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The European Central Bank's new monetary policy strategy*

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*The views expressed in this article are those of the author and do not necessarily represent the views of the European Central Bank and the Eurosystem.

1 Introduction

Since the previous strategy review of the European Central Bank (ECB) back in 2003, the euro area and the global economy have undergone fundamental structural changes. Interest rates have reached historical lows and the set of monetary policy instruments has expanded significantly. In parallel, developments such as globalisation, digitalisation, an ageing population, climate change and innovations in the financial system have posed new challenges for the conduct of monetary policy. These issues prompted the ECB to launch a review of its monetary policy strategy in early 2020.

The new monetary policy strategy was unanimously approved by the Governing Council of the ECB and announced on 8 July 2021. Its main objective is to improve the ECB's capacity to fulfil its price stability mandate in the years to come by being as effective as possible in this challenging and changing environment – both today and in the future. The current review has drawn on an immense collective effort by staff at the ECB and the Eurosystem national central banks (NCBs) over the past 18 months, organised across thirteen work streams.[1] During this process we have listened to opinions from across Europe, including those from citizens, academics, members of the European Parliament and civil society organisations.

In this article I analyse the main aspects of the ECB's strategy review. It is structured as follows. Section 2 contextualises the previous strategic framework and explains the major structural changes the euro area has undergone in recent decades, leading the ECB to update its monetary policy strategy. More specifically, this section addresses two particularly significant issues for the conduct of monetary policy: the fall in the equilibrium real interest rates and, as a result, the limitations imposed by the lower bound on interest rates. Section 3 describes the main aspects of the strategy review and explains how they can help address the challenges which motivated it. Section 4 discusses the implications of climate change risks for the conduct of monetary policy in the euro area and how this has

[1] See https://www.ecb.europa.eu/home/search/review/html/workstreams.en.html.

been reflected in the strategy. Section 5 analyses the recent change in our forward guidance on interest rates in order to adapt it to the new strategy. Section 6 summarises the ECB's monetary response to recent economic and inflationary developments under the new strategy framework. Section 7 contains my conclusions.

2 Motivation

2.1 The previous strategic framework and its results

The monetary policy strategy of the ECB is guided and bound by the mandate conferred by the Treaty on European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU). Article 127(1) of the latter confers on the European System of Central Banks (ESCB) and, in particular, on the ECB the primary objective of maintaining price stability in the euro area.[2] The TFEU leaves to the discretion of the ECB the exact definition of "price stability" and how it is to be achieved, which is what is known as "monetary policy strategy". The initial ECB monetary policy strategy was set out in 1998, the year the ECB was created. The ECB then defined price stability as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%. After an evaluation of this strategy, in 2003, the Governing Council of the ECB clarified that, in the pursuit of price stability, its objective was to maintain inflation rates below, but close to, 2% over the medium term.

The ECB set a positive inflation target, rather than zero, mainly for three reasons.[3] First, because maintaining a positive inflation rate reduces the probability that nominal interest rates will become constrained by their lower bound as a result of a disinflationary shock. This is a crucial issue that will be dealt with extensively in the following sections. For the moment, it suffices to point out that, back in 2003, it was considered that an inflation rate below, but close to, 2% provided a safety margin wide enough for interest rates not to hit their lower bound.

A second reason for having a positive inflation target is that HICP inflation may be subject to a positive bias when measuring the real increase in the cost of the consumption basket (e.g. owing to improvements in product quality). This implies that zero inflation in the HICP would entail a *de facto* fall in prices.

Third, a positive inflation rate in the euro area as a whole leaves room for possible differences between the inflation rates of the different countries. If the euro area's inflation target was zero, this would imply that, in order to offset positive inflation in certain countries, the rest would face negative inflation rates, i.e. deflation. Since, in environments with downward price and wage rigidities, deflation tends to have negative effects on economic activity and employment, maintaining positive inflation in the euro area reduces the risk of observing those negative effects in some parts of it.

[2] Without prejudice to this objective, Article 127 of the TFEU also establishes that the Eurosystem shall support the general economic policies in the European Union (EU) with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the TEU. These objectives include balanced economic growth, a highly competitive social market economy aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment.

