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LESSONS FOR THE EUROPEAN CENTRAL BANK FROM THE 2021-2023 INFLATIONARY EPISODE

PABLO HERNÁNDEZ DE COS

Since mid-2021, the euro-area economy has gone through several shocks, leading to the highest inflation since the creation of the European Monetary Union. A forceful and persistent response from the European Central Bank, grounded in the monetary policy framework it agreed in 2021 ahead of the inflationary episode, has succeeded in bringing inflation down and delivering on the central bank's price-stability mandate. The framework will be reviewed in 2025 and it might conclude that there is no need for a drastic change.

Nevertheless, this assessment should be compatible with identifying some areas for improvement. In particular, the 2021 review was primarily focused on the effective lower bound. The recent inflationary episode, together with high ongoing uncertainty, indicate that the articulation of monetary policy strategy frameworks should be robust to very different scenarios.

Likely persistence of high levels of uncertainty over the next few years will also require an emphasis on flexibility to adapt to the magnitude, origin and persistence of shocks. Unconditional forward guidance should be avoided. In addition, there might be a need to more clearly distinguish in the future, when possible, between quantitative easing for market functioning versus monetary stimulus, which could incentivise a careful assessment of the amount, duration and structure of any asset purchase programme. Communication also needs to be improved in relation to the level of uncertainty and its consequences for monetary policy making with, for instance, greater use of scenarios and sensitivity analyses as appropriate. Improving forecasting/modelling tools, in particular when dealing with large supply shocks, and understanding the roles of different measures of inflation expectations should also be priorities.

JEL classification: E02, E17, E31, E52, E58

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1 Introduction

The 1992 Maastricht Treaty gave the European Central Bank (ECB) the primary task of ensuring price stability in the euro area, while leaving to the ECB the exact definition of 'price stability' and the framework by which to achieve it – what is known as monetary policy strategy. In July 2021, the ECB approved its last monetary policy strategy review (ECB, 2021a, 2021b, 2021c). Its main content could be summarised as follows:

- First, the macro context was at that time characterised by a prolonged period of below-target inflation and a low natural rate of interest (r*)[1], arising from low productivity, demographics and the consequences of the global financial crisis. In this context, a major concern was the risk of interest rates hitting the lower bound frequently.
- Second, the earlier inflation objective ("*below, but close to, 2 % over the medium term"*) was replaced by a 2 percent symmetric target in the medium term.
- Third, this symmetry was considered to require an especially forceful or persistent monetary policy response when the economy was close to the lower bound, to avoid negative deviations from the inflation target becoming entrenched, which may also imply a period in which inflation is moderately above target.
- Fourth, interest rates were considered the primary monetary policy instrument but, in recognition of the lower bound, the use of forward guidance (FG), quantitative easing (QE) and long-term refinancing operations ((T)LTROs[2]) were considered appropriate.
- Fifth, financial stability is a pre-condition for price stability (and vice versa). Thus, financial stability considerations should be incorporated into monetary policy deliberations[3].
- Sixth, the interaction between monetary and fiscal policy is considered important and, in proximity to the lower bound, countercyclical fiscal policy was considered particularly effective.

The ECB also announced that it would assess periodically the appropriateness of its monetary policy strategy, with the next assessment expected in 2025.

Since mid-2021, the euro-area economy has gone through several shocks, leading to the highest inflation since the creation of the European Monetary Union followed by the largest and swiftest increase in interest rates. Even today, although inflation has declined significantly since its peak, it

[1] The natural rate of interest, r*, can be defined as the real rate of interest that is neither expansionary nor contractionary.
[2] LTROs are long-term refinancing operations with maturity beyond three months (which is a standard mainstay of the ECB operating framework) and TLTROs are a targeted variant in which liquidity is provided on particularly attractive terms with the condition that the liquidity be lent on to the real economy.
[3] The new strategy also ended with the two pillars by stating that the Governing Council would adopt *"an integrated assessment of all relevant factors. This assessment builds on two interdependent analyses: the economic analysis and the monetary and financial analysis. Within this framework, the economic analysis focuses on real and nominal economic developments, whereas the monetary and financial analysis examines monetary and financial indicators, with a focus on the operation of the monetary transmission mechanism and the possible risks to medium-term price stability from financial imbalances and monetary factors. The pervasive role of macro-financial linkages in economic, monetary and financial developments requires that the interdependencies across the two analyses are fully incorporated"* (ECB, 2021a).

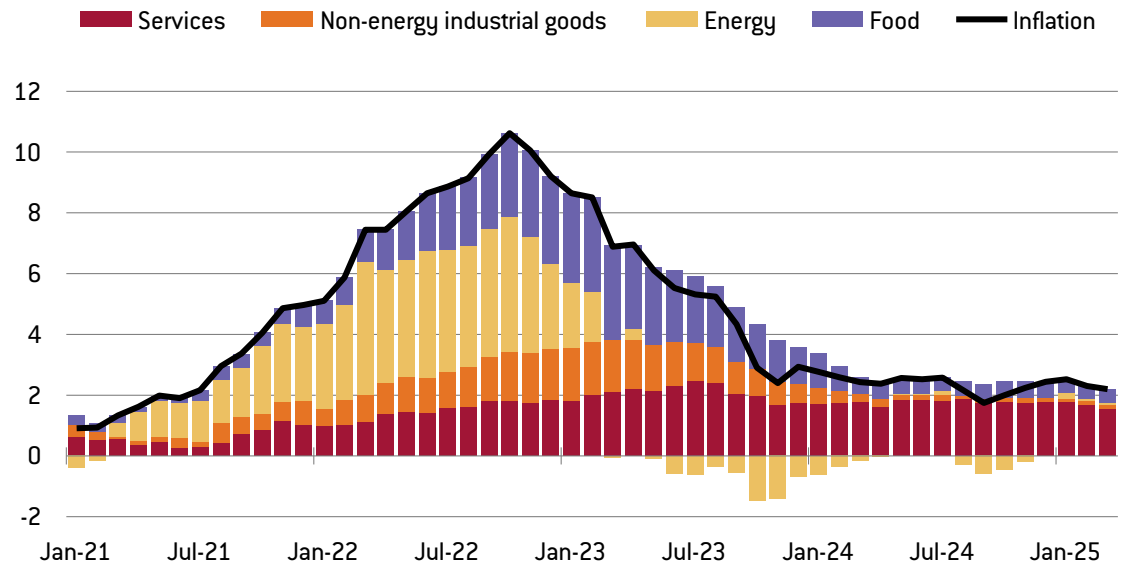
remains above 2 percent, and interest rates are higher than those prevailing in 2021 and before the COVID-19 pandemic.

This paper reflects on these developments ahead of the ECB's 2025 monetary policy review. In the subsequent sections it deals in turn with the six aspects of the 2021 review summarised above: the macro context, the definition of price stability, the reaction function, the policy tools, the relationship between financial stability and monetary policy, and the interactions between fiscal and monetary policy.

2 The macro context and how it has changed

Figure 1 shows how the period since 2021 has been characterised by very high and persistent inflation, followed by a disinflationary process. The inflation surge was caused by a series of exceptional shocks. The COVID-19 pandemic starting in early 2020 led to lockdowns that undermined the global supply system. In early 2021, as economies reopened, inflationary pressures emerged when the release of pent-up demand and excess savings that had accumulated during the pandemic (underpinned by synchronised and highly accommodative monetary and fiscal policies around the globe) confronted a supply system severely affected by restrictions and bottlenecks in global value chains. This demand-supply mismatch rapidly impacted the prices of manufacturing products, transportation and commodities. In addition, energy prices increased rapidly from mid-2021, along with the economic recovery, but also because of problems with French nuclear power plants, compromised hydropower generation because of the warm and dry summer and a reduced supply of Russian gas to Europe.

Figure 1: Euro-area headline inflation and contributions (%, percentage points)



Source: Eurostat. Note: latest observation: March 2025.

Inflationary pressures gathered pace in 2022, exacerbated by the impact of the full-scale Russian invasion of Ukraine on energy and other commodity markets. As a net energy importer, the euro area was particularly exposed to this shock, which emerged as the main factor behind the inflation surge. Other commodities, including food (for which energy and energy-intensive products such as fertilisers are important production inputs), were also affected, spreading the inflationary pressures.

For much of 2021 and 2022, these factors were further compounded by a depreciation of the euro. In addition, the indirect effects of energy cost increases and supply-chain bottlenecks led to a steady increase in non-energy industrial goods and services inflation.

In late 2022, inflation turned downwards, supported initially by a sharp energy inflation correction, and over time by the effects of monetary policy tightening and the gradual unwinding of adverse supply shocks.

Several characteristics of these developments deserve emphasis.

