, 2.4%.

Figure 1: All items consumer price inflation (percent change compared to the same month of the previous year)



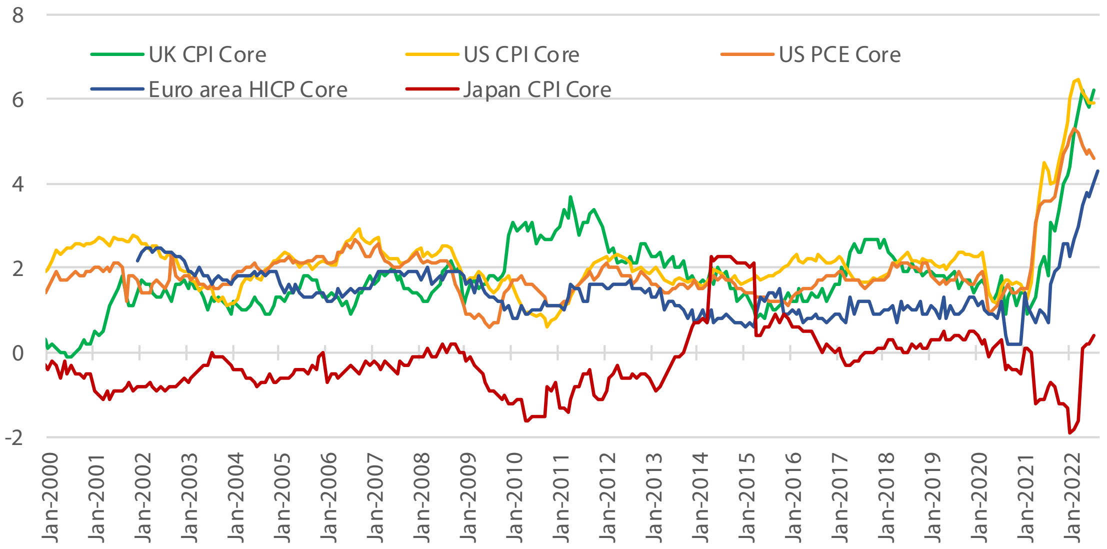
Source: FRED and OECD (US), Eurostat (euro area), ONS (UK), e-Stat (Japan).

Notes: CPI: consumer price index; HICP: harmonised index of consumer prices; PCE: price index of private consumption expenditures. The last observation is August 2022 for the euro area and July 2022 for the three countries.

The differences in inflation dynamics are even more visible in core inflation, which is the inflation rate excluding the volatile energy and food price inflation. The US core consumer price inflation started to increase in spring 2021 and reached 6% (5% for PCE). In the UK, core inflation started to rise a few months later than in the US and has similarity reached 6%. In the euro area, core inflation picked up even later and surpassed 2% only in November 2021. Still, by August 2022, it reached 4.3%. In Japan, core inflation just turned to positive in summer 2022.

[1] The Federal Reserve inflation target indicator is the price deflator of private consumption expenditures (PCE), not the consumer price index (CPI). There is a persistent gap between these two price indicators (Darvas and Martins, 2022). We report both PCE and CPI in Figure 1 and Figure 2, because CPI is more comparable with euro area, UK and Japanese data, but it is also essential to show the index targeted by the Federal Reserve.

Figure 2: Core consumer price inflation (percent change compared to the same month of the previous year)

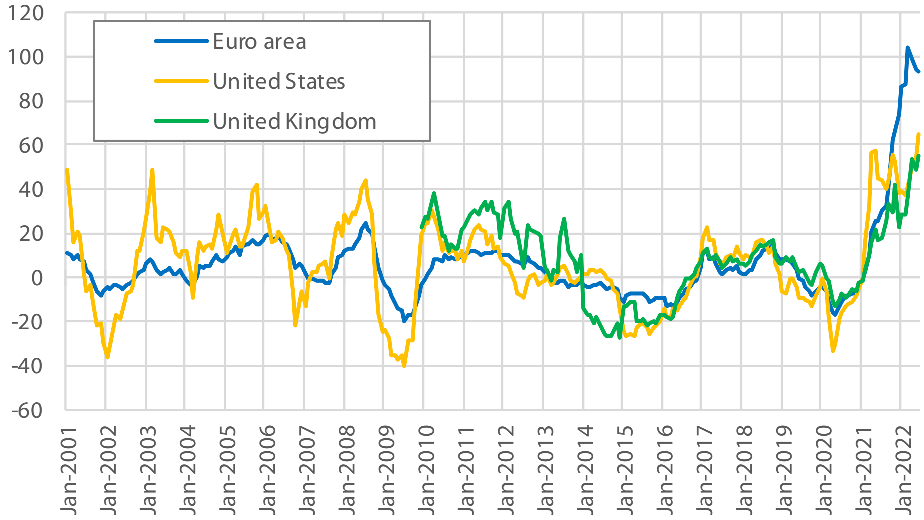


Source: FRED and OECD (US), Eurostat (EA), ONS (UK), e-Stat (JP).

Notes: CPI: consumer price index; HICP: harmonised index of consumer prices; PCE: price index of private consumption expenditures. The last observation is August 2022 for the euro area and July 2022 for the three countries.

Consumer price developments were influenced by the size of the energy price shock, which differed across the four economic areas. Figure 3 reports energy producers' price inflation, which reflects the energy price changes the companies faced. In the past, euro area and US energy producer price inflation tended to move in the same direction, reflecting common global movements in energy prices, even though US inflation was more volatile. In 2022, energy producer prices jumped to much higher levels in the euro area than in the US and the UK. The updated estimates of Venditti and Veronese (2020), presented by Lane (2022), show that the increase in oil prices in 2022 is almost entirely driven by the supply side, while the decline in oil prices was predominantly driven by demand after February 2020, when the spread of COVID-19 virus was declared a global pandemic.

Figure 3: Energy producer price inflation (percent change compared to the same month of the previous year)



Source: OECD Producer Prices dataset.

Notes: The OECD dataset does not include Japan.

Thus, inflation increased earlier and core inflation increased to a higher level in the United States and the United Kingdom than in the euro area, while the 2022 energy price shock (a supply shock) is the highest in the euro area. Japan has the lowest inflation pressure among the four economic areas. The different timing and magnitude of central bank monetary tightening is in line with these differences.

2.3. Inflation forecasts and expectations

The magnitude of inflation increase was unexpected by international organisations, professional forecasters and financial markets. The IMF's October 2021 World Economic Outlook argued that "*for the most part, price pressures are expected to subside in 2022*" and predicted a deceleration of consumer price inflation in 2022 in the United States and the euro area and a small acceleration in the United Kingdom in 2022, with a deceleration in 2023 (Table 2). A month later, the November 2021 European Commission forecast predicted similar tendencies with slightly higher, 2.2%, euro area inflation in 2022. In December 2021, the Economic Outlook of the OECD foresaw 2.7% inflation in the euro area, to be followed by less than 2% inflation in 2023.

Table 2: Inflation forecasts by three institutions made between October-December 2021 (percent per year)

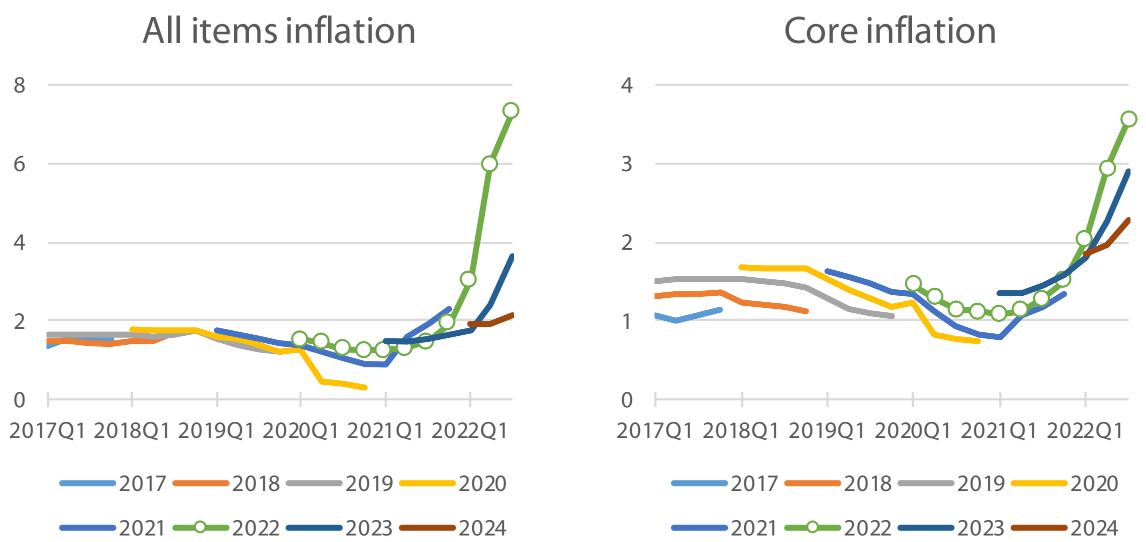
	IMF (October 2021 estimate)			European Commission (November 2021 estimate)			OECD (December 2021 estimate)		
	2021	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**
United States	4.3	3.5	2.7	4.3	3.3	2.2	3.9	4.4	2.5
United Kingdom	2.2	2.6	2.0	2.4	3.2	2.2	2.4	4.4	2.4
Euro area	2.2	1.7	1.4	2.4	2.2	1.4	2.4	2.7	1.8
Japan	-0.2	0.5	0.7	-0.5	0.2	0.4	-0.2	0.8	0.8

Source: IMF World Economic Outlook October 2021, European Commission's European Economic Forecast Autumn 2022 (published in November 2021), OECD Economic Outlook December 2021.