[3] See https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html

The strategy review in 2003 also stated that price stability had to be maintained over the medium term. It is impossible, and often not even desirable, for any central bank to either keep inflation on target at all times or to bring it back to a desired level within a very short period of time. This is due to the existence of short-term volatility resulting from nonmonetary shocks that might affect the price level. Consequently, the conduct of monetary policy needs to have a forward-looking, medium-term orientation. The horizon should be short enough to be verifiable and credible, but long enough to be consistent with inflation controllability. The standard transmission lag of monetary policy (i.e. the time it normally takes for a monetary policy impulse to exert its maximum impact on the economy and inflation) determines the minimum interval of time that quantifies the "medium term".

Moreover, the medium-term orientation allows the ECB to adapt its monetary policy responses to the nature and size of the shocks affecting the economy. Demand shocks, for instance, such as an increase in government spending, cause inflation and output to increase (or decrease) jointly. Nonetheless, supply shocks push inflation and output in opposite directions. As a result, supply shocks usually require a smoother and more protracted policy response to avoid excessive volatility of output and employment.[4]

The 2003 strategy review also analysed the instruments that the ECB should employ to achieve its target. Its main instruments were the ECB's key interest rates: (i) the deposit facility rate (DFR), i.e. the interest earned by euro area banks on their overnight deposits at the ECB; (ii) the rate of the marginal lending facility, through which the ECB provides overnight credit to banks; and (iii) the rate on the main refinancing operations, through which the ECB provides one-week credit to banks. Changes in these policy interest rates affect money market rates and these, in turn, are ultimately passed through to the interest rates paid by agents in the real economy (firms, households and governments), whether through debt markets or bank lending.

The performance of the ECB before the Great Financial Crisis (GFC) of 2008-2009 was quite positive. During the first decade of the euro, against a backdrop of mainly inflationary shocks, inflation remained close to target levels. This helped keep economic agents' inflation expectations well-anchored and, therefore, established the ECB's credibility for fulfilling its price stability mandate.

The onset of the GFC in 2008, however, led to a second phase dominated by disinflationary pressures which, over time, generated a downward trend in inflation. During this phase, the ECB maintained a low interest rate policy in an attempt to boost the economy and inflation. However, the existence of a lower bound on interest rates restricted the ECB's ability to continue reducing its key interest rates. This limitation, together with the persistent fall in inflation and incipient signs of deanchoring of long-term inflation expectations, led the ECB to implement, from 2014, non-standard monetary policy measures such as large-scale asset purchases or longer-term refinancing operations. Despite the implementation of all these measures, inflation has remained persistently below target since 2013[5] (see Chart 1).

[4] For further details, see ECB (2021a).

[5] For further details, see Rostagno et al. (2019).

CHART 1: EURO AREA HICP (1999-2021)

Source: Eurostat. Last observation: November 2021.

2.2 The decline in natural interest rates and the problem of the lower bound

Why have the historically low interest rates of the last decade not been sufficient to keep inflation around its target? To answer this question, we need to understand the concepts of "natural interest rate" and "lower bound".

First, it is important to remember that, in order to achieve price stability, the central bank influences the level of interest rates on the financing received by the various economic agents. Although the central bank controls the nominal interest rate, it is the "real" interest rate – i.e. the nominal rate less expected inflation – that is relevant for households' and firms' spending decisions. For instance, a nominal interest rate of 2% when expected inflation is 4% is much more expansionary than a nominal interest rate of 1% in a non-inflationary setting.

Given that goods and services prices are partly rigid, the central bank may influence the real interest rate by adjusting nominal rates. The central bankers' playbook prescribes that if the economy is overheating and prices and wages are under upward pressure, the central bank should raise nominal interest rates above inflation expectations, thus tightening real rates and cooling down the economy. And vice versa, in a downturn, with falling prices and rising unemployment, the central bank should cut nominal interest rates, thus reducing real rates and stimulating aggregate demand.