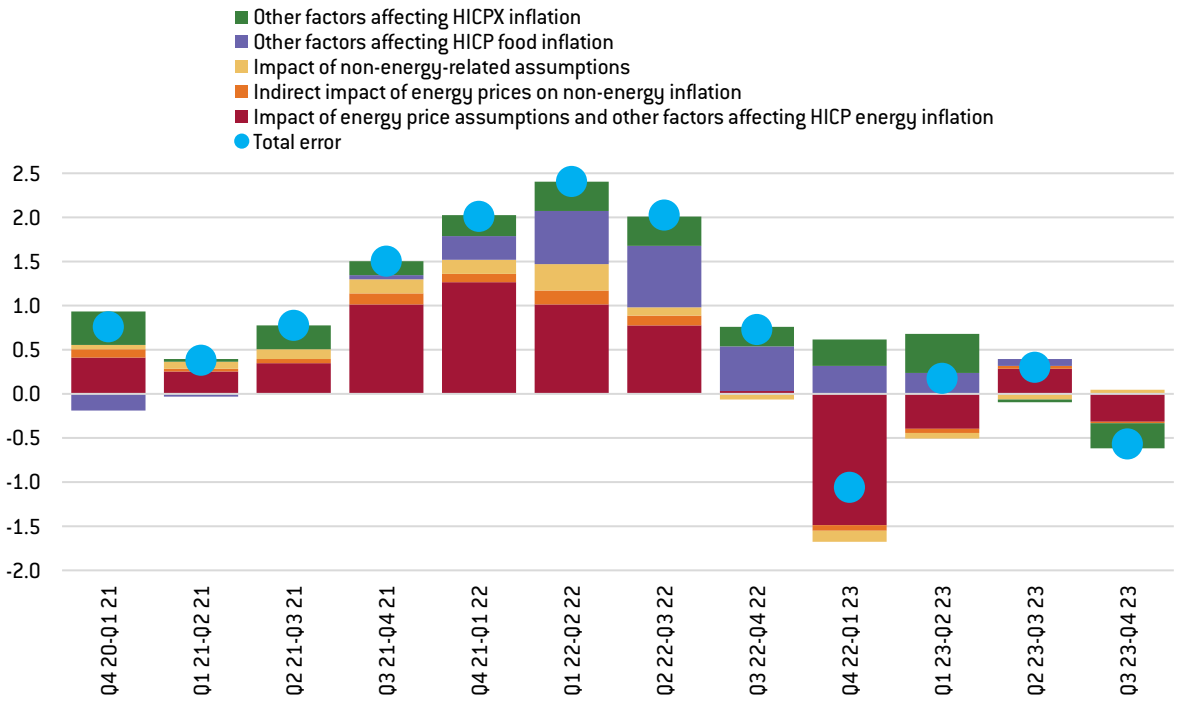
First, forecasting inflation during this period has been very challenging, even over the short-term. Figure 2 shows the quarter-to-quarter errors in ECB/Eurosystem staff inflation projections. Large and rising positive errors were observed until the second quarter of 2022, shortly after Russia's invasion of Ukraine[4]. Forecast errors then began to decline, especially during 2023, coinciding with the disinflationary process, when errors became small and even slipped into negative territory at times. Forecast errors have remained relatively small since then.

To analyse the origin of these errors, those derived from external or technical assumptions, which ECB staff use as conditioning assumptions, should be identified. For example, commodity prices and interest-rate projections follow market expectations at the time of the projection cut-off date, and bilateral exchange rates are assumed to remain at the average level prevailing during the ten working days before the cut-off date.

To isolate their significance, counterfactual paths for inflation can be constructed using models under the assumption that forecasters had perfect foresight about the path of conditioning variables. Such an exercise suggests that about 70 percent of forecast errors for inflation during 2021 and 2022 resulted from errors in the technical assumptions[5]. Initially the underprediction of inflation mainly reflected upward surprises related to the dramatic increase in energy prices[6]. In early 2022, food prices started to play a significant role as well, while the speed and intensity with which energy and food inflation passed through to core inflation was higher than expected. In 2023, the role of energy prices was also significant, but in the opposite direction, contributing to an overprediction of inflation[7].

[4] See Lane (2024a).
[5] Based on the use of the so-called Basic Model Elasticities (BMEs), which summarise the unconditional dynamics responses of variables across models used by national central banks and ECB staff.
[6] In addition to energy prices, supply bottlenecks also contributed to inflation forecast errors, especially in the second half of 2021.
[7] For a comprehensive analysis and monitoring of Eurosystem forecast errors during this period, see Chahad *et al* (2022, 2023 and 2024).

Figure 2: Decomposition of recent one-quarter-ahead HICP inflation errors in Eurosystem/ECB staff projections (%, percentage points)



Source: ECB.

Even after controlling for errors in technical assumptions, forecast errors are positive and account for around 30 percent of total inflation errors during the period 2020 Q4-2023 Q3[8]. This suggests that forecasting models struggled to capture how the large shocks observed were transmitted to inflation. This finding was also observed in other jurisdictions[9].

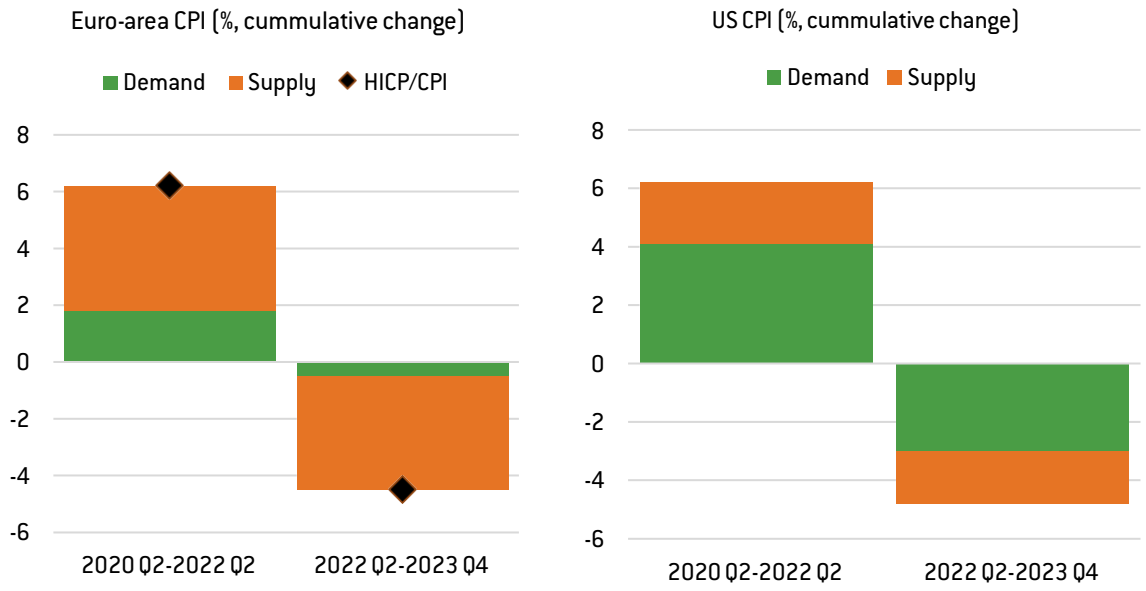
Econometric evidence and simulation exercises show that standard linear forecast models do not properly capture the transmission of large commodity price shocks to non-energy inflation[10]. One possible explanation for these non-linearities is that, when facing large shocks to their input costs, firms tend to update their prices more frequently and hence pass on the cost increases more quickly

[7] For a comprehensive analysis and monitoring of Eurosystem forecast errors during this period, see Chahad *et al* (2022, 2023 and 2024).
[8] Similarly, Lane (2024a) estimated the decomposition of the eight-percentage-point projection error in the fourth quarter of 2022 relative to what was projected in December 2021, and showed that around half was due to unexpected developments in oil and gas prices, and nearly one third to errors in food inflation.
[9] See, for instance, Koch *et al* (2023) for a worldwide analysis, or Kryvtsov *et al* (2023) and Reserve Bank of Australia (2022), among others, for country-specific analyses.
[10] As can be seen from simulation exercises for energy shocks in Burriel *et al* (2024) and González Mínguez *et al* (2023), and for food shocks in Borrallo *et al* (2024).

to selling prices[11]. The strong demand for contact-intensive services (tourism, hospitality) after the reopening of the economy could have amplified these non-linearities. The rapid increase of short-term inflation expectations after the inflation spike could have also played a role.

A second related point concerns the nature of the shocks that dominated the inflation surge. The main drivers of inflation in the euro area were supply-side shocks (Arce *et al*, 2024; Banbura *et al*, 2024; Kataryniuk *et al*, 2024), whereas in the United States, inflation was dominated by demand-side forces (Figure 3).

Figure 3: Decomposition of inflation between supply and demand shocks, euro area vs US



Source: Bruegel based on FRED St Louis, Eurostat, Banco de España. Note: historical decomposition (mean deviations) based on a structural VAR model using quarterly data from the US (1990Q2 to 2023Q4) and the euro area (2007Q1 to 2023Q4) for the following variables: real GDP, HICP/CPI, oil spot price (WTI or Brent), effective funds rate from the effective federal funds rate or the ECB deposit facility rate (DFR) and the bottleneck indices from Burriel *et al* (2024). Structural shocks are identified through exclusion and sign restrictions, see Kataryniuk *et al* (2024). Demand structural shocks aggregate demand and monetary policy shocks, while supply shocks aggregate cost-push, oil and botteneck shocks. COVID-19 cases entered the model as exogenous.