Private professional forecasters did no better in predicting the 2022 huge inflation surge. In the beginning of October 2021 (2021Q4 round of the survey), on average, over 50 professional forecasters predicted 1.9% all items inflation for 2022 in the euro area (left panel of Figure 4). In 2022Q1, the forecast for 2022 was raised to 3.0%, which was subsequently revised to over 7% by 2022Q3. Core inflation predictions reflect similar tendencies, even though, naturally, at lower levels (right panel of Figure 4).

Looking ahead, it is also notable that professional forecasters expect a significant deceleration of both all items and core inflation over the next two year, falling to 2.1% in 2024, which is almost equal the ECB's 2% inflation target.

Figure 4: Inflation expectations by professional forecasters (percent)



Source: ECB Survey of Professional Forecasters.

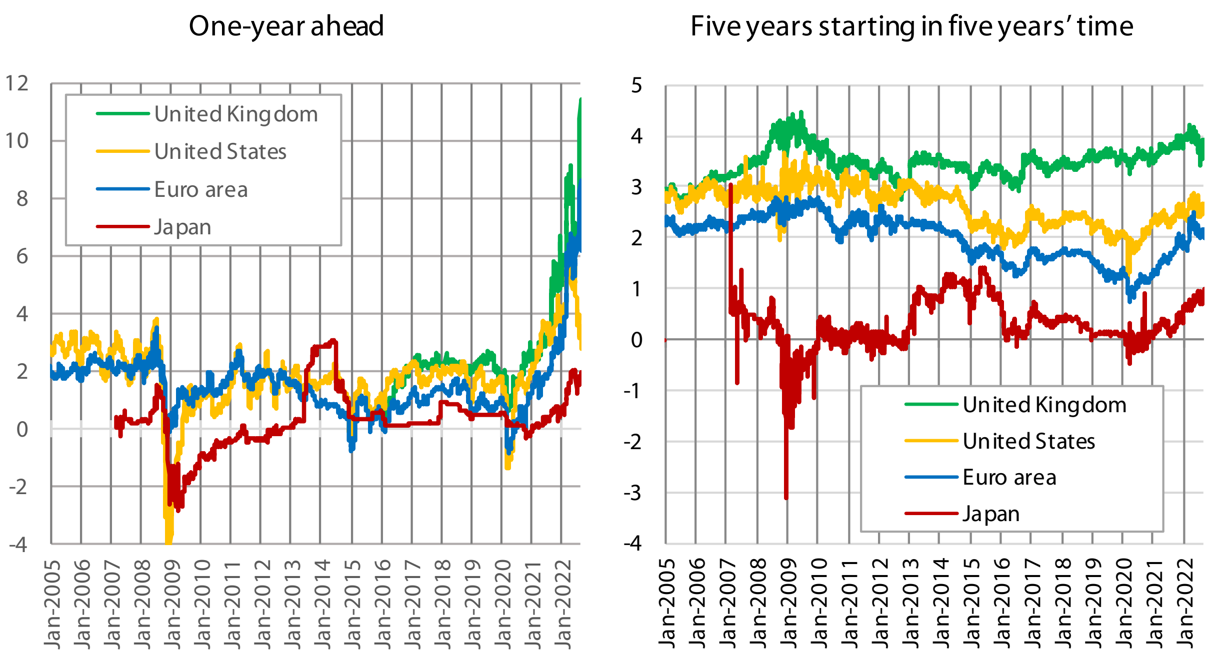
Notes: The Survey of Professional Forecasters is conducted regularly around beginning of January, April, July and October, respectively, for the Q1, Q2, Q3 and Q4 results, that are published towards the end of each of the months when the survey is conducted.

Market-based expectations show similar patterns to the forecasts of professional forecasters (left panel of Figure 5). For the euro area, one-year ahead inflation expectations were below 3% up to mid-December 2021. Such expectations increased to about 3.5% by mid-February 2022, and there was a more significant jump after the start of the Russian invasion of Ukraine from late February 2022. By mid-March, the one-year ahead inflation expectations in the euro area exceeded 6%.

The left panel of Figure 5 also shows that the one-year ahead expectations started to rise earlier in the United States and the United Kingdom when compared to the euro area, while for Japan, such expectations increased much later and to a lower level. These developments are in line with the different inflation pressures the four economies faced, as analysed in the previous section.

Longer-term expectations (five-year average inflation starting in five years' time) in the euro area are very close to the ECB's 2% target: after reaching a peak of 2.5% in late April/early May 2022, they fell back and fluctuated around 2.1% from late May to September 2022 (right panel of Figure 5). Such expectations for the United States were around 2.5%, 3.7% for the United Kingdom and 0.9% for Japan in early September 2022.

Figure 5: Market-based inflation expectations (inflation swaps, percent per year)

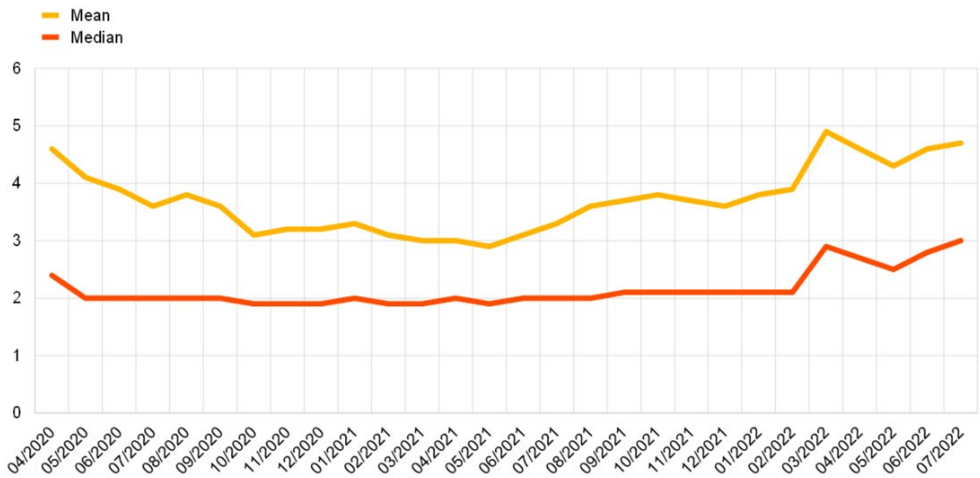


Source: Bloomberg.

On the other hand, the average medium-term inflation perceptions of consumers, as measured by the ECB's Consumer Expectations Survey, has increased to 4.7% by July from values close to 3% in summer 2021 (Figure 6). Thus, these medium-term consumer expectations are back to where they were in April 2020, when the first lockdowns had just started and there were shortages of some items in the supermarkets. The median value of consumer expectations increased from close to 2% in May 2020 – February 2022 to 3% by July 2022. The gap between the mean and the median suggests that consumers expecting a higher than the median inflation foresee a bigger positive gap to the median than the negative gap by those who expect a lower than the median expectations.

Nevertheless, by comparing consumers' perception of inflation over the past 12 months (9.5% on average), with expectations over the next 12 month (7.1%) and the 12-month starting in two years' time (4.7%), indicates that consumers expect a deceleration of inflation. The same tendency applies for median perceptions and expectations, which are 7.9%, 5.0% and 3.0%, respectively.

Figure 6: Consumer expectations survey: expected one-year inflation from two to three years from now (percent per year)



Source: ECB's Consumer Expectations Survey, https://www.ecb.europa.eu/stats/ecb_surveys/consumer_exp_survey/html/index.en.html

Notes: The question asked: "By about what percentage do you expect prices in general in the country you currently live in to increase/decrease over the 12-month period between two years from now and three years from now?"

Thus, neither the IMF, the European Commission, OECD, nor professional market forecasters, nor investors trading with inflation swaps foresaw the huge inflation spike of 2022. Forecasts and expectations suggested the strongest inflation pressure in the United States and the United Kingdom in 2021 and the weakest in Japan, with which the different sequencing of central bank actions is consistent. The market expectation of the return to the ECB's 2% inflation target by 2024 is consistent with the temporary nature of the current inflation spike, and/or with the belief that high inflation without accelerated wage growth would depress demand and prices, and/or with the expectation that the ECB will implement proper measures to bring inflation back to target. Long-term inflation expectations by professional forecasters and markets remained anchored at the ECB's 2% target so far, but consumer expectations increased since the middle of last year.

2.4. Macro developments

The stronger inflationary pressure in the US and UK than in the euro area and Japan is in line with aggregate macroeconomic indicators: estimated output gaps and private consumption and investment developments.

Output gap estimates are inherently uncertain, as we have also argued before (Darvas, 2019). Supply bottlenecks that arose with the COVID-19 pandemic and with the Russian war make the estimation of output gap even more difficult. Nevertheless, the cross-country differences of estimates made by a particular institution can reveal differences in the cyclical situation. Table 3 shows that the IMF estimated positive output gaps for the US and UK for 2022, but negative for the euro area and Japan. The European Commission estimated a positive gap for the US, almost zero for the UK, and negative for the euro area (no estimation is made for Japan). The OECD estimated negative output gaps for all four economic areas, yet estimates for the euro area and Japan were considerably lower than estimates for the US and UK. Thus, the estimates of all three main institutions regularly estimating output gaps suggest (a) more favourable cyclical positions in the US and UK than in the euro area and Japan, and (b) a negative output gap for the euro area.

A negative output gap *reduces* inflation, thus, if the sign of these estimates is correct, demand conditions cannot be the driver of current high inflation in the euro area.