The standard "New Keynesian" monetary policy model establishes that, to achieve the inflation target, the central bank must maintain real interest rates at a level known as the "natural interest rate", defined as the real interest rate that maintains output at its potential level and inflation stable at its target level.[6] This natural interest rate evolves dynamically

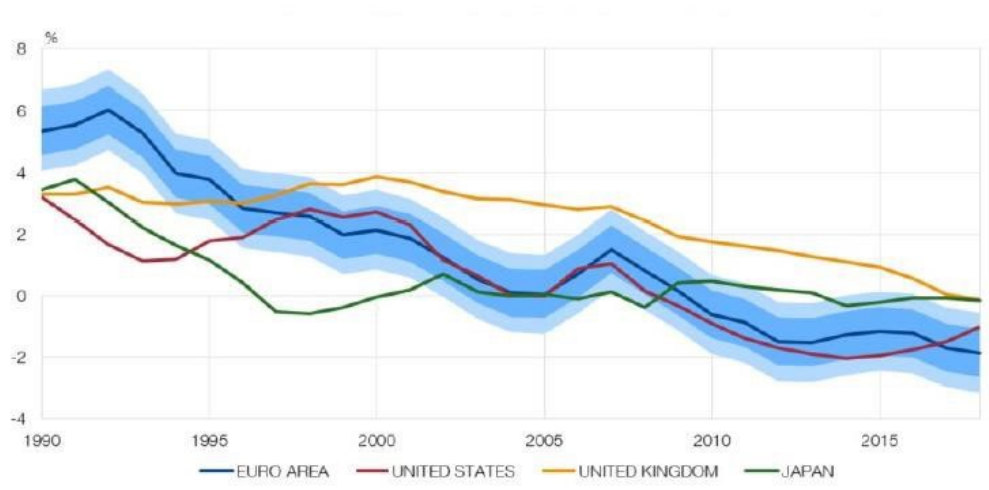
[6] The concept, determinants and implications for monetary policy of the natural interest rate are discussed in Galesi et al. (2017). The natural rate of interest is sometimes also called the "equilibrium interest rate".

depending on both the structural and cyclical situation of the economy. A central bank with a price stability mandate will attempt to adjust nominal interest rates, over time, in line with the changes in the natural interest rate.

In practice, the natural rate of interest cannot be observed directly and can only be estimated, with some degree of uncertainty, using econometric techniques.[7] Despite this caveat, there is a general consensus that in advanced economies the natural rate of interest has been in progressive decline over recent decades (see Chart 2). This drop is mainly attributable to structural factors that have shifted the balance between the supply of savings and investment demand. These factors include demographic developments (such as increased life expectancy, which gives workers an incentive to save more for retirement),[8] the decline in trend productivity growth (which reduces demand for credit to finance investment projects)[9] and growing inequality (as higher income groups usually have a greater propensity to save).[10] Given that these are, in principle, long-term trends, they are unlikely to reverse in the short and medium term. Accordingly, the natural rate of interest can be expected to stay at low levels in the years ahead.

The decline in the natural interest rate means that, in order to stabilise inflation, real interest rates and, therefore, nominal interest rates need to be lower now than two or three decades ago. Indeed, in economies such as the euro area several estimates place the natural rate of interest at negative levels.[11]

CHART 2: CHANGE IN NATURAL RATE OF INTEREST IN MAIN ADVANCED ECONOMIES



Source: 2018 Annual Report, Banco de España, drawing on the model of Fiorentini, Galesi, Pérez-Quirós and Sentana. (2018). Note: The euro area bands denote 68% and 90% confidence levels.

[7] For example, Holston et al. (2017) estimate that in 2016 the natural rate in the United States was positive but very close to zero.

[8] See, for instance, Gagnon et al. (2016) and Eggertsson et al. (2019).

[9] For studies that relate the natural interest rate to productivity growth and risk factors, see Gordon (2015) and Fahri and Gourio (2018).

[10] Mian et al. (2021) estimates suggest that rising income inequality is the more important factor explaining the decline in the natural rate in the United States.

[11] See, for example, Fiorentini et al. (2018).