Importantly, most of these supply shocks were of a global nature (pandemic related, war in Ukraine). There were also significant sectoral shifts. Initially lockdowns and supply-chain disruptions moved demand toward goods. Later the reopening of the economy led to a strong demand for contact-intensive services. In contrast, labour-market tightness played a comparatively minor role, although

[11] See Lagarde (2025). In a model with state-dependent price-setting, Costain *et al* (2022) showed how firms increase their frequency of price changes when inflation is higher. Empirically, analysis of the microdata on consumer prices reveals a notable increase in price adjustment frequencies during the inflationary episode (Gutiérrez *et al*, 2024; Gautier *et al*, 2023; Dedola *et al*, 2024).

the lagged adjustment of wages (and prices) to the initial inflation shock generated persistent services inflation (Arce *et al*, 2024; IMF, 2024).

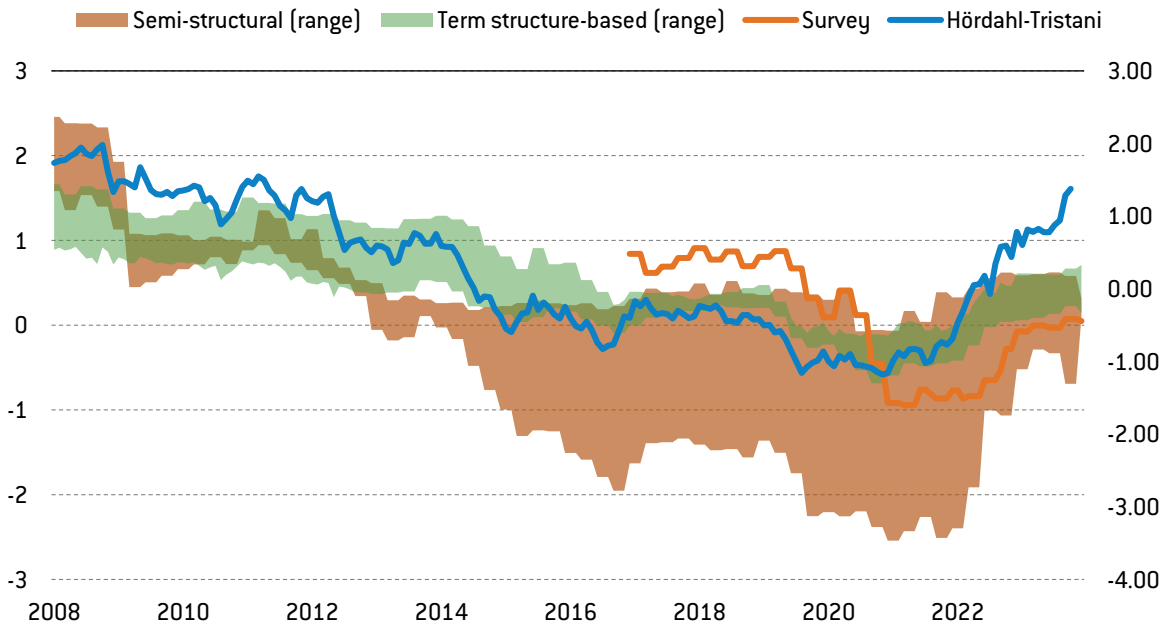
All these developments illustrate the high level of uncertainty that continues to prevail. This leads to a third point: how this uncertainty affects the estimates of r* and how it influences its usefulness in guiding monetary policy.

Tracking long-term trends in r* is important to quantify how frequently short-term interest rates may hit the lower bound. Indeed, this was one of the main motivations behind the ECB's 2021 strategy review. Most recent estimates of r* suggest that its level remains low compared to the period prior to the Global Financial Crisis (Williams, 2023; Brand *et al*, 2025). Estimates for the euro area show a median increase of around 30 basis points since mid-2019, with a range from about minus half of a percentage point (pp) to around half a pp (Figure 4). Thus, notwithstanding arguments that may justify an increase in r* (such as the exceptional investment financing needs arising from structural challenges related to the climate transition, the digital transformation and geopolitical shifts), those estimates still point to the risk that nominal interest rates might become constrained by the effective lower bound.

However, the high level of uncertainty associated with estimating r* should be highlighted. The current range of estimates implies *nominal* rates (ie real natural rate plus 2 percent inflation) ranging from 1.75 percent to 2.25 percent[12] and each of these point estimates comes with a significant margin of error (Laubach and Williams, 2003; Brand *et al*, 2025) (Figure 4). The high level of uncertainty stems from more than methodological challenges. The long-term evolution of the fundamentals that determine r*, such as productivity growth, demographics, fiscal positions, geopolitical shifts and climate change, is extremely hard to predict, even directionally in some cases.

[12] For further details, see Brand *et al* (2024, 2025).

Figure 4: Estimates of the euro-area real natural rate (%)



Source: Bruegel, Hördahl and Tristani (2014). Note: survey-based estimates are computed as the mean between the estimate from the Survey of Monetary Analysts (measured as the median of respondents' long-run expectations regarding the ECB's DFR less expectations of inflation in the long run), starting in mid-2021, and the Consensus Economics estimate (measured as the expected 3-month interbank rate 10 years ahead, less expectations of inflation in the long run).

For regular policymaking, levels of interest rates are compared to the level of r* to determine how contractionary/expansionary monetary policy is. However, in a context of high uncertainty about the level of r*, the evidence stresses that the previous rate should serve as the primary reference point to mitigate the impact on r* of estimation errors (Orphanides and Williams, 2002). This approach also advocates for gradual adjustments in the policy rate, driven by estimated inflation and output gaps. In such a context, when central banks announce their decisions, they gain valuable insight into whether they have surprised financial markets and, if so, the extent to which these surprises impact inflation and economic activity expectations (Gürkaynak *et al*, 2005; Swanson, 2021). A careful interpretation of these signals often proves to be the most effective tool for assessing the stance of monetary policy (Schnabel, 2024b).

All in all, a first conclusion that can be drawn is that any monetary policy strategy should be designed (and communicated) to guarantee robustness to very different scenarios[13]. The 2021 ECB strategy framework has proven able to deal successfully with a completely different context to that which prevailed in the previous decade and prompted the review. However, the communication of the review

[13] For a similar conclusion for the US, see Romer and Romer (2024a).

was very much focused on the risk of interest rates hitting the lower bound in a context of very low inflation. Experience since then would justify communication of the new strategy review in a more general way, emphasising the capacity of the framework to cover different inflation scenarios.

A second conclusion is related to macroeconomic analysis and forecasting. Given the importance of inflation forecast for inflation targeting, central banks should endeavour to improve their ability to forecast how various shocks, in particular large ones, are passed through to inflation (Lagarde, 2025). This is particularly relevant for supply shocks. Supply-side shocks are more difficult to anticipate and can have very different effects on wages and inflation than shocks triggered by changes in aggregate demand, making inflation targeting more challenging. There are also reasons to believe that supply shocks may become more frequent (Lagarde, 2023), related for example to climate change, population ageing, artificial intelligence and/or changes in globalisation.

A deeper analysis of global/external and sectoral shocks and how this can be incorporated into forecasting tools should also be a priority (Forbes *et al*, 2025). When shocks are external, domestic inflation may be affected in the medium run by the impact of the terms-of-trade shock on aggregate demand (Villeroy de Galhau, 2024a). Moreover, the pandemic highlighted the importance of specific goods and sectors, which could cause shifts in the composition of production and demand and lead to differential impacts on inflation compared to more economy-wide shocks.

The ECB is already taking steps in that direction, not only by revising traditional models, but also by developing complementary tools, including specific models for certain components, such as commodities, and new techniques, such as non-linear econometric models[14].

A third lesson relates to the need to consider uncertainty around the baseline projections (Schnabel, 2024a; Lane, 2024c). Uncertainty is taken into account in monetary policymaking in different ways, including through risk analysis tools such as fan charts[15], subjective probability distributions or model-based risk analysis (based on macro-at-risk models) and/or alternative scenarios (characterised, for example, by paths for key external assumptions that differ from those in the baseline). The challenge is how to communicate this uncertainty to the outside world. Communicating in a clear manner the outlook, the risk assessment and the policy reaction can enhance the effectiveness of monetary policy, tempering volatility and facilitating the stabilisation of inflation expectations (Williams, 2024).

To provide more clarity on their reaction function, some central banks publish the interest rate path that would allow the inflation target to be met, as compared to the market-implied interest-rate curve

[14] Indeed, the 2021 ECB strategy review analysed the role of models and came to similar conclusions (ECB, 2021d).
[15] Fan charts with ranges around the baseline are built based on past forecast errors, each range representing prediction intervals at different probabilities and therefore indicating the probability that future observations will fall within these ranges if the typical shocks from the past, excluding exceptional events, were to occur again. In most cases, however, the distribution around the baseline is assumed to be perfectly symmetrical, so no information is provided on the balance of risks and so-called Knightian uncertainty is ruled out. It is a pure statistical tool that also lacks an explanation for the underlying drivers of uncertainty.

used in the baseline projection[16]. The Federal Reserve System publishes the expected path of voting members (the so called 'dot plot'), the distribution of which could be seen as providing the uncertainty they attach to the baseline. However, the evidence shows that, although interest-rate projections provide additional information to macroeconomic projections, they have not significantly improved market understanding of central banks' reaction functions. And dot plots are not always easy to interpret and can contradict the message the central bank sends through other channels.