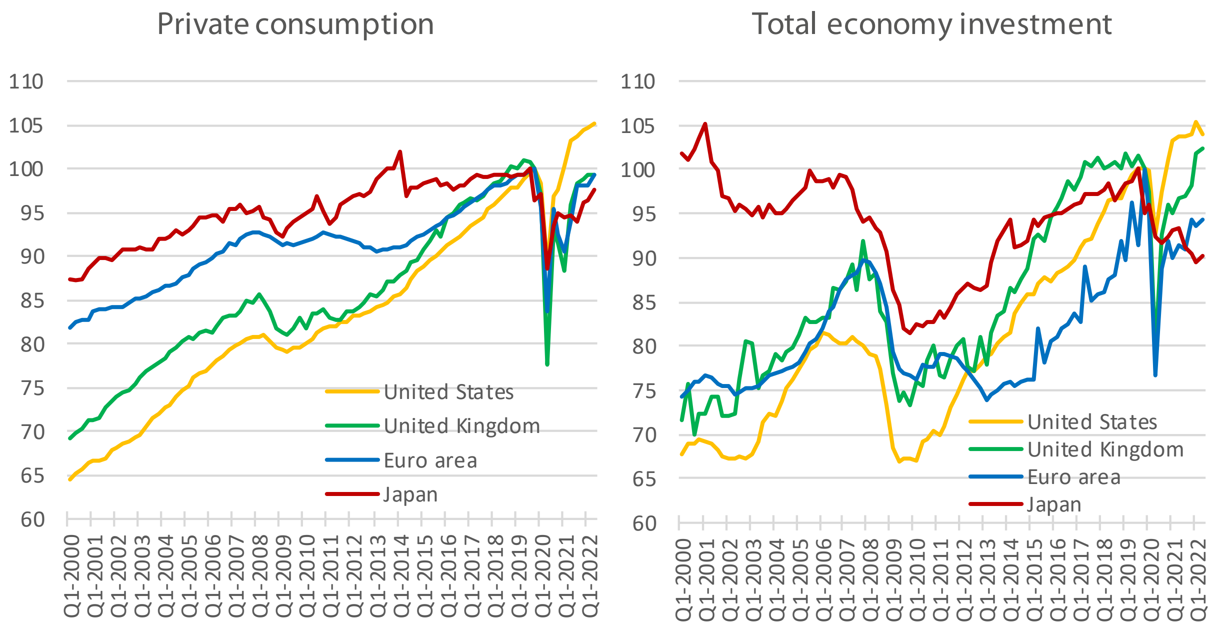
Table 3: Output gap estimates for 2022 (percent of potential output)

	IMF (April 2022 estimate)	European Commission (May 2022 estimate)	OECD (June 2022 estimate)
United States	1.6	0.8	-0.9
United Kingdom	1.4	-0.1	-0.9
Euro area	-1.0	-0.6	-2.3
Japan	-1.7	n.a.	-1.8

Source: IMF World Economic Outlook April 2022, European Commission's European Economic Forecast Spring 2022 (published in May 2022), OECD Economic Outlook June 2022.

The recovery of demand after the COVID-19 pandemic shock also differs across the four economies (Figure 6). In the US, private consumption already reached its pre-pandemic level by 2021Q1 and increased dynamically further, nearing its pre-pandemic trendline already from 2021Q2. Total US investment is not far from the pre-pandemic trendline. Private consumption in the UK, euro area and Japan has not yet reached its pre-pandemic level. The recovery of total investment was stronger in the UK than in the euro area and Japan.

Figure 7: Private consumption and total economy investment (2019Q4=100, chain-linked volumes)



Source: Bruegel based on OECD's and Eurostat's Quarterly National Accounts dataset.

Notes: Seasonally adjusted data. 2019Q3=100 for Japan. Investment: Gross fixed capital formation. The last observation is 2022Q2. Quarterly data on private investment is not available for the euro area and thus we report total economy investment for all four economies.

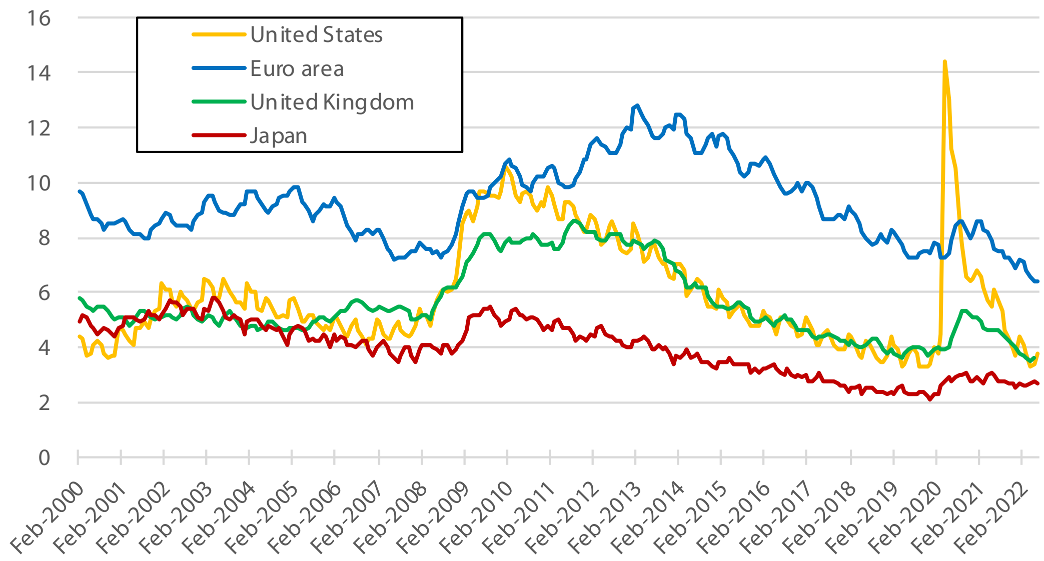
Therefore, main macroeconomic indicators suggest the strongest rebound of demand in the US, followed by the UK, while the recovery has been weaker and incomplete in the euro area and Japan[2].

2.5. Labour markets

In June 2022, the unemployment rate in the euro area fell to 6.4%, its lowest value since the creation of the euro (Figure 8). It is difficult to assess whether labour markets became tight in the euro area and thus whether the likelihood of a wage-price spiral has increased, because structural changes in the labour market, especially with the COVID-19 pandemic, make the estimation of any equilibrium rate of unemployment, such as the natural rate of unemployment or the non-acceleration wage (or inflation) rate of unemployment (NAWRU/NAIRU), uncertain. Nevertheless, wage growth in the euro area has hardly accelerated (Figure 9), in contrast to the UK and US, and the euro area unemployment rate is still well above the rate in the UK and US (Figure 8). Both wage growth and the rate of unemployment are the lowest in Japan among the four main economies.

[2] By analysing US data, Shapiro (2022) concludes that supply factors explain about half of the increase in US inflation, demand factors are responsible for about one-third, with the remainder resulting from ambiguous factors.

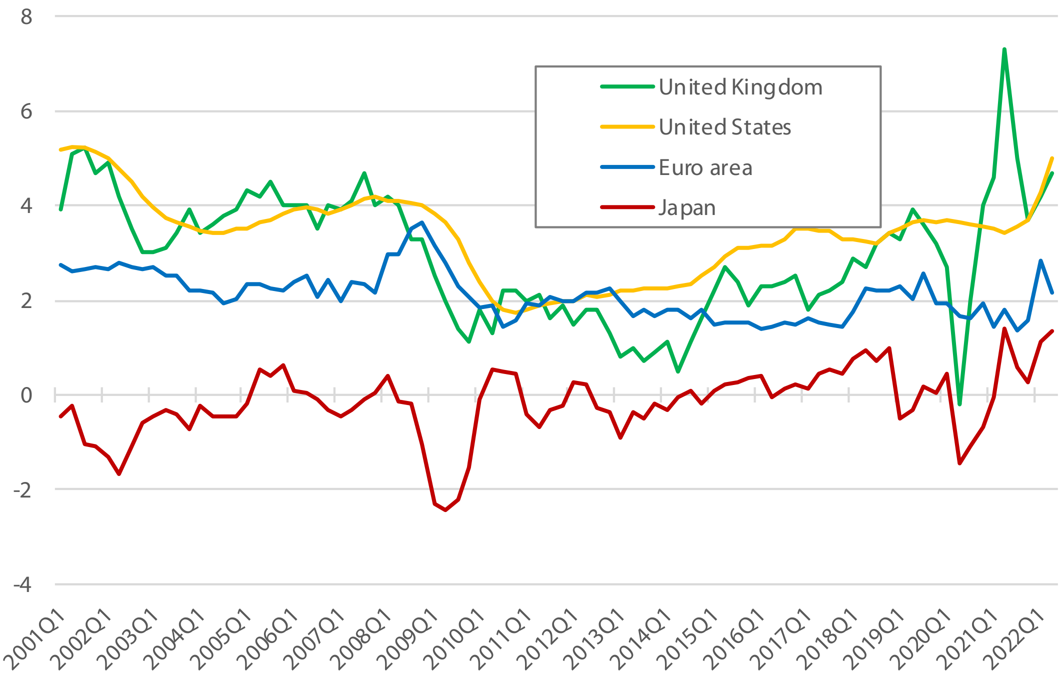
Figure 8: Unemployment rate (percent of labour force)



Source: Bruegel based on OECD's Short-Term Labour Market Statistics dataset.

Notes: Seasonally unadjusted data.