The decline in natural rates of interest would not be problematic if nominal rates could fall as much as necessary; for instance, with an expected inflation rate of 1%, in order to achieve a real interest rate of, for example, -2%, the nominal rate would have to be as low as -1%. The problem is that nominal interest rates cannot drop as far into negative territory as would be necessary. As the central bank lowers rates into negative territory, commercial banks endure negative returns on a growing portion of their assets. Each individual bank would then face the dilemma of either passing on these negative returns to deposits, with the risk of depositors transferring their savings to other banks or withdrawing them as cash, or else seeing their profitability undermined by the negative spread between the return on their assets and liabilities. In either case, very negative interest rates would adversely affect the financial sector's intermediation capacity, with the ensuing detrimental impact on the supply of credit, economic activity and inflation.

There is therefore a lower bound to nominal interest rates. Should central banks lower interest rates below this bound, the effect on the economy may even be contractionary rather than expansionary, owing to the adverse effects on the financial system as a whole.[12] The level of this lower bound is not directly observable and varies over time according to the financial sector's situation. In any event, it represents a floor for central bank interest rates.[13]

The lower bound introduces an asymmetry into the conduct of monetary policy. As mentioned before, if inflation rises above its target, central banks can raise interest rates as much as necessary to cool the economy and bring inflation down. However, should deflationary shocks drive inflation below the target and prompt the central bank to cut its interest rates, these may ultimately hit their lower bound. This asymmetry means monetary policy is potentially highly effective in combating high inflation, but less so in combating deflation or even persistently low inflation.[14]

A dangerous vicious circle may develop as a result. Against a backdrop where central banks' hands may frequently be tied by the lower bound, economic agents will expect any inflation overshooting to be corrected swiftly, but may expect an undershooting to last much longer. Therefore, expected future average inflation will tend to run below target, reflecting the asymmetric distribution of inflation expectations. Given that in the long run the nominal interest rate is the real equilibrium interest rate plus expected inflation, a fall in the latter entails lower average nominal rates, causing them to hit their lower bound more often. This means less room is available for monetary policy to provide stimulus in downturns, driving inflation expectations even lower, and so on. This vicious circle must be avoided, since the economy could ultimately become stuck in a trap of low interest rates, low inflation and low growth.

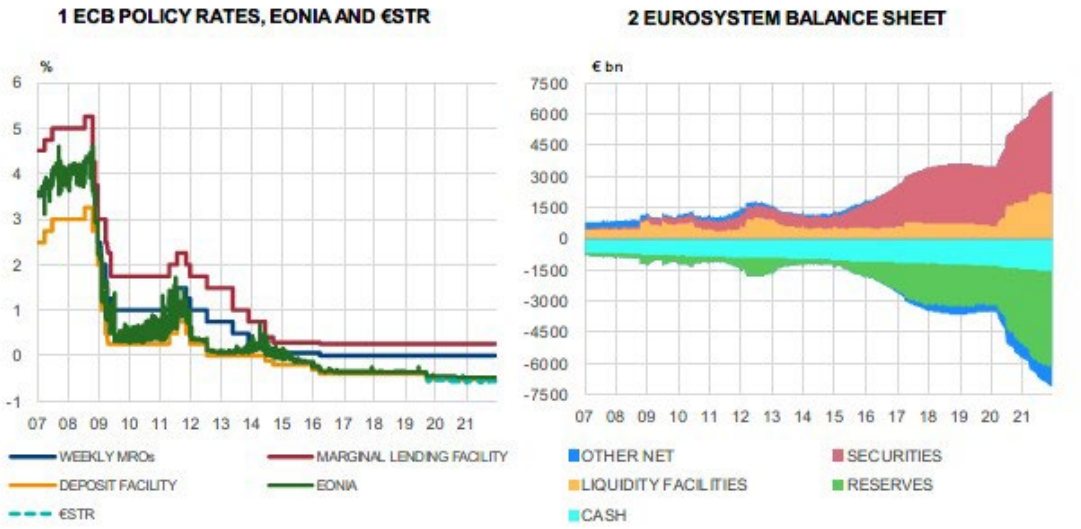
[12] See, for example, Brunnermeier and Koby (2018) for a discussion of the effect of interest rates on banks' profitability and their ability to lend.