As stressed by recent external evaluations of central banks' forecasting procedures, a better way forward to communicate on risks would be to make greater use of alternative scenarios and sensitivity analyses[17]. The ECB has already moved in this direction (Lane, 2024a). However, the publication of these scenarios should not be done in a rigid manner, which could dilute the focus on the baseline and make communication more difficult. The key is to communicate more about risk and uncertainty, while admitting the limitations of any individual approach.

3 The definition of price stability

The symmetric, medium-term 2 percent inflation target was one of the key innovations in the last ECB strategy review. From a theoretical point of view, the optimal inflation rate can vary over time, which should lead to the target being reviewed regularly (Adam *et al*, 2019). However, the communication challenge associated with changing the target should set the bar for such a change very high. In the current case, the high inflation episode and the potential increase in r* since 2021 should undercut the case for an increase in the target advocated by some economists at that time (Reichlin *et al*, 2021, 2024).

Moreover, given the potential increase in the volatility of inflation associated with more shocks and uncertainty, consideration could be given to moving from a point target to inflation bands. Bands could reduce the risk of overreacting to small changes in inflation[18], signal that the inflation target is pursued with the flexibility required for absorbing temporary shocks, and help to communicate that the central bank has imprecise and uncertain control over the inflation process (Cœuré, 2019).

The comparison between bands and point targets was analysed in the 2021 review (ECB, 2021e). Three elements of the 2021 conclusions bear emphasis and should lead to the current point target being retained.

[16] As mentioned above, the Eurosystem uses the interest rate implied by financial market prices on a specific cut-off day as a conditioning assumption for its macroeconomic projections. Thus, markets should expect policy to deviate from the market-implied path if the medium-term inflation forecast is inconsistent with the target (Schnabel, 2024a), although the link between policy decisions and inflation projections is diluted given that projections are 'owned' by staff and not the Governing Council. In any case, markets can compare the exogenous path for the policy rate with actual monetary policy decisions, in order to gain insights into the reaction function (Nagell, 2024).

[17] See Milesi-Ferretti *et al* (2023) for an independent review of the Banco de España's macroeconomic projections, and Bernanke (2024) for an independent review of the Bank of England's economic forecasting.

[18] Some central banks, such as in the UK and Canada, follow targets with an explicit tolerance band. The Swiss national bank targets an inflation band, for which they express indifference.

First, bands could reduce the strong anchoring signal of a point target, in particular if interpreted as indifference ranges, indicating that the central bank will not respond to inflation deviations within that range. The scarce empirical evidence shows that a band or a range over which the central bank is indifferent has a (marginally) weaker commitment to the midpoint over the longer run.

Second, initial conditions may matter. If the central bank has been undershooting/overshooting the inflation objective for some time when introducing bands, bands can be interpreted as accepting the low/high observed inflation. This is relevant for the current discussion since inflation has been above 2 percent since 2022.

Third, bands can lead to stronger monetary policy reactions once the limits of the bands are exceeded, and can therefore lead to greater output volatility (Le Bihan *et al*, 2023).

The medium-term horizon of price stability should be maintained since it precisely permits the uncertainty on the origin, magnitude and persistence of the shocks, and on the transmission of monetary policy, to be taken into account. As to its duration, the ECB's definition of the medium-term should be flexible, allowing patience when confronted with temporary shocks that may dissipate on their own, thus avoiding unnecessary economic volatility[19].

Of course, projecting medium-term inflation is particularly difficult in a context of high uncertainty. The ECB's emphasis in recent years on measures of underlying inflation – including new definitions that take into account the influence of the extraordinary shocks[20] – is particularly appropriate, since these measures filter out the short-term volatility in headline inflation and therefore capture better where headline inflation is likely to settle, once temporary factors have dissipated. Since underlying inflation is not observable, using a range of measures is key, the range being an indicator of uncertainty. It is also welcome how the ECB has strengthened its monitoring of wages and mark-ups[21] as key determinants of domestic inflation and therefore of the potential persistence of shocks[22].

Finally, the current symmetry of the target also seems particularly important in a context of diverse shocks hitting the economy from different directions. Symmetry should be understood as both negative and positive deviations from 2 percent being equally undesirable.

All in all, there is a clear case for maintaining the current definition of price stability.

[19] On this argument, see Reichlin *et al* (2024).
[20] The standard set of underlying inflation measures has become less informative in recent years given the exceptional shocks affecting the economy. Thus, ECB staff developed 'adjusted' measures that filtered out the exceptional influences from these shocks.
[21] For an analysis of the role of mark-ups, see Hann (2023).
[22] The so called 'wage tracker' is focused on identifying current and future wage pressures using granular data from collective bargaining agreements in several countries, information that is timelier than other wage-growth indicators. See Bates *et al* (2024) for more details.

4 The reaction function

The nature of the shocks that drive inflation determines how central banks respond to those shocks. The 2021 ECB Strategy Review stated: *"As different types of shock may move inflation and real economic activity in the same direction (as in the case of demand shocks) or create a temporary trade-off (as in the case of supply shocks), the medium-term orientation provides the policy flexibility to assess the origin of shocks and look through temporary shocks that may dissipate of their own accord, thus avoiding unnecessary volatility in activity and employment"* (ECB, 2021c).

This paragraph encapsulates two key considerations when confronting adverse supply shocks.

First, in the face of a negative supply shock, inflation increases while output typically falls. That introduces a meaningful trade-off for monetary policy: an aggressive reaction may produce an excessive contraction in economic activity. That justifies greater patience[23].

Second, patience does not mean inaction. Whether a central bank should look through temporary supply shocks hinges critically on whether such shocks are expected to have (or not) a temporary effect on inflation.

Consider a stylised shock that creates a one-off change in the price level, that is, a spike in inflation that dissipates quickly. If the central bank tightens monetary policy, it may affect inflation long after the inflationary effects of the shock have vanished, and could lead to more inflation volatility and to unnecessary declines in activity and employment. However, in case the negative supply shock has persistent effects, by raising interest rates, the central bank can reduce the inflation deviation from target not only during the inflation spike, but also after it. Thus, an active monetary policy response could generate less inflation volatility than an alternative 'looking-through' policy. In addition, this reaction could be particularly important to avoid a de-anchoring of inflation expectations[24].

In practice, central banks do not know how persistent a given supply shock will be. Nor do they know whether a supply shock will be followed by another. And theory is far from providing a clear answer as to how monetary policy should react in a highly uncertain environment.

The classic Brainard (1967) attenuation principle states that monetary policy should be conservative in the face of uncertainty about the impact of underlying shocks and/or the impact of any policy mis-calibration on inflation (Pill, 2022). The greater the uncertainty, the greater the probability that a more aggressive monetary policy response may move inflation and output away from target[25].

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[23] For further development of this point, see Guerrieri *et al* (2023) and Tenreyro *et al* (2023).

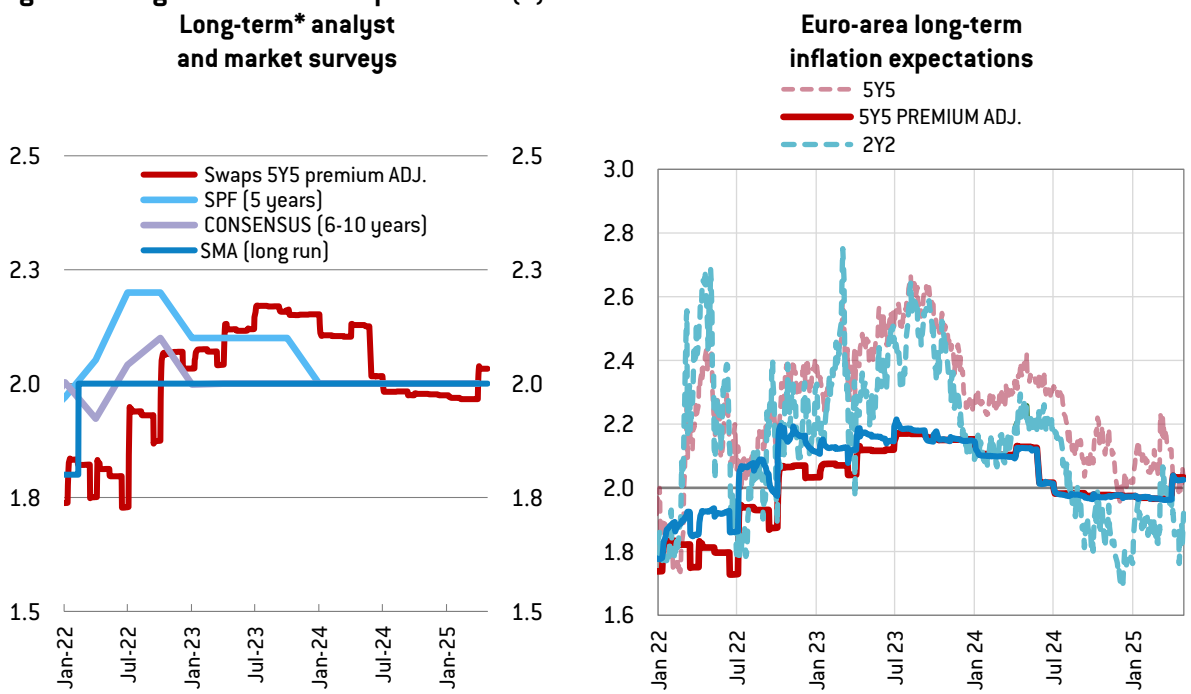
[24] A related issue is to what extent supply constraints could have made the Phillips curve shift to the left and become steeper, implying that demand shifts would generate more inflation volatility than in the past. In this case, aggressive contraction would generate a large output loss. Again, flexibility with the duration of the medium could help to avoid these effects.