Figure 9: Nominal wage growth (percent annual change)

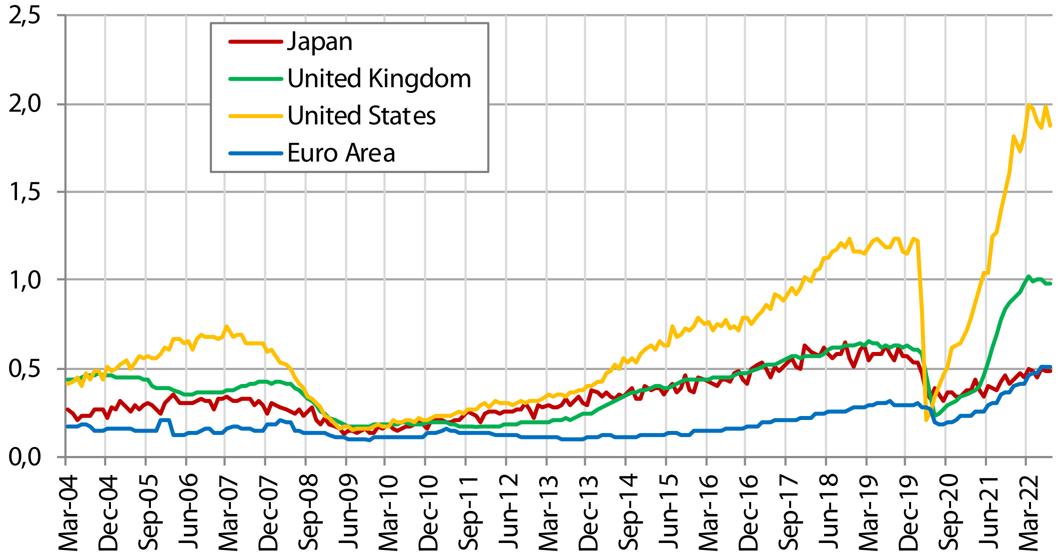


Source: Bruegel based on Eurostat, ONS, the Atlanta Fed and the Japanese ministry of health, labour and welfare.

Notes: Contractual wages for the euro area, UK and Japan. For the US, the data reflect 12-month moving averages of monthly median wage growth. Data definitions have specificities and thus the four lines are not fully comparable.

In the euro area and Japan, the ratio of the number of vacancies to the number of unemployed is about half, implying that there are two unemployed for a single vacancy (Figure 10). In the UK, the ratio is one, while in the US the ratio is two. While there are differences in the competences and skill sets of the unemployed and the vacancies, the ratio is indicative of the tightness of the labour market and suggest much tighter markets in the US and UK than in the euro area and Japan.

Figure 10: Ratio of the number of vacancies to the number of unemployed



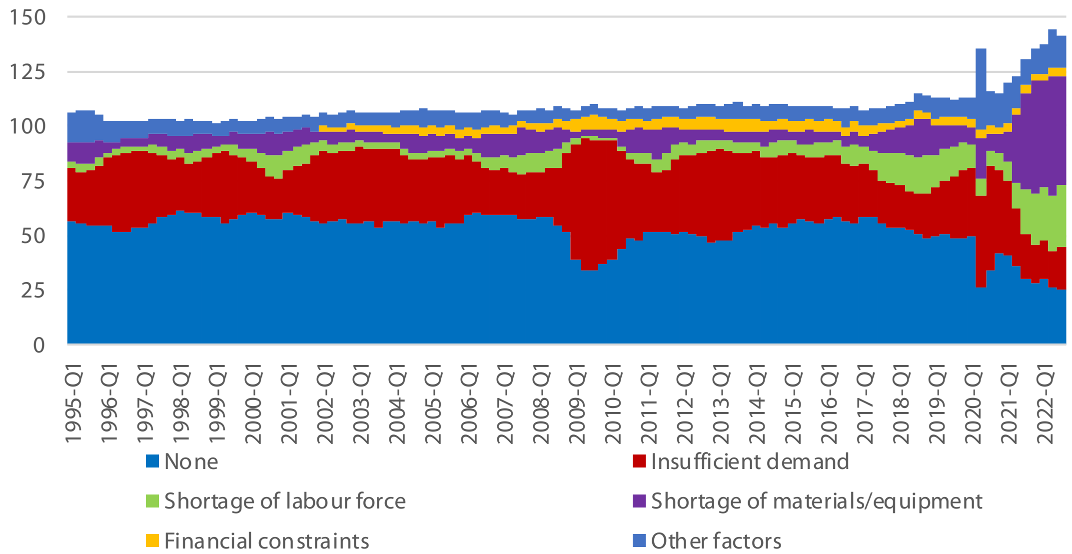
Source: Bruegel based on Bloomberg.

Notes: For the euro area, the number of vacancies was derived from the rate, using the following formula indicated on Eurostat: job vacancy rate = number of job vacancies * 100 / (number of occupied posts + number of job vacancies).

2.6. Factors limiting production

Finally, Figure 11 shows that the share of companies reporting no factor limiting production decreased from about one-half in 2019 to one-quarter in 2020Q2 with the outbreak of the COVID-19 crisis. There was some recovery by 2021Q2, but a fall since then. The biggest impeding factor became the shortage of materials and equipment (49% of companies in 2022Q3), followed by labour shortage (29%). Lack of demand is a constraint for 20% companies. Input and labour shortages point toward price pressures, while limited demand is disinflationary.

Figure 11: Factors limiting the production of euro area firms (percent)



Source: Bruegel based on European Commission's Joint Harmonised EU Industry Survey.

To sum up, inflation pressures emerged earlier in the United States and the United Kingdom than in the euro area, while there is hardly any pressure in Japan.

- Inflation increased earlier and core inflation increased to a higher level in the US and UK than in the euro area;
- the energy price shock is much higher in the euro area than in the US and the UK;
- estimates suggest negative output gap in the euro area, but positive in the US and UK;
- the recovery of euro area private consumption and investment from the COVID-19 pandemic has been incomplete and inferior to the US and the UK;
- wage growth has hardly picked up in the euro area, in contrast to the US and the UK;
- there are twice as many unemployed in the euro area then vacancies, but the opposite holds for the US;
- long-term expectations are well anchored in the euro area, but markets expect somewhat higher inflation in the US and UK;
- the shortages of materials and equipment supply is the main factor that limits production in the euro area.

Thus, inflation mainly results from supply shocks in the euro area, while there is a strong demand component in the US and UK.

3. EVALUATION OF ECB MONETARY POLICY STANCE

Overall, our data analysis in the previous chapter suggests that the Federal Reserve and the Bank of England had to tighten monetary policy earlier than the ECB, while there is no clear reason for tightening in the case of Japan so far. Thus, the ECB raising interest rates some months later than the UK and US central banks is in line with the macroeconomic differences. Nevertheless, all three central banks might have tightened belatedly, as suggested by Reis (2022). To assess whether this was the case with the ECB, we first summarise the ECB's monetary policy decision statements, then give an overview of the criticism formulated for ECB monetary policy over the past year. We then offer our thoughts.

3.1. The ECB's shift from dove to hawk

Following a lengthy period of too low inflation and systematically upward biased inflation forecasts (Darvas, 2018), the ECB adopted a very expansionary monetary policy in the years prior to the COVID-19 pandemic, with little impact on inflation. The economic fallout from the pandemic triggered renewed monetary accommodation and rightly made the ECB cautious. In the first half of 2021, when inflation pressures emerged in the United States but there were no signs of such pressures in the euro area, the ECB's policy remained very accommodative, supported by forward guidance about the likely evolution of key interest rates, asset purchases, and long-term refinancing operations (see the Annex for a chronology of the evolving tone of ECB monetary policy statements since early 2021). In particular, to support the economy during the pandemic crisis, the ECB launched the pandemic emergency purchase programme (PEPP) with a total envelope of EUR 750 billion, then increased twice to a total of EUR 1,850 billion. The pace of purchases under the PEPP was higher in the second and third quarters of 2021 than during the first months of the year, since the Governing Council deemed it necessary to support the economic recovery. Forward guidance stated that interest rates would be increased shortly after net purchases under the asset purchase programme (APP) would end. Initially, no termination date of APP net asset purchases was specified, instead the guidance said it would be in place "*as long as necessary*".

The conclusions from the ECB's monetary strategy review in July 2021 was still influenced by the problem of too-low inflation. Actual headline inflation was 2.2% in July 2021, while core inflation fell to 0.7%. Beyond adjusting the forward guidance on the level of policy rates (a natural consequence of inflation target adjustment of the strategy review), the monetary policy stance remained unchanged until September 2021, when a moderate reduction in PEPP purchases was announced. The October 2021 meeting did not result in any change in policy, even though headline inflation had increased to 4.1% and core inflation to 2% by that time. The ECB's revised strategy said that the medium-term orientation might "*imply a transitory period in which inflation is moderately above target*" and it was concluded that actual inflation satisfied this clause.

The December 2021 meeting, by when the November 4.9% headline and 2.6% core inflation data were known, concluded that "*monetary accommodation is still needed for inflation to stabilise at the 2% inflation target over the medium term*". Still, the pace of asset purchases was reduced and a clear end date (March 2022) of PEPP net purchases was announced. For the APP, monthly purchase amounts for the year 2022 were announced, indicating an increase in purchases in the second and third quarter of 2022 and a return to the monthly pace of EUR 20 billion "*from October 2022 onwards […] for as long as necessary to reinforce the accommodative impact of our policy rates*", which implied that the APP would continue after October 2022.

The February 2022 meeting, by when the January 5.1% headline and 2.3% core inflation data were known, did not result in any change in policy. About two weeks after Russia's invasion of Ukraine, which created major uncertainties, the March meeting (when the February 5.9% headline and 2.7% core inflation data were known) reduced the pace of asset purchases under the APP but kept interest rate forward guidance unchanged.

In April 2022, when the March 7.4% headline and 3% core inflation data were known, the termination of APP purchases in the third quarter was announced, but the wording on interest rates had not changed. The wording of the statement put a clear emphasis on the data-driven character of decisions made by the ECB Governing Council, while also strengthening the 'flexibility clause' stating that the ECB could adjust any of its instruments if necessary.