[13] Arce et al. (2018) estimate that the current level of negative rates does not necessarily restrict the supply of credit by European banks, in particular by Spanish ones.

[14] See Banco de España (2019) for a detailed discussion.

To stave off such a vicious circle, and in view of the scant space to cut interest rates further, in 2014 the ECB decided to introduce a set of "non-standard monetary policy measures". These measures included (mildly) negative deposit facility rates, the asset purchase programme (APP), targeted longer-term refinancing operations (TLTROs) and forward guidance on the future path of interest rates. These instruments aim to minimise the lower bound problem by acting on the medium and long parts of the yield curve or, in the case of TLTROs, by directly incentivising the supply of bank lending to the real economy (see Chart 3).

CHART 3: ECB POLICY RATES AND EONIA, AND EUROSYSTEM BALACE SHEET



Sources: Thomson Reuters Datastream and ECB.

A brief overview of each of these non-standard measures is in order. One of them was the adoption of moderately negative interest rates, specifically for the deposit facility. Following subsequent small cuts since 2014, the DFR currently stands at -0.5%. The evidence so far suggests that this negative interest rate policy has been effective in stimulating the economy.[15] Notwithstanding, the existence of the lower bound implies that the space for further cuts is limited.

A second measure was the purchase by the Eurosystem of different financial instruments, including public and corporate sector bonds, covered bonds and asset-backed securities (ABS). Asset purchases support inflation in three ways: (i) through the market stabilisation channel, by which asset purchases provide liquidity when there are deep dislocations in financial markets; (ii) through the portfolio rebalancing channel, by which they reduce the aggregate duration and credit risk to be held by price-sensitive investors, inducing a shift into other, riskier assets in the economy and thereby supporting their value; and, (iii) through

[15] Arce et al (2018) estimate that the adverse effects of the negative interest rates on European banks' intermediation capacity only show up after a protracted period of ultra-low rates.

the signalling channel, by which they signal the intention of central banks to keep policy rates low for longer.[16]

Through these channels, asset purchases drive up demand for public and private-sector bonds, raising their price and, therefore, lowering their yield. Thus, although short-term interest rates are restricted by the lower bound, the ECB can reduce medium and long-term interest rates, which are often more relevant when it comes to determining the financing conditions of economic agents and, consequently, their spending decisions.[17]

A third measure were longer-term refinancing operations. Under the current TLTRO framework, the Eurosystem extends long-term financing to euro area banks at lower rates than the standard policy rates, on the condition that banks increase or maintain their supply of credit to the real economy. This lowers the cost of bank loans to firms and households, thus stimulating aggregate demand and inflation.[18]

Lastly, the central bank uses forward guidance to signal to investors and other economic agents the expected path of interest rates and the factors determining that path.[19] For example, for a number of years the ECB has linked the eventual lift-off in its key interest rates to the evolution of the outlook for euro area inflation. The ECB thus establishes the conditions, in terms of the convergence of inflation to its target, that must be in place in order to begin raising interest rates. This allows the ECB to steer market expectations on the future path of its policy interest rates, which affects the yield curve and, again, financing conditions for economic agents.

All in all, there is a broad consensus that these non-standard instruments have been effective in easing financing conditions and supporting euro area inflation, economic growth and employment.[20] However, despite their expansionary effects, they have not prevented inflation from remaining persistently below the ECB's aim for much of the previous decade.

It should also be emphasised that the inflation target as defined under the previous strategy amplified the problems associated with the lower bound. The previous inflation aim ("below, but close, to 2%") risked being interpreted as asymmetric, in the sense that the monetary policy response to an inflation overshoot would be more forceful than to an undershoot. This possible perception of asymmetry, together with the ambiguity over the exact

[16] See Costain et al. (2021) for a discussion of the effects of public bond purchases on interest rates. For an analysis of how the corporate sector purchase programme affects the financing of non-financial corporations, see Arce et al. (2017).

[17] For governments and corporate issuers, this is a direct channel since they mainly raise financing on bond markets using medium and long-term bonds. For households and firms relying on bank lending, this channel is less direct: medium and long-term market rates are used as a benchmark for setting the cost of most loans.