[25] Again, it will depend on the degree of persistence of the shocks that hit the economy, as shown by Ferrero *et al* (2019).

An alternative strand of literature, on the basis of robust control principles, provides guidance pointing in the opposite direction in order to keep longer-term expectations well-anchored[26]. The experience of the 1970s shows that shocks can be concatenated, especially when they originate on the supply side of the economy, with strong additive effects on economic variables. In this case, theory suggests that monetary policy should be more reactive to prevent backward-looking behaviour from becoming embedded in economic expectations.

These considerations could help to characterise the ECB's reaction during the last monetary policy cycle. In the initial phase when the inflation persistence of the adverse supply shocks that hit the euro area in 2021 and 2022 was unclear, policy instruments were adjusted gradually (Figure 5). But when it became clearer that inflation persistence was high, affecting the medium-term inflation outlook, and risks of an upside de-anchoring of inflation expectations emerged, the ECB opted for forceful and persistent rate increases[27] (for example holding at 4 percent the deposit facility rate from September 2023 to June 2024).

Figure 5: Long-term inflation expectations (%)



Source: Bruegel. Note: modelling inflation expectations from the Bank of Spain. * The Survey of Professional Forecasters (SPF) inflation expectations are fora period of 4/5 years. The last SPF is from March 2025 and refers to 2028. The last Survey of Monetary Analysts (SMA) is from April 2025 and refers to the median of the long-run expectations, interpreted as the horizon over which the effects of all shocks will have vanished.

[26] For empirical evidence showing that central banks' excessive caution may shift inflation expectations away from their inflation target, see Dupraz *et al* (2023).
[27] A pair of 75-basis-point hikes in September and October 2022, followed by three 50-basis-point hikes between December 2022 and March 2023.

The reaction of monetary policy made sure that inflation did not remain too far above the target for too long, and therefore price and wage-setters could focus on recovering the backward purchasing power lost without worrying about the 'forward' adjustment dynamics that would be generated by any de-anchoring of inflation expectations. As such, an upward de-anchoring of inflation expectations was observed in 2022, which the ECB policy response helped to limit and then reduce (Lane, 2024b).

With respect to the first phase of the inflation surge, it has been argued that the forward guidance that was put in place in July 2021 unduly delayed the ECB response (Darvas and Martins, 2022; De Haan, 2025), stressing that, first, the 2021 interest rate forward guidance included a link with QE that retarded the interest rate liftoff, and second, it was linked to three conditions that, again, hampered a timelier reaction[28].

The available model simulations (Lane, 2024b) show that, had the nature and size of shocks been known back in the fourth quarter of 2021, the model-implied optimal policy[29] would have called for interest rates to be increased earlier and more forcefully. However, when constructed with the information available at the time (taking as a basis the ECB macroeconomic projections), the optimal policy path is similar to that followed by the ECB, with the exception of early 2022, when optimal policy would have called for interest rate hikes already in the first quarter[30]. Moreover, this evidence suggests that the timing of this tightening did not prove crucial, given the forceful and persistent response after the first hike (BIS, 2024; Lane, 2024b). All in all, forecast errors seem to explain to a great extent the delay with the first hike, with staff/Eurosystem ECB projections only showing inflation at or above 2 percent for the whole projection horizon in June 2022[31].

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[28] The exact wording of the linked forward guidance was *"The Governing Council expects net purchases to end shortly before it starts raising the key ECB interest rates"*. In addition, there was forward guidance on QE, for example in December 2021: *"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"*. And there was forward guidance on interest rates, with three conditions for the liftoff: *"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"*. The three conditions were calibrated as a mechanism to hedge against false positives, ie short-lived inflationary shocks of the type observed in the first ten years of monetary union that could trigger a premature reaction (a premature liftoff). Moreover, the linked forward guidance should have been interpreted with a hierarchy between the two: the key conditions for policy were those attached to the rate policy while the horizon for QE was sized relative to the horizon of liftoff (indeed, in June 2018 the Governing Council rotated to rate guidance as the primary instrument to steer the monetary policy stance; see Praet, 2019, and Rostagno *et al*, 2019).

[29] Defined by the minimisation of loss function featuring squared terms for the deviation of inflation from target, the output gap and the change in the interest rate.

[30] A second episode was identified in September 2023 when the model-implied optimal policy would have called for one fewer interest-rate hike.

[31] See Lane (2024), which simulated a set of alternative policy paths, based on two macroeconomic models of the euro area. The results suggested that, if the ECB had perfect foresight on the path that inflation and output would follow subsequently, it should have started hiking in the fourth quarter of 2021, to between 4.5 percent and 6 percent by mid-2023, depending on the model used. Inflation would have peaked at around 7 percent, roughly 3½ percentage points below the actual inflation peak in October 2022. However, output would have needed to decline by 5 percent below the baseline by the end of 2022 using one of the models, and to contract by 2 percent in early 2022 and continue contracting for over a year using the second model.

A first conclusion from this discussion is that there is no single answer to how monetary policy should respond optimally to supply shocks. It depends on the magnitude, the external or internal origin and the expected persistence, among other factors.

Second, facing high uncertainty requires judgement based on a critical examination of the evidence and the realisation that patterns observed in the past can change rapidly. It also requires flexibility in relation to the speed, scale and persistence of policy adjustments, as different situations may necessitate different approaches. Thus, a basic response to risk and uncertainty is to proceed on a meeting-by-meeting and data (but not data point) dependent manner, as the ECB has done in recent years. In such a context, it is also useful to identify risk proxies to monitor and communicate (eg underlying inflation and indicators of the strength of monetary transmission in the case of the ECB).

Fourth, if gradualism in moving policy rates were an optimal option, keeping inflation expectations anchored might also require forceful action in certain circumstances. In this regard, the 2021 strategy review stressed that when the economy is close to the lower bound and is suffering a deflationary shock, especially forceful or persistent monetary policy measures might be required. The review also recognised that *"it is important to respond forcefully to large, sustained deviations of inflation from the target in* **either direction**" (emphasis added). The 2025 strategy review should emphasise more clearly the symmetry in the potential need for forceful action[32]. A combination of forcefulness and persistence is appropriate whenever there is a threat to the anchor, while naturally still taking into account the special properties of the effective lower bound.

Finally, facing high uncertainty should imply avoidance of unconditional commitments by the central banks. In particular, the rapid reversal of the macro context and the required policy response observed in recent years stresses the need to accompany forward guidance with conditionality elements. Thus, clear communication that certain forward guidance on rates or QE hinges on the prevalence of a certain inflationary outlook is of the essence. This could include providing well-defined, state-contingent thresholds. The criteria for this conditionality should be carefully considered and adjusted to provide greater flexibility if the economic environment does not evolve as expected. Unconditional forward guidance should therefore be avoided.

5 On monetary policy instruments

What has been learned since 2021 about the effectiveness of policy instruments? In principle, several features could have altered the transmission mechanism of monetary policy in the euro area in the recent tightening process[33].

[32] The potential need for forceful action at the lower bound was included in the review monetary policy statement and press release, while the potential need to act forceful in cases of sustained deviations of inflation from target in either direction was mentioned only in the overview of the monetary policy strategy (ECB, 2021a, 2021b, 2021c, respectively).
[33] For further details, see Hernández de Cos (2024).

First, banks are better capitalised and have higher liquidity ratios and there has been an increase in concentration in the banking sector[34], which could have weakened the transmission mechanism[35].

A second factor, pointing in the same direction, relates to the debt burden of the euro-area non-financial private sector, which has become less sensitive to interest rates in the short term[36].

Third, when the ECB started to tighten its monetary policy, money market rates were in negative territory and there was an excess of liquidity in the banking system. This very accommodative starting position may have weakened the pass-through of market rates to deposit rates[37].

Fourth, there has been a shift from bank to bond funding over the last decade[38]. This, together with faster monetary policy pass-through to bond rates than to bank rates, implies more rapid transmission than in the past.

Fifth, some euro-area countries experienced significant increases in house prices during the decade running up to the pandemic. The monetary tightening may have contributed to an adjustment in house prices, especially in countries with stretched valuations, adding contractionary impact[39].

Sixth, the tightening took place in the context of weak growth and high uncertainty, which may have contributed to amplifying its impact through higher risk premia and tighter credit standards.

Finally, the current tightening cycle has been unprecedented both in terms of its magnitude and speed[40]. The possible existence of non-linearities could have strengthened the transmission.

The available evidence shows a certain amplification of the tightening of financing conditions through higher risk premia and tighter credit standards than in the past. Consequently, the slowdown in credit

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[34] For instance, the average share of assets held by the five largest banks in the euro area rose from 60 percent in 2008 to 68 percent at the end of 2022.