The statement of the June 2022 meeting (when the May 8.1% headline and 3.8% core inflation data were known) announced the ending of APP purchases as of 1 July 2022 and expressed the intention to raise ECB interest rates by 25 basis points in the July meeting, indicating that larger increases might follow from September. In turn, rates were raised by 50 basis points in July and 75 basis points in September, and the prospect of further rate increases was highlighted. Forward guidance for the full reinvestments of APP and PEPP was maintained. Data dependence and meeting-by-meeting approach for rate setting was reinforced. In a speech at the Jackson Hole Economic Policy Symposium in late August, the ECB Executive Board member Isabel Schnabel argued to act forcefully against inflation (Schnabel, 2022).

3.2. Criticism of ECB monetary policy

Over the past year, with the increase in inflation from previous low levels, various views arose regarding what the ECB policy should be doing to tackle inflation and when, both internally – among the most hawkish members – and externally.

3.2.1. Internal divisions

Internally, it has long been known that there are more hawkish and more dovish views in the ECB Governing Council. While a broad agreement was reached early on in the pandemic in order to deploy policy aimed at supporting the economy, as the pandemic effects started to fade and inflation started to rise, some dissenting voices started to speak up, indicating a preference to tackle the rise in prices in the euro area.

By the end of September, when headline inflation increased to 3.4% and core inflation to 1.9%, President Lagarde (2021) stressed that the ECB should keep focusing policy on the medium-term and not react to temporary inflationary pressures linked to the reopening of the economy. Also, Villeroy de Galhau, the French governor, shortly after stated that he believed the inflation increase was temporary and that it would go below 2% by the end of 2022, seeing no reason to raise policy rates (Arnold, 2021a). The ECB's monetary policy accounts of the December 2021 Governing Council meeting indicated that there were some concerns arising regarding the possibility that inflation could be "higher for longer". This would be due to high energy prices and supply and demand mismatches. Still, bottleneck effects were expected to fade by the end of 2022. At the beginning of 2022, some of the members hinted at raises in the ECB policy rates still in 2022 – Dutch, German and Belgian governors – and at the March meeting, by when the February 5.9% headline and 2.7% core inflation rates were known, the views in the Governing Council were quite split on how to address high levels of inflation, especially in view of the recent events related with Russia's invasion of Ukraine (Arnold, 2022a).

3.2.2. External views

External opinions have been split, while some seem to support the ECB's monetary policy decisions, others have adopted a more critical view about the ECB policy choices (or lack of them). During the last quarter of 2021, as inflation was going beyond the 2% inflation target, critiques started to pop-up calling the ECB to tighten monetary policy. This was more prominent among German media and entities, where inflation was escalating more than in other euro area countries (Arnold, 2021b; Reuters, 2021). On the other side, in December 2021, the Financial Times Editorial Board, highlighted that the core inflation was much higher for the UK and US, justifying the earlier moves of these central banks in contrast with the ECB (FT Editorial Board, 2021). Around the same time, also Melvyn B. Krauss, Professor Emeritus of Economics at New York University, came forward with the same view that the ECB should be going at a different pace than other central banks, adding that an additional factor for the ECB to consider when making decisions was the fragmentation risk (Krauss, 2021). If support was lifted too quickly and interest rates increased too fast, this would push up Member States' borrowing costs at a time when debt levels were high and the recovery from the pandemic on-going. Even though not directly commenting on the ECB's policy stance or future action, in November 2021 Cadamuro and Papadia (2021) highlighted the possible difficulty to control inflation if there would be more negative events resulting in higher inflation volatility, while keeping money growth high.

Around February 2022, views among experts seemed quite split. For instance, Mohamed El-Erian, President of Queens' College, Cambridge University, claimed that the ECB was being too slow to react to the high inflation levels, which in his view were clearly not transitory. Additionally, he argued that this would increase the risk of second-round effects, such as wage increases and higher inflation expectations (El-Erian, 2022). On the other side, Stefan Gerlach, Chief Economist of the EFG Bank (Switzerland), and Megan Greene, senior fellow at Harvard Kennedy School and chief economist at Kroll, highlighted that inflation rather seemed to be transitory due to the soaring energy prices and supply bottlenecks. The fact that monetary policy acts with a lag could mean that the effects of tighter policy kick-in when these short-term shocks have dissipated, and inflation would be back at a level around the 2% target. This would mean that policy decisions would be effective when inflation no longer needed such a break. Also, the ECB implemented an unfortunate monetary policy tightening in April and July 2011, which turned out to be "too early" and was reversed from November of the same year. Tightening when the economic recovery was still incomplete could risk being a repetition of past mistakes (Gerlach, 2022a; Greene, 2022).

One of the most critical voices of the ECB has been Otmar Issing, former ECB Chief Economist. In April 2022, in an interview with the Financial Times, Issing affirmed that the ECB was late to react, and that the normalisation process should have started way before, given the good results on growth and inflation recovery after the initial pandemic shock together with positive labour market developments. The risk of stagflation seemed ahead, and it would be hard for the ECB to deal with it (Arnold, 2022b). In June 2022, Dabrowski (2022) argued that excessive monetary and fiscal expansion in advanced economies are the main drivers of the rise in inflation and that the ECB should have started tightening its monetary policy earlier. Still, he did not explain what the transmission channels were in the euro area, where consumption and investment have not yet returned to pre-pandemic levels and wage growth has not accelerated. In June 2022, in a paper reflecting on the historical record of economic forecasts and uncertainty, Grzegorczyk and Papadia (2022) arrive at the conclusion that the shock created by the Russian war was "*more inflationary than recessionary, justifying monetary tightening*."

By July 2022, with data showing inflation beyond 8%, the pressure for the ECB to follow its peers – US Federal Reserve and the Bank of England – and to tighten its monetary policy was high, and the ECB raised its policy rate by 50 basis points. Even so, just before this announcement, there were still supporters of the ECB's delay in acting. Martin Sandbu, European Economics Commentator at the Financial Times, argued that it would be a mistake to try to reduce demand, by putting forward several arguments (Sandbu, 2022). One of the reasons for the global surge in inflation, which came earlier than the energy price shock, was the strong rebound in US consumer goods demand, leading to a global scarcity of goods, with spill-over effects on the rest of the world. Central banks have limited ability to tackle supply-side shocks, but instead can depress demand. This happens with a time lag, so, in the meantime, the reduction of consumption due to high prices and withdrawal of pandemic programs would have done the contractionary work. Additionally, the author highlights that the current energy crisis makes the need to expand clean energy supply and electrification of energy use evident, which requires massive investments. Increases in policy rates could have the unintended consequence of increasing costs for those planning to invest in energy. He also noted that job creation at a time of high inflation reflects favourable structural changes in the economy and that the best cure to avoid a wage-price spiral is to allow job creation to continue. Following the hawkish central banker speeches at the August 2022 Jackson Hole Economic Policy Symposium, Gerlach (2022b) expressed his concerns about the time lag of monetary policy impacts and what seems to be now a "competitive race to raise interest rates".

3.3. An assessment

3.3.1. Possible mistakes over the past year

With hindsight, it is easy to say that the ECB should have acted earlier. We found it hard, however, to detect good analyses that urged interest rate increases in the second half of 2021, when inflation pressure gradually built up in the euro area and the odds of Russia's invasion of Ukraine were slim.

In December 2021, no inflation forecast, nor expectation indicated that the inflation pressures would persist and reach levels as those seen now. Nevertheless, in view of the increase in inflation (the November 4.9% headline and 2.6% core inflation were known), and the positive growth outlook that the ECB staff forecasted – "*growth to rebound strongly over the course of 2022*" and expected 4.2% growth in 2022 and 2.9% in 2023 –, the ECB could have made choices which would allow for greater flexibility and an earlier start of monetary tightening. The December 2021 monetary decisions were maintained without any alteration in February 2022. Subsequently, monetary decisions were revised rather slowly, and the first interest rate increase was made when inflation was almost 9%. We try to abstract from knowing what happened in 2022 and highlight the following issues with the December 2021 monetary policy decisions and statement, based only on information that was available by then.

First, the December 2021 monetary policy statement claimed that "*monetary accommodation is still needed – including net purchases under the APP and our forward guidance on interest rates – for inflation to stabilise at our two per cent inflation target over the medium term*", but the text did not give a clear answer on why this was the case. Inflation was way above the target and it was accelerating (including core inflation), robust growth forecasts were presented, risks to the economic outlook were assessed as broadly balanced, and financing conditions for the economy were assessed to be favourable. Only the 1.8% staff inflation forecasts for 2023-2024 suggested that inflation might marginally undershoot the 2% target. Yet the reliability of staff forecast was questionable – see our comments on staff forecasts in points 4 and 5 below.

Second, while forward guidance on interest rates rise was data-dependent, another condition for interest rates increases was the termination of APP net purchases, which was date-dependent. The interest rate forward guidance said: "*the Governing Council expects the key ECB interest rates to remain at their present or lower levels until it sees inflation reaching 2% well ahead of the end of its projection horizon and durably for the rest of the projection horizon, and it judges that realised progress in underlying inflation is sufficiently advanced to be consistent with inflation stabilising at 2% over the medium term*". For net APP purchase, the statement specified the monthly purchase volumes from October 2022 onwards without any data dependency. The statement also said: "*The Governing Council expects net purchases to end shortly before it starts raising the key ECB interest rates.*" Thus, there was a potential conflict, which has indeed materialised: the data-dependent interest rate guidance was reached ahead of the date until which APP net purchases were promised. Forward guidance on asset purchases should have been data-dependent as well.