[35] Better capitalised banks are able to obtain funding at lower costs and to absorb potential losses associated with the tightening of monetary policy and, as a consequence, can grant more loans at lower prices (Altavilla *et al*, 2020; Holton and Rodriguez d'Acri, 2018; Gauvin, 2014). For the impact of concentration, see Mayordomo *et al* (2023) or Van Leuvensteijn *et al* (2013).

[36] Between 2012 and 2022, the share of households' bank debt with an interest rate fixation period of up to one year fell from 35 percent to 24 percent, while for non-financial firms the proportion of bank debt either maturing within a year or with an interest rate fixation period of up to one year declined from 70 percent to 59 percemt. However, the gross debt-to-income ratios of households were higher than in the 2000 and 2005 tightening episodes, which would tend to strengthen transmission. See Lane (2023).

[37] However, cutting rates to negative levels can compress term rates by more than an equally sized cut from one positive level to another. This is because of frictions that encourage investors to move along the duration and risk scale when interest rates are negative. Symmetrically, raising rates from negative to zero or positive levels could also have a disproportionate tightening impact on the term structure. Advance communication of an imminent hike can attenuate this threshold effect. See Altavilla *et al* (2021).

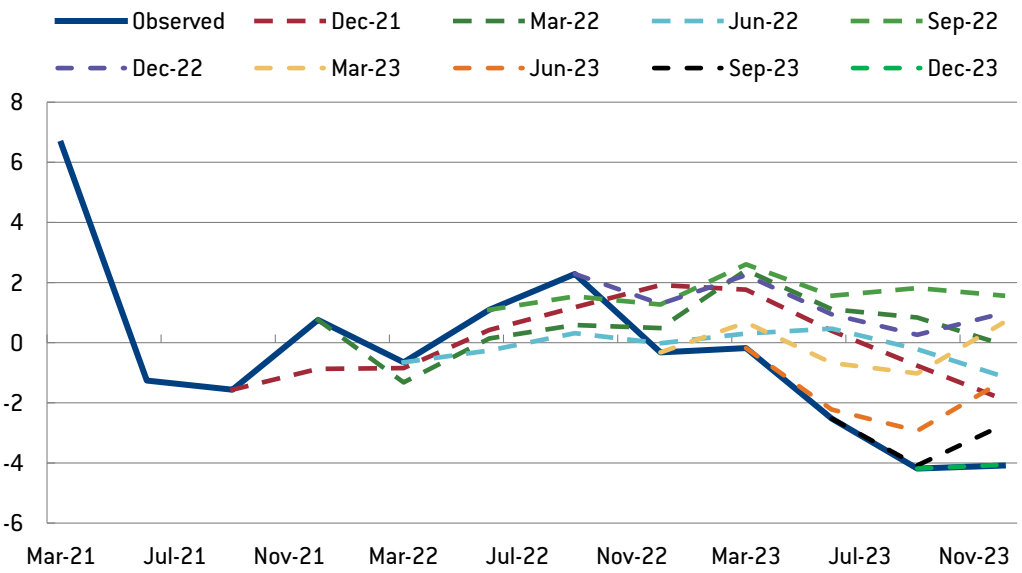
[38] Bond debt increased from 16 percent to 24 percent of non-financial corporations' total debt between 2012 and 2022.

[39] A potential decrease in house prices would weigh negatively on household wealth. Additionally, it would have a negative impact on banks' portfolios, by reducing the value of the collateral provided to banks by households and firms, which might ultimately affect credit developments.

[40] Between July 2022 and September 2023 (ie over 14 months) policy rates rose by 450 basis points and were accompanied by a significant reduction in the balance sheet.

flows has been more intense than predicted by historical patterns (Figure 6)[41]. However, the strong growth in nominal income, in a context of robust employment and profit growth, has slowed the increase in credit risk, which still falls short of what would be expected based on historical experience.

Figure 6: Loan projections (y-o-y), Spanish non-financial firms*



Source: Bruegel based on ECB and Banco de España. Note: * in all forecasting exercises the explanatory variables are those observed in December 2023.

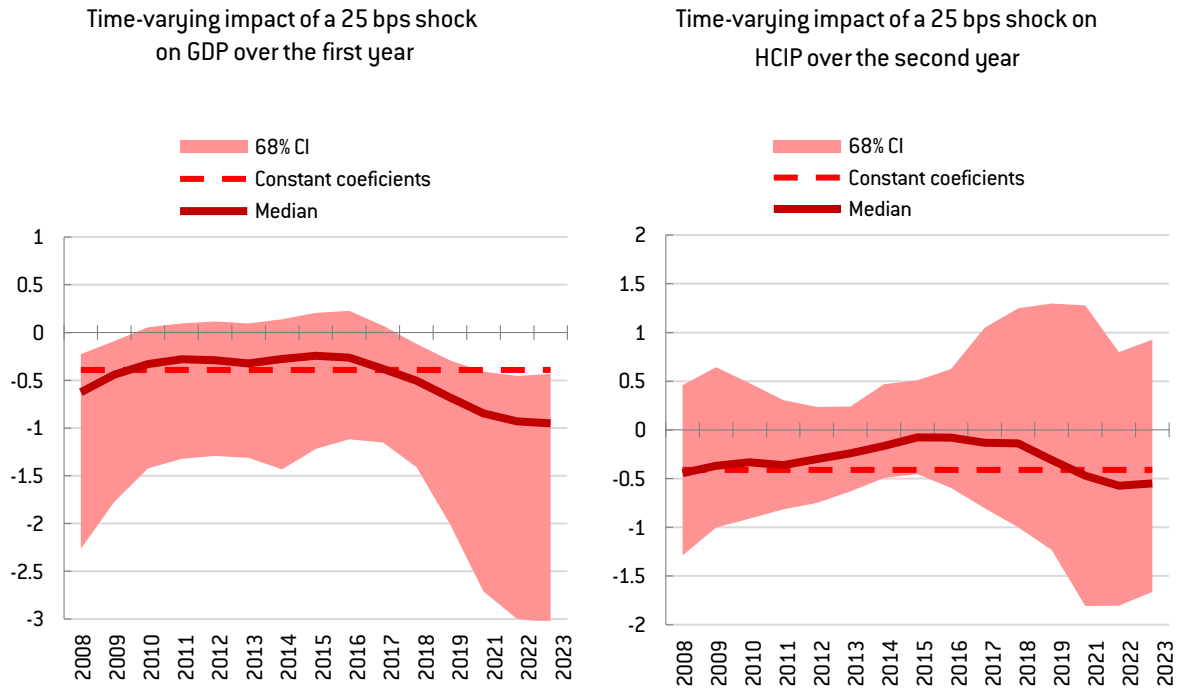
In terms of the impact on activity and inflation, the ECB macroeconomic projections overestimated GDP growth, and the downward surprises do not seem to be fully explained by errors in the technical assumptions. In these projections, the impact of financial variables on activity and inflation is based largely on historical correlations and linear models, which might signal a stronger transmission than in the past.

Inflation projection errors were significant, as noted above, but their accuracy has significantly improved since the end of 2022. Complementary evidence, using micro data, shows that the pass-through of the current tightening has become faster and stronger than in the past (Allayioti *et al*, 2024).

Additional evidence based on recursive estimates confirms these results that the transmission may have been somewhat more intense than in the past[42]. This is especially the case for growth, whereas the evidence for inflation is less conclusive (Figure 7)[43].

[41] For further details, see Lane (2023) and García-Posada *et al* (2024).
[42] The evidence is based on recursive estimates of the impact of (non-systematic) monetary policy shocks by means of a structural VAR model extension from Brandt *et al* (2021), identified through sign restrictions.
[43] See, for the US case, Romer *et al* (2024b) and Auclert *et al* (2023). Moreover, Canova *et al* (2024) showed how different types of monetary policy shocks impact the US economy under high- versus low-inflation regimes. They concluded that in high-inflation regimes, the peak response of output growth, unemployment and inflation is smaller, but the effects persist longer.

Figure 7: Time-varying estimated impact of interest rate increases in euro-area GDP and inflation (y-o-y, %)



Source: Bruegel. Note: structural shocks are identified through sign restrictions.

All in all, the available evidence confirms that monetary policy has played a crucial role in the disinflation process and validates the use of the instruments, in particular the role of interest rates as the primary tool. ECB analysis shows that without the sizeable tightening, inflation would have been about two percentage points higher on average in each year between 2023 and 2026 (Lane, 2024a). Importantly, these estimates do not incorporate the impact of monetary policy in keeping long-term inflation expectations anchored.

At the same time, given the scale of the monetary tightening, it can be argued that the 'sacrifice ratio' of bringing inflation down has been relatively low. The labour market has demonstrated remarkable resilience[44], with unemployment rates lower than expected from staff projections[45]. There may be two reasons for this.

First, the severity of the output-inflation trade-off depends crucially on inflation expectations. In the New Keynesian Phillips curve, a rise in inflation expectations shifts the relationship between the short-term output gap and inflation upwards. This implies that stabilising output at potential is not enough to

[44] The euro-area unemployment rate falling from 8.8 percent in September 2020 to 6.2 percent in February 2025.
[45] The persistent underestimation of employment growth could be attributed, at least to some extent, to labour hoarding by firms in a context of a very tight labour market and an economic slowdown largely perceived as transitory.

bring inflation back to target: instead, the central bank must depress output below potential to achieve the inflation target.