Third, the forward guidance on APP net purchases was extended for a rather long time ahead, beyond October 2022. Providing forward guidance for such a distant point in time when inflation was going up, the growth outlook was strong, and there were some sources of uncertainty – including rising geopolitical tensions with Russia – seems too stretched. Had the ECB kept the pace of net purchases under the APP and provided a data-dependent guidance, or at least a date-dependent guidance for a shorter time span, it would have had much more flexibility to terminate net purchases earlier while abiding by the guidance provided.

Fourth, interest rate forward guidance put too much emphasis on ECB staff forecasts. However, these forecasts had a poor track record. In the 5-year period prior to the pandemic, when no major shock hit the economy and output and employment grew nicely[3], ECB forecasts systematically overpredicted inflation, underpredicted growth, and overpredicted unemployment (see Darvas, 2018). Growth underprediction and unemployment overprediction would have been consistent with inflation overprediction (i.e. better than predicted growth and lower than predicted unemployment should have resulted in higher than predicted inflation), but the opposite happened. This suggests that some of the behavioural relationships in ECB forecasting models are mis-specified and thus staff forecasts should have been assessed cautiously. The December 2021 staff forecast suggested inflation falling to 1.8% both in 2023 and 2024, below the ECB's 2% target. Core inflation forecasts were almost the same: 1.7% in 2023 and 1.8% in 2024. Especially at a time when inflation was well above the target and rising, and various shocks hit the economy, forward guidance, and consequently monetary policy decisions, should have been formed with a more cautious reliance on inflation forecasts.

Fifth, a further issue with ECB staff inflation forecasts is that owner-occupied housing costs inflation was not taken into account, even though the monetary policy strategy review, which was concluded in July 2021, underlined its importance. The incorporation of owner-occupied housing cost inflation could have brought the December 2021 headline and core inflation forecasts above 2% in 2023 and 2024.

Sixth, as described in section 3.1, the December 2021 Governing Council meeting decided that net purchases under the PEPP would end in March 2022, but that there would be an increase in the net APP purchases from April 2022, in what looked like a form of compensation. As President Lagarde stressed various times, the PEPP was a specific programme targeted at supporting the economy from the impacts of the COVID-19 pandemic. The APP, on the other side, was a programme that was already in place more than five years before the introduction of PEPP with the aim of steering inflation rates towards the ECB target. It is puzzling why an instrument aimed at increasing inflation has been boosted when inflation was high and going up, the growth outlook was strong, and the discredited staff forecast – without considering owner occupied housing costs – suggested just a minimal undershooting of the 2% target in 2023-2024.

And seventh, the December 2021 statement emphasised the possibility of "*renewed market fragmentation*". We cannot exclude the hypothesis that fears of market fragmentation have played a role in the extension of asset purchases (duration of net APP purchases and increase in its volume from

[3] Nobody forecasted the pandemic and the war, and thus we do not form a view on ECB forecast errors following these larger external shocks.

April 2022) at the December 2021 meeting. Instead of extending APP, which had the goal of boosting inflation, it would have been preferable to introduce the transmission protection instrument (TPI) earlier, which was introduced only later in July 2022.

As we turned to 2022, the pressures for the ECB to start tightening monetary policy increased: a) the acceleration of inflation continued, b) some members of the Governing Council indicated preferences to start tightening, c) the Bank of England and the Federal Reserve had already taken steps to normalise their monetary policies (Table 1), and d) the voice of external critics became louder.

Part of the reason for not acting earlier can be related to constraints by forward guidance and the belief that acting against earlier promises might undermine the credibility of the ECB. Additionally, the 2011 episode of the ECB's premature monetary tightening might have contributed to a more cautious attitude this time[4].

Still, some commitments under the forward guidance were not followed:

- The December 2021 meeting announced the monthly amount of net APP purchases for October 2022 and onwards (confirmed by the February 2022 meeting, by when the January 5.1% headline inflation data was known), yet the net APP purchases were stopped by 1 July 2022.
- Since interest rate increases were tied to the end of net APP asset purchases, the promise for continuation APP throughout 2022 implied no interest rate increase in 2022. Yet, interest rates were raised in July 2022.
- The June 2022 monetary policy statement indicated that "*the Governing Council intends to raise the key ECB interest rates by 25 basis points at its July monetary policy meeting*", but the increase turned out to be 50 basis points.

The deviations from the initial forward guidance may reflect the pressure from the worsened energy and supply crisis triggered by the Russian invasion of Ukraine in February 2022. Also, the – at some point unavoidable – evidence that inflation would keep deviating further from the ECB inflation target, was calling for an urgent revision of the monetary policy stance.

Therefore, fundamental aspects of the forward guidance seem to have been a clear source of constraint for the ECB, in particular: a) that inflation forecasts need to show sustained convergence to the 2% target based on forecasts, b) the sequence of net asset purchase ending first and only then increase of policy rates, and c) promising net asset purchases a year ahead when inflation was well above target and rising rapidly. Nevertheless, since the ECB broke some of its earlier promises, it could have gone further and start the tightening cycle earlier.

A key question is what difference an earlier start would have made. Since monetary policy measures influence inflation with a time lag, and the main drivers of inflation were supply shocks in the euro area, inflation rates in 2022 might have not been much different. But acting belatedly might undermine the credibility of the ECB. Consumers might lose their trust in the ECB when they witness rapidly growing prices, earn zero interest on their bank deposits, and the ECB does not do anything. Investors might conclude that fears from fragmentation (including the increase in the government bond yields of fiscally vulnerable euro area countries) prevent the ECB from addressing inflationary shocks.

The full reinvestment policies for the maturing PEPP and APP holdings were not changed in the July and September 2022 monetary policy meetings. We believe this was a good choice. While policy rate

4 The ECB raised interest rates by 25 basis points in April and July 2011, but had to reverse and cut rates from November 2021.

changes speedily influence short-term yields and also influence long-term yields via expectations, the transmission mechanism of changes in the size of the balance sheet is more complex. Moreover, the impacts of simultaneously raising interest rates and reducing central bank balance sheets is not yet well understood. Given the uncertainty regarding future developments, decisions on the reduction of the balance sheet should be delayed to when there is more clarity on the inflation trajectory.

We also find two possible mistakes studied by Reis (2022) relevant for the ECB:

- An over-reliance on the credibility earned in the past, creating an illusion of too much room to focus on the recovery of real activity and underpredicting the resulting inflation.
- A revision of strategy that made central banks tolerant to higher inflation because of the falling trend in the return on government bonds, even though the return on private capital stayed high.

3.3.2. The ECB's current monetary policy stance

The current monetary policy stance is still accommodative. A 0.75% deposit rate is accommodative when headline inflation is 9.1%, the long-term expectations of professional forecasters and financial markets are slightly over 2%, and consumer expectations are close to 5%. The crucial question is the extent of monetary tightening, not whether interest rates are increased in steps of 25 or 100 basis points.

The updated Holston, Laubach, and Williams (2017) estimates for the euro area natural rate of interest – the real short-term interest rate that would prevail absent transitory disturbances – were around 0.5% in 2013-2020, but further updates of the estimates were suspended due to the extraordinary volatility in GDP related to the COVID-19 pandemic[5]. Assuming this model can provide a reliable estimate and that the 0.5% value has not changed with the pandemic, a 2% medium term inflation is consistent with a 2.5% ECB deposit rate. Bringing inflation down might require a period when the interest rate is higher than the natural rate.

The 8 September 2022 ECB monetary policy decision statement did not provide any clue about expected total magnitude of rate increases, though it pictured the implemented 75 basis points increase as frontloaded: "*This major step frontloads the transition from the prevailing highly accommodative level of policy rates towards levels that will ensure the timely return of inflation to the ECB's 2% medium-term target.*" At the press conference following the September 2022 decision, there were repeated questions about the "*terminal interest rate*", but President Lagarde did not indicate any value or method to determine that. Yet in one of her answers, she provided some hints: "*We are frontloading and we will continue to increase rates meeting-by-meeting on the basis of data, because we believe that we are far away from the rate at which we hope and we'll see inflation return to the 2% medium-term target. This is the goal that we have. I'm not scratching my head around the neutral rate versus the terminal rate versus the r* and so on and so forth. What we know is that we want to get to that 2% medium-term target, and we will take the necessary steps along the way in order to get there. We think that it will take several meetings. Some people will say, "How many is several?" Well, it's probably more than two, including this one, but it's probably also going to be less than five. Now, I leave it to you to decide whether it's going to be two, three or four. You have at least a ballpark idea of how long it will take.*"[6] If a 75 basis points increase is a frontloading, then probably some later increases might have a lower value, and if there will be less than five increases, then the total currently envisioned increase could be around 2-3%. Market-based

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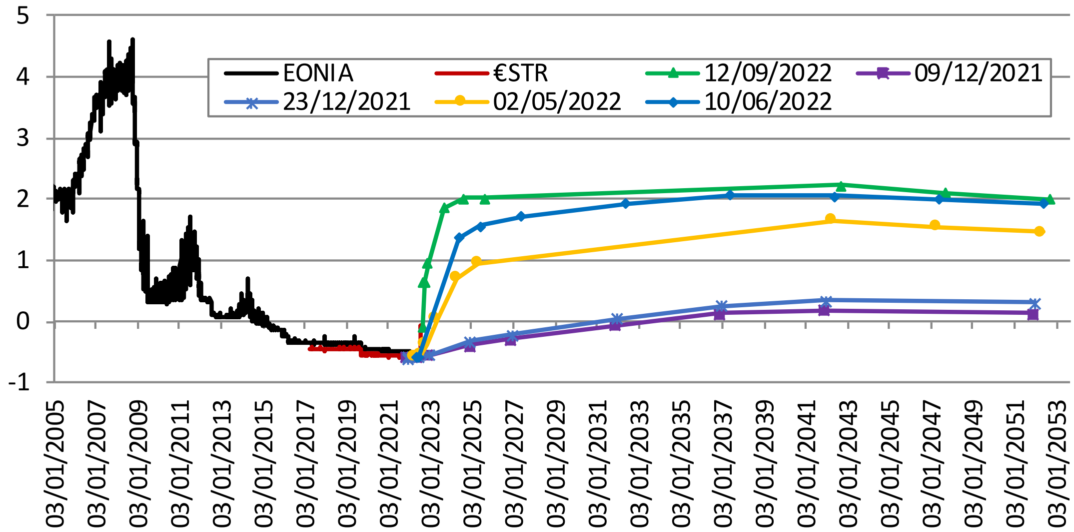
5 Estimates for the euro area, Canada, UK and US are available at: https://www.newyorkfed.org/research/policy/rstar

6 https://www.ecb.europa.eu/press/pressconf/2022/html/ecb.is220908~cd8363c58e.en.html

expectations on the future path of short-term interest rates indicate a stabilisation around 2%, according to the most recent data (Figure 12).