In the latest inflationary episode, there was a real risk that the sharp and persistent rise in inflation would lead to a de-anchoring of inflation expectations (BIS, 2022; Carstens, 2022). However, inflation expectations over medium- and long-term horizons remained broadly anchored to the 2 percent target (Figure 5). It can be argued that the credibility central banks have gained over the last decades allowed for such strong anchoring of inflation expectations[46]. This could be seen as one of the reasons why the sacrifice ratio has been relatively small compared to previous inflationary episodes during which supply shocks predominated, such as in the 1970s.

Second, the output-inflation trade-off also depends on the slope of this relationship, ie how much output must fall to bring inflation down (for given inflation expectations). In the basic New Keynesian model, this slope is steeper when the frequency with which firms adjust their prices to changes in their cost and demand conditions is greater.

During the recent episode of high inflation, firms changed their prices more frequently, accelerating the transmission of shocks to inflation[47]. This implies that inflation is more sensitive to changes in aggregate demand, allowing the central bank to achieve the same reduction in inflation with smaller output losses[48].

All in all, an additional conclusion should be the crucial importance for central banks of acting and communicating in a way that keeps inflation expectations well anchored. It also requires a better understanding of how different measures of inflation expectations at different horizons affect the evolution of inflation dynamics.

5.1 The experience with quantitative tightening

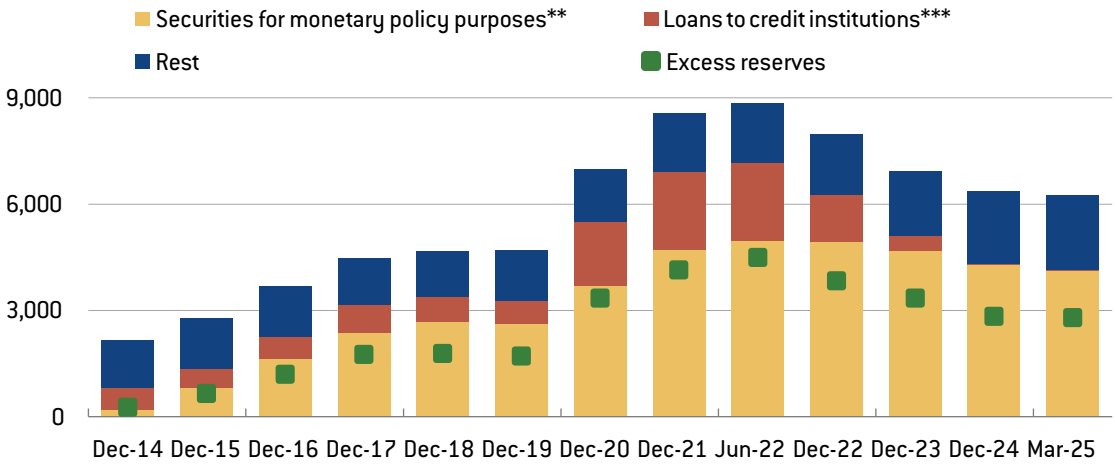
The macro-financial effects of QE have been analysed extensively[49]. The theory shows that QE lowers yields mainly through anticipation effects: investors react depending on their expectations of how much debt the central bank will extract over time from the market, so that risk-averse market participants will not have to hold it. In part, this involves the extraction of duration risk – the risk related to changes in a bond's market price over its remaining life due to changes in short-term interest rates

[46] See Villeroy de Galhau (2024b). Dupraz and Marx (2023) estimated that, had inflation expectations been as poorly anchored as they were in the 1970s in the US, ECB policy rates would have had to peak at about 8 percent instead of 4 percent. Central bank credibility allows for less imported inflation and hence moderate inflation expectations (Ciccarelli and Mojon, 2010).
[47] Cavallo *et al* (2023) showed how the frequency of price changes increases dramatically after a large shock.
[48] The optimal monetary policy prescription in this situation has been analysed in the literature, concluding that the central bank should 'strike while the iron is hot', in other words, fight inflation by countering firms' inflationary aspirations, thereby achieving a lower sacrifice ratio (see Karadi *et al*, 2024). More generally, when the Phillips curve is steep for an economy overall, the benefits of monetary tightening are amplified. At the same time, when supply constraints are limited to the commodity sector, conventional policy rules, such as those targeting measures of core inflation, are valid since targeting sticky prices results in more gradual disinflation with a smoother output path (see IMF, 2024).
[49] See, for instance, Aguilar *et al* (2020, 2022, 2024), Altavilla *et al* (2021) and Eser *et al* (2023).

(Vayanos *et al*, 2021; Eser *et al*, 2023). In the euro area, duration-risk extraction is reinforced by the extraction of sovereign credit risk (Costain *et al*, 2024).

There are some reasons to expect that the effects of QT will not just be the mirror image of QE (Vayanos *et al*, 2021; Costain *et al*, 2024). First, QE policies were often implemented at times of great market stress, when their effects are larger (Krishnamurthy, 2022) , whereas central banks have waited for times of market tranquillity before embarking on QT. Furthermore, QE took the form of outright purchases, but QT has taken the form of a passive run-off of bond portfolios (Figure 8)[50]. Lastly, the announcement of large-scale QE programmes often came as a surprise to the market, while the current QT path was carefully announced in advance[51].

Figure 8: Eurosystem balance sheet and excess reserves* (€ billions)



Source: Bruegel based on ECB and LSEG Datastream. Note: * year-end data, except for June 2022 (which reflects the peak level on 23 June 2022) and the latest available data (March 2025). ** ECB asset purchase programmes: SMP, CBPP3, ABSPP, PSPP, CSPP and PEPP. *** Includes main refinancing operations, longer-term refinancing operations, and the marginal lending facility.

Empirical studies find much smaller effects of QT than those attributed to QE[52]. It is reasonable to assume that the reduced response to QT reflects its gradual and predictable implementation[53], and also the more benign financial market conditions, compared to conditions when QE began. The recent

[50] Among the four major central banks (the Federal Reserve, ECB, Bank of England and Bank of Japan), only the Bank of England has implemented active QT by selling bonds in the current episode.
[51] For instance, the ECB announced in December 2022 the pace at which it would begin to reduce the Asset Purchase Programme portfolio through partial reinvestment of maturing bonds, ensuring a gradual and predictable reduction. See ECB press release of 15 December 2022, 'Monetary policy decisions', https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.mp221215~f3461d7b6e.en.html. Logan (2024) likewise discussed asymmetries in the observed effects of QE and QT attributable to differing financial conditions at the time of implementation, and to differences in the impacts of anticipated and unanticipated policy announcements.
[52] Du *et al* (2024) surveyed the effects of QT across countries. Their findings suggest that the cumulative impact of QT announcements from 2021 to 2023 was an increase of around 20-26 bps, on average across countries, government bond yields at horizons of one year and longer, with some variation between countries. Eser *et al* (2023) estimated a cumulative decline in yields of more than 90 bps in ten-year euro area yields in response to the ECB's Asset Purchase Programme over the years of its maximum impact (roughly 2017-2019). See also Box 3.1 in Banco de España (2023).
[53] Du *et al* (2024) found it challenging to identify any 'surprises' in QT actions.

experience therefore seems to validate the gradual and predictable approach to QT adopted by central banks.

At the same time, the experience of central banks that faced some bumps in the road to balance-sheet normalisation shows that temporary flexibility in its implementation can be useful in managing liquidity events without reversing the medium-term path of QT[54].

Looking forward, as excess liquidity in the system decreases alongside central banks' balance-sheet run offs, it will be important to monitor market developments and analyse which investor types are absorbing the increased supplies of bonds (Ferrara *et al*, 2024). Likewise, it will be essential to ensure that reserves remain ample at the endpoint of the QT process, as otherwise the impact of QT may be greater and the risk of liquidity events may increase (Copeland *et al*, 2021; Altavilla *et al*, 2023).

The experience with QT offers some lessons for QE as well. As concluded in the ECB's 2021 strategy review, QE is a useful tool when the interest rates are constrained at the effective lower bound. However, the most recent period has also made visible the potential costs derived from the interest rate risk assumed by central banks when entering into QE, with many central banks showing annual losses from asset holdings.

While monetary policy should be designed to maintain price stability and a central bank can continue performing its functions while incurring losses or even recognising negative equity (Esteban *et al*, 2024), it can be argued that not distributing profits or asking for further capital contributions could prompt external interference (Chiacchio *et al*, 2018; Reis, 2013). In this regard, one approach could be to establish predefined rules for automatic recapitalisation of the central bank if reserves fall below a certain threshold, which would head off potentially difficult political discussions during periods of persistent losses (Bank of Canada, 2025; Forbes *et al*, 2025).

6 Monetary policy and financial stability

Interactions between monetary policy and financial stability are potentially significant. On many occasions, the pursuit of price stability is complementary to the pursuit of financial stability – for instance, if financial stability and inflationary risks were to emerge in parallel. In stressed conditions in which a deflationary demand shock is present, financial-stability risks might also materialise in a manner that does not create a trade-off with monetary policy. The COVID-19 pandemic was a case in point.

But even if liquidity crises occur during high-inflation periods, tools can be skilfully designed to ensure separation (Schnabel, 2023). The tools must be targeted and temporary, and the underlying financial-stability challenge must truly be one of liquidity rather than solvency. For instance, the intervention by

[54] For example, the Bank of England faced a liquidity crisis affecting UK pension funds at the outset of its QT policy, briefly expanding its longer bond purchases but maintaining its medium-term path of balance-sheet normalisation (Pinter, 2023).

the Bank of England in autumn 2022 to stabilise the gilt market can be regarded as one instance in which monetary policy had to be applied to directly address a financial-stability problem.

The ECB's July 2022 announcement of the transmission protection mechanism (TPI) was another example. It occurred in an environment of mounting inflationary pressures and of a monetary policy tightening stance. Heightened concerns about sovereign debt dynamics led to sharp increases in sovereign bond yields that could have triggered severe financial distress and market fragmentation. The TPI helped stabilise markets and therefore support the smooth functioning of financial markets necessary to transmit the monetary policy stance evenly across countries. In this regard, the TPI has been crucial in enabling a forceful monetary policy response to tackle the inflation problem.

There are cases, however, in which a trade-off between the two objectives arises, such as when bank solvency issues emerge in a high inflation environment. These solvency issues should be mitigated by a proper supervision and resolution framework and by actions taken by fiscal authorities. Nonetheless, monetary policy may have to react, considering that a financial crisis is likely to lead to the emergence of prolonged disinflationary forces that should ease this trade-off.

Another instance in which such a trade-off may emerge is when a build-up of systemic risk occurs in a situation of subdued inflation. A prolonged loosening of monetary policy could exacerbate financial stability risks, and the activation of macroprudential policy tools may not be enough. The prolonged low-interest rate environment prevalent before the pandemic is often cited as an example. In such a context, monetary policy could be designed to minimise the potential negative impact on financial stability. For example, the ECB's TLTROs, which set a lending target that excludes housing loans, were designed specifically to not contribute to the formation of real-estate bubbles.

All in all, the latest developments confirm the conclusion reached in the 2021 strategy review of the need to take financial stability into account in monetary policy deliberations[55].

In addition, the recent experience shows that it could be useful to more clearly distinguish between QE for market functioning (financial stability) versus monetary stimulus (stance), and from the need to maintain a structural bond portfolio providing liquidity to the banking system. While differentiating between the price and financial-stability objectives is inherently complex, and sometimes (like the pandemic emergency purchase programme (PEPP) in the ECB's case) it can make sense to have a dual role, a clearer distinction would not only improve communication around these programmes, but would also incentivise a careful consideration of their amount, duration and structure, to ensure they are designed to accomplish their specific goals (Bank of Canada, 2025; Forbes *et al*, 2025).

[55] In practical terms, this means that an integrated framework of economic analysis and monetary and financial analysis is used to measure developments in financial vulnerabilities and macroprudential measures, and their impact on output and inflation, including in the long run. It does not mean that monetary policy consists of systematic policies of 'leaning into the wind' (whereby monetary policy is systematically tightened when systemic risk builds up) or of 'cleaning' (whereby monetary policy is systematically loosened when systemic risk materialises). It is rather a flexible approach.

There are also lessons for macroprudential policy (Hernández de Cos, 2023a). A more active stance is needed to foster the accumulation of releasable macroprudential buffers during non-crisis periods in order to release them in crisis periods. Finally, the effective transmission of both monetary and macroprudential policies can be significantly enhanced by deepening integration within the EU banking union and through the creation of a Capital Markets Union.

7 Monetary and fiscal policy interactions

The interactions between monetary and fiscal policy are also strong. The coordinated fiscal and monetary policy response during the pandemic was crucial to minimise the potential structural damage caused by the crisis, while avoiding deflationary pressures. However, as the inflationary shocks took hold, monetary and fiscal policies increasingly pulled in opposite directions. Fiscal policy responded with measures to mitigate the impact of the price shock on households and businesses. And many of these measures were not sufficiently targeted, resulting in an expansionary impulse that was broader than necessary (Ferdinandusse *et al*, 2024).

The monetary policy tightening generated a significant increase in sovereign bond yields in all countries. However, it did not trigger a significant increase in sovereign bond spreads between countries. Several factors could explain this outcome, including higher growth in some of the more highly indebted countries, the high average sovereign-bond maturity, the strengthening of the European framework since the global financial crisis and the extraordinary European response during the pandemic, that benefited countries with higher debt levels more – all this in a context of high risk appetite on the part of investors in global financial markets.

The predictable and gradual reduction of the balance sheet and the TPI announcement also played significant roles. The rationale behind the TPI lies in the fact that the combination of national fiscal policies and single monetary policy can, in certain circumstances, generate abrupt interest-rate spirals in bond markets. These developments could affect the capacity of the ECB to guarantee an adequate monetary policy stance. By announcing possible interventions or, if necessary, by carrying out targeted, temporary interventions, the central bank can prevent these spirals, and therefore it can ensure the smooth transmission of monetary policy across the whole euro area.

To ensure that market discipline for sound fiscal policies is preserved, the TPI sets clear conditions for the purchase of bonds: i) the ECB cannot counter tensions that arise because of country fundamentals[56]; ii) it can only be used in countries that pursue sound and sustainable macroeconomic policies, including compliance with EU fiscal rules.

In this respect, the EU fiscal framework, updated in 2024, focuses mainly on debt sustainability, which could make it less likely that fiscal policy does conflicts with monetary policy. It could also help to generate the fiscal buffers needed for fiscal policy to play its stabilising role in complementing

[56] Darvas *et al* (2024) found no evidence of fiscal dominance over euro-area monetary policy.

monetary policy. And it could encourage structural reforms that have the capacity to increase potential output growth and r*, giving monetary policy more room for manoeuvre (Draghi, 2015). Of course, all this will require the effective implementation of the updated framework by EU countries.

In practical terms, given the elevated public debt levels and low potential growth rates in many countries, and the fact that real interest rates remain higher than before the pandemic, guaranteeing fiscal sustainability should imply a restrictive fiscal policy in the next few years, in particular in countries with significant fiscal imbalances. In parallel, the fiscal adjustments will take place at a time when public investment needs in relation to climate change, digitalisation and defence are significant (Draghi, 2024) and will be very difficult to achieve with the fiscal space available in many countries (Boivin *et al*, 2025)[57]. This should be another strong argument, in addition to the most traditional ones, in favour of a common, permanent, European financing instrument.

8 Conclusions

Since mid-2021, the euro-area economy has gone through several shocks, leading to a period of the highest inflation seen since the creation of the European Monetary Union, and followed by the largest and swiftest increase in interest rates. Even in mid-2025, although inflation has declined significantly since its peak, it remains above 2 percent, and interest rates are significantly higher than those prevailing in 2021 and before the pandemic.

Forceful and persistent measures taken by the ECB have succeeded in bringing inflation down and delivering on the bank's price-stability mandate. All this has been done within the monetary policy framework approved in 2021, before the inflationary episode. A first conclusion that could be drawn is therefore that there is no need for a drastic change in the framework in the context of the ECB's 2025 review.

This general assessment should be compatible with identifying some areas for potential fine-tuning of the framework. In particular, the 2021 review was very much focused on the effective lower bound. The recent inflationary episode and the high level of uncertainty justify more general communication of future strategy reviews, emphasising robustness to very different scenarios.

A good example of this change in communication relates to the central bank's monetary policy response. The 2021 review emphasised the need for forceful action when the economy is close to the lower bound and suffering from a deflationary shock. While of course still taking into account the special properties of the effective lower bound, the 2025 review should emphasise more clearly that a

[57] The European Commission's March 2025 proposal to activate the national escape clause under the fiscal rules for defence investments illustrates the difficulty.

combination of forcefulness and persistence is appropriate whenever there is a threat to the inflation anchor.

The high level of uncertainty, which is likely to continue over the next few years, will also require an emphasis on flexibility to adapt to the magnitude, origin and persistence of shocks. It should also imply avoiding the use of unconditional forward guidance.

There is also a need to communicate better on the level of uncertainty and its consequences for monetary policymaking. A promising approach would be to make greater use of alternative scenarios and sensitivity analyses. These scenarios should also receive more attention in ECB communications.

The large forecast errors observed since 2021 imply that forecasting tools should be improved, in particular when dealing with large supply shocks, especially because there are good reasons to believe that these will become more frequent. A deeper analysis of global/external and sectoral shocks and how this can be incorporated into forecasting tools is also a key. A better understanding of the impacts on the evolution of inflation dynamics of different measures of inflation expectations at different horizons should also be a priority.

Moreover, the 2021 ECB monetary policy strategy to explicitly take financial-stability considerations into account in monetary policy deliberations seems valid. However, when possible, it might be necessary to more clearly distinguish between QE for market functioning versus monetary stimulus, which could incentivise a careful assessment of the amount, duration and structure of any asset purchase programme.

On fiscal policy, the 2021 review emphasised the effectiveness of expansionary fiscal policy to help deal with negative shocks to growth and inflation in the context of the effective lower bound. Given the high level of public debt in many countries, the new review should focus on the need for sustainable fiscal policies as a precondition for a well- functioning EMU.

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