Figure 12: Euro area short-term interest rates and expected evolution at selected dates (percent per year)

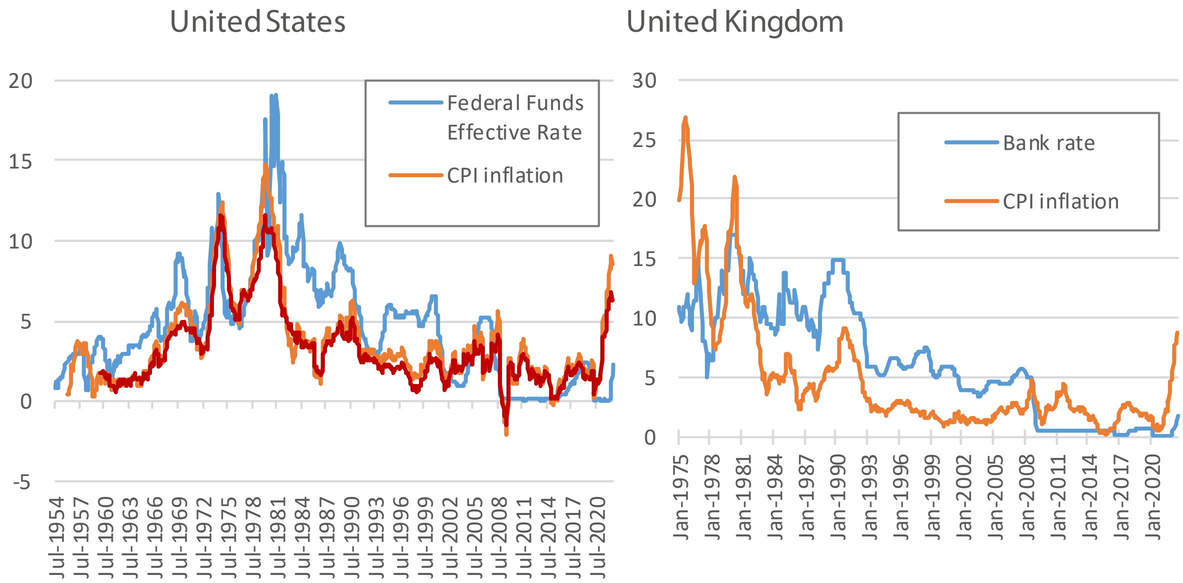


Source: Bruegel based on Bloomberg.

Notes: The €STR line reflects pre-€STR values from 15 March 2017 to 30 September 2019 and €STR values since 1 October 2019, when the ECB started publishing it. EONIA was discontinued on as of 3 January 2022. The lines with dates reflect interest-rate expectations via interest rate swaps.

Such a tightening is dwarfed by the interest rate policy implemented by the Federal Reserve and the Bank of England in the 1980s after the oil price shocks of the 1970s, when the central bank main interest rate was above actual inflation (Figure 13). Even if the natural rate and the real interest rate on government bonds declined (though not for corporate investments, as Reis [2022] argues), the extent of expected tightening by the ECB is several factors smaller than what was implemented after the oil price shocks of the 1970s. The Holston, Laubach, and Williams (2017) estimates suggest an approximately 2 percentage points decline in the natural rate. Further research should elaborate the differences in the historical context and circumstances to understand whether a much smaller monetary tightening this time than in the 1980s could be able reach the 2% inflation target rapidly and with smaller costs now than in the 1980s.

Figure 13: US and UK inflation and main central bank interest rates (percent)

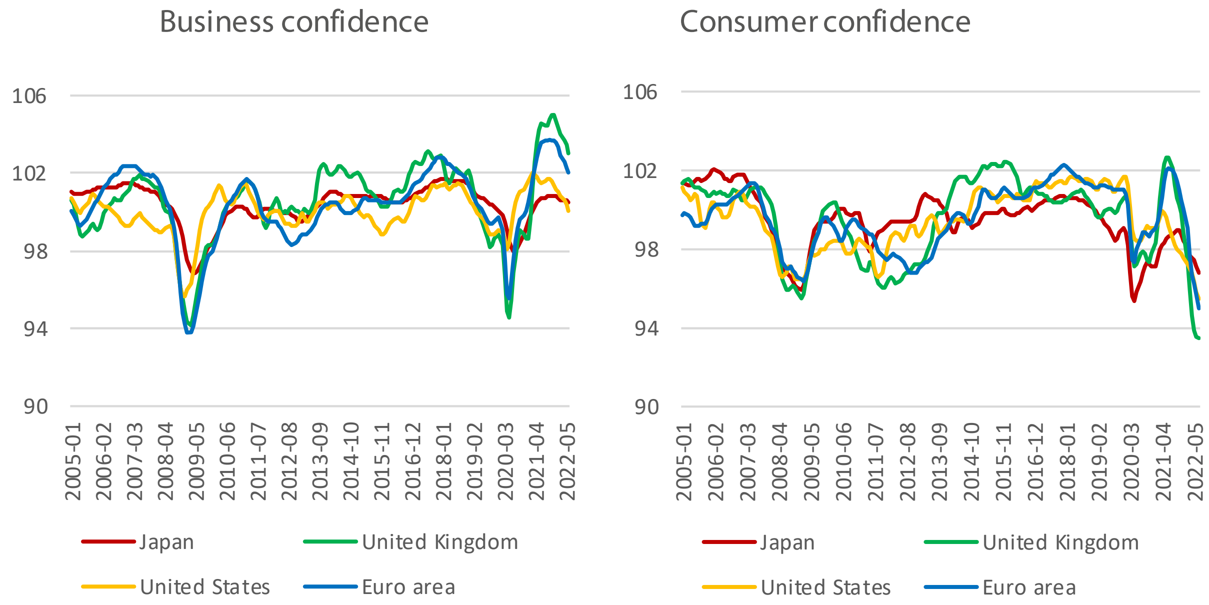


Source: FRED - Federal Reserve Economic Data, Bank of England, Office of National Statistics.

Notes: Federal Funds Effective Rate (FEDFUNDS): Percent, Monthly, Not Seasonally Adjusted, Bank of England Official Bank rate history.

As regards the pace of future interest rate hikes, the main arguments calling for a cautious approach are that tightening would reduce demand and economic activity in one or two years from now. By then, the currently mostly supply-driven inflation could decline due to the ceasing impact of the current energy price shock and the weaker economic activity (or even potentially a recession). The economic fallout from the war, as well as lower demand resulting from lower real wages could depress euro area output and inflation. Leading indicators reflecting business and consumer confidence towards future developments in the euro area show a reversal in confidence since March 2022 and August 2021, respectively (Figure 14). The drop is particularly steep for consumers, which are now more pessimistic than anytime during the past twenty years, including the global financial crisis, the subsequent euro crisis and the COVID-19 pandemic.

Figure 14: OECD leading business and consumer confidence indices



Source: OECD.

Notes: Figures above 100 suggest an increased confidence towards the future business performance/economic situation, and numbers below 100 indicate pessimism towards future performance/developments in the economy, respectively, for the business and consumer indices.

In this regard, a particularly important risk is an eventual complete stop in Russian gas supply to the EU this winter, which would lead to a recession in the downside risk scenario presented by President Lagarde at the 8 September 2022 press conference. In such a case, energy prices might increase further, pushing inflation higher, but private demand would decline, lowering inflation. At that press conference, President Lagarde did not give an answer to questions on what monetary policy would be followed in such a case, yet the situation might justify a stop in the tightening process or even some monetary accommodation. Given that the next rate setting meeting will be in late October, by when some information will likely be available on the possible gas supply disruptions, and the subsequent meeting will be in the middle of December, by when eventual gas supply shortages will materialise or not, the ECB will have the chance of slowing down, halting, or even reversing interest rate hikes.

The main arguments for forceful monetary tightening, as emphasised by Schnabel (2022), are that inflation might remain persistent irrespective of whether it is caused by supply or demand shocks. High inflation without forceful action might undermine the credibility of the central bank, and the costs of acting too late might be large.

Taking all factors into account, we recommend a cautious approach by increasing rates slowly until the economic fallout from the war, including an eventual complete stop in Russian gas supply, will become observable. In the absence of a winter gas supply disruption, more speedy interest rate increases could return and rates might be increased above the best estimate of the natural rate of interest. But in case of a winter gas supply disruption and a consequent recession, rate increases might be halted.

Irrespective of the course of interest rate developments, we recommend designing a special longer-term refinancing operation aimed at providing favourable conditions for investments in energy efficiency improvements (e.g. house insulation) and clean energy generation. While in general ECB policies should not be sector-specific, the supply-induced energy price increase is the main driver of current euro area inflation and might be a driver in the years to come. As Sandbu (2022) highlighted, increases in policy rates could discourage energy investments and thereby aggravate the inflation outlook. By incentivising the flow of credit to projects aimed at improving energy efficiency and clean energy generation via a special longer-term refinancing operation, the ECB would be contributing to address the main supply-side driver of inflation.

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ANNEX: CHRONOLOGY OF THE TONE OF ECB MONETARY POLICY STATEMENTS SINCE EARLY 2021

This annex provides a chronological overview of the changing tone of the ECB monetary policy statements[7] since the beginning of 2021, highlighting the changes in monetary policy with a special focus on the evolution of the forward guidance.

21 January 2021: The ECB kept its interest rates unchanged, including the -0.5% deposit facility rate, and noted that "*The Governing Council expects the key ECB interest rates to remain at their present or lower levels until it has seen the inflation outlook robustly converge to a level sufficiently close to, but below, 2% within its projection horizon, and such convergence has been consistently reflected in underlying inflation dynamics.*"

For the pandemic emergency purchase programme (PEPP), it was announced that "*The Governing Council will conduct net asset purchases under the PEPP until at least the end of March 2022 and, in any case, until it judges that the coronavirus crisis phase is over*" and the "*Governing Council will continue to reinvest the principal payments from maturing securities purchased under the PEPP until at least the end of 2023.*"

The statement said that the asset purchase programme (APP) "*will continue at a monthly pace of €20 billion. The Governing Council continues to expect monthly net asset purchases under the APP to run for as long as necessary to reinforce the accommodative impact of its policy rates, and to end shortly before it starts raising the key ECB interest rates. The Governing Council also intends to continue reinvesting, in full, the principal payments from maturing securities purchased under the APP for an extended period of time past the date when it starts raising the key ECB interest rates, and in any case for as long as necessary to maintain favourable liquidity conditions and an ample degree of monetary accommodation.*"

The third series of targeted longer-term refinancing operations (TLTRO III) was expected to be continued: "*the Governing Council will continue to provide ample liquidity through its refinancing operations*", without hinting at its termination date.

The statement also expressed that the "*Governing Council continues to stand ready to adjust all of its instruments, as appropriate, to ensure that inflation moves towards its aim in a sustained manner, in line with its commitment to symmetry.*" that we'll call the 'flexibility clause'. It was included in all later statements in a practically unchanged form till October 2021, and with some changes from December 2021.

11 March 2021: the statement started with the PEPP and reinforced monetary accommodation by saying: "*Based on a joint assessment of financing conditions and the inflation outlook, the Governing Council expects purchases under the PEPP over the next quarter to be conducted at a significantly higher pace than during the first months of this year.*" The wording has not changed for other modalities of PEPP, nor for APP and interest rates.

22 April 2021 and **10 June 2021**: no change compared to the 11 March 2021 meeting.

22 July 2021: the ECB announced the conclusions from its monetary strategy review, which resulted in a change in the inflation target: "*a symmetric inflation target of two per cent over the medium term*"[8]. The forward guidance regarding interest rates has changed accordingly: "*In support of its symmetric two*

[7] Source: ECB monetary policy press releases https://www.ecb.europa.eu/press/govcdec/mopo/html/index.en.html

[8] See Darvas and Martins (2021) for an assessment of the change in the ECB's inflation objective.

per cent inflation target and in line with its monetary policy strategy, the Governing Council expects the key ECB interest rates to remain at their present or lower levels until it sees inflation reaching two per cent well ahead of the end of its projection horizon and durably for the rest of the projection horizon, and it judges that realised progress in underlying inflation is sufficiently advanced to be consistent with inflation stabilising at two per cent over the medium term. This may also imply a transitory period in which inflation is moderately above target." The level of interest rates, the modalities of PEPP and APP and their reinvestment policies, and TLTRO, remained unchanged.

9 September 2021: the extent of monetary accommodation was slightly reduced with a "*moderately lower pace of net asset purchases under the pandemic emergency purchase programme (PEPP) than in the previous two quarters*". The level of the ECB interest rates, forward guidance on their likely future evolution, purchases under the asset purchase programme (APP), reinvestment policies, and longer-term refinancing operations remained unchanged.

28 October 2021: no change.

16 December 2021: moderate reduction in asset purchases. The statement said "*The Governing Council judges that the progress on economic recovery and towards its medium-term inflation target permits a step-by-step reduction in the pace of its asset purchases over the coming quarters. But monetary accommodation is still needed for inflation to stabilise at the 2% inflation target over the medium term.*"

For the PEPP, net asset purchases to be conducted at "*a lower pace than in the previous quarter*" and the "*at least the end of March 2022*" indication was turned to a clear terminal date: "*It will discontinue net asset purchases under the PEPP at the end of March 2022.*" On the other hand, the full reinvestment period of maturing PEPP holdings was extended from "*until at least the end of 2023*" to "*until at least the end of 2024*". Another novelty of the statement was to emphasise flexibility in reinvestments: "*in the event of renewed market fragmentation related to the pandemic, PEPP reinvestments can be adjusted flexibly across time, asset classes and jurisdictions at any time*".

For the APP, the statement noted that "*the Governing Council decided on a monthly net purchase pace of €40 billion in the second quarter and €30 billion in the third quarter under the APP. From October 2022 onwards, the Governing Council will maintain net asset purchases under the APP at a monthly pace of €20 billion for as long as necessary to reinforce the accommodative impact of its policy rates*". The second and third quarter referred to 2022 and implied an increase compared to the €20 billion monthly purchases in 2021.

Interest rates, along with the forward guidance on their likely future evolution, remained unchanged.

For the TLTRO, an explicit end date was announced: "*the special conditions applicable under TLTRO III to end in June next year*".

The flexibility clause was also amended with the qualification of "*in either direction*", that is: "*The Governing Council stands ready to adjust all of its instruments, as appropriate and in either direction, to ensure that inflation stabilises at its 2% target over the medium term.*"

3 February 2022: The Governing Council confirmed the December 2021 decisions.

10 March 2022: The Governing Council revised the purchase schedule for APP: "*Monthly net purchases under the APP will amount to €40 billion in April, €30 billion in May and €20 billion in June. The calibration of net purchases for the third quarter will be data-dependent and reflect its evolving assessment of the outlook. If the incoming data support the expectation that the medium-term inflation outlook will not weaken even after the end of its net asset purchases, the Governing Council will conclude net purchases under the APP in the third quarter.*"

The key ECB interest rates and the forward guidance on their likely future evolution remained unchanged. Additionally, the statement said: "*Any adjustments to the key ECB interest rates will take place some time after the end of the Governing Council's net purchases under the APP and will be gradual.*"

The modalities of PEPP and TLTRO III have not changed.

14 April 2022: The Governing Council confirmed to terminate net APP asset purchases in the third quarter of 2022, along with "*The calibration of net purchases for the third quarter will be data-dependent and reflect the Governing Council's evolving assessment of the outlook.*"

The wording on interest rates and PEPP has not changed compared to the March 2022 meeting.

The flexibility clause was strengthened by explicitly incorporating *the word "flexibility*" and by extending it with two additional sentences, that is: "*The Governing Council stands ready to adjust all of its instruments within its mandate, incorporating flexibility if warranted, to ensure that inflation stabilises at its 2% target over the medium term. The pandemic has shown that, under stressed conditions, flexibility in the design and conduct of asset purchases has helped to counter the impaired transmission of monetary policy and made the Governing Council's efforts to achieve its goal more effective. Within the Governing Council's mandate, under stressed conditions, flexibility will remain an element of monetary policy whenever threats to monetary policy transmission jeopardise the attainment of price stability.*"

9 June 2022: The Governing Council decided to end net asset purchases under APP as of 1 July 2022. The modalities of APP and PEPP reinvestments have not changed, nor the end date of TLTRO III.

Interest rates were kept unchanged, but it was announced that "*the Governing Council intends to raise the key ECB interest rates by 25 basis points at its July monetary policy meeting*" and "*the Governing Council expects to raise the key ECB interest rates again in September. The calibration of this rate increase will depend on the updated medium-term inflation outlook. If the medium-term inflation outlook persists or deteriorates, a larger increment will be appropriate at the September meeting. Beyond September, based on its current assessment, the Governing Council anticipates that a gradual but sustained path of further increases in interest rates will be appropriate.*"

The flexibility clause remained unchanged.

21 July 2022: Key ECB interest rates were raised by 50 basis points because "*The Governing Council judged that it is appropriate to take a larger first step on its policy rate normalisation path than signalled at its previous meeting.*" For further normalisation of interest rates, "*a transition to a meeting-by-meeting approach to interest rate decisions*" was announced, in which "*The Governing Council's future policy rate path will continue to be data-dependent and will help to deliver on its 2% inflation target over the medium term.*"

Reinvestment policies for APP and PEPP remained unchanged.

A new instrument called Transmission Protection Instrument (TPI) was introduced with the aim "*to support the effective transmission of monetary policy*".

The flexibility clause was shortened and simplified to one sentence: "*The Governing Council stands ready to adjust all of its instruments within its mandate to ensure that inflation stabilises at its 2% target over the medium term.*"

8 September 2022: Key ECB interest rates were raised by 75 basis points, while data-dependency and a meeting-by-meeting approach was confirmed.

This paper contrasts macroeconomic developments and monetary policy measures of the European Central Bank with the Federal Reserve, Bank of England, and Bank of Japan, assesses the ECB policy errors that occurred in the last year, and the appropriateness of the current monetary policy stance of the ECB.

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