[18] Andreeva and García-Posada (2019) estimate the impact of TLTROs on banks' lending policies in the euro area. More recently, Barbiero et al. (2021) estimates suggest that TLTRO-III have allowed banks to accommodate the large-scale increase in credit demand triggered by the pandemic.

[19] For an analysis of the macroeconomic effectiveness of forward guidance on interest rates and on future developments in the central bank's asset portfolio, see Arce et al. (2019).

[20] Considering the effective lower bound on policy rates, a combination of instruments is generally more efficient than relying on a single tool. See Altavilla et al. (2021) for an assessment of the efficacy, efficiency and potential side effects of the ECB's monetary policy instruments since 2014.

numerical target, arguably did not help anchor inflation expectations at levels genuinely close to 2% once interest rates ran close to the lower bound. There was therefore a case for establishing a clearer and more symmetric inflation target, one that would not be interpreted mechanically as an inflation ceiling.

In January 2020, this consideration, together with the challenges associated with declining natural rates of interest and other structural changes in recent decades (such as globalisation, digitalisation and climate change), prompted the ECB to launch an exhaustive review of its monetary policy strategy.[21] On 8 July 2021, the President, Christine Lagarde, presented the outcome of that review, which will be addressed in more depth in the next section.

3 The main elements of the new strategy

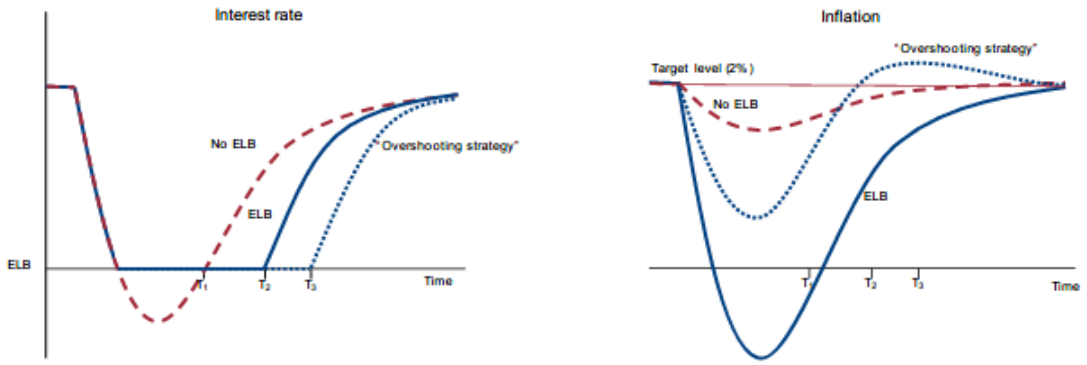
The ECB's revised strategy includes two fundamental innovations.

First, a new medium-term inflation target of 2% has been adopted. This target is symmetric, meaning that positive and negative deviations of inflation from the target are considered to be equally undesirable. Hence, the 2% inflation target seeks to provide a clear anchor for inflation expectations, which is essential for maintaining price stability; this eliminates any ambiguity and the possible perception of asymmetry of the previous target. Also, the replacement of a target that, in spite of the ambiguity, was in any case below 2% by one that is exactly 2% involves a de facto increase in the target, which should help to raise the average level of inflation and nominal interest rates and, therefore, reduce the frequency with which the lower bound constrains ECB action in the future.

Second, to maintain the symmetry of the inflation target, the ECB has recognised the importance of taking into account the implications of the lower bound. In particular, the strategy establishes a requirement for especially forceful or persistent monetary policy action when the economy is close to the lower bound, in order to avoid negative deviations from the inflation target becoming entrenched. This may also imply a transitory period of overshooting, in which inflation is moderately above target. This may be useful to the extent that, in a situation in which nominal interest rates are limited by their lower bound, agents expect relatively high inflation in the future, which reduces real interest rates and thus stimulates economic activity (see Chart 4).

[21] See ECB press release "ECB launches review of its monetary policy strategy", of 23 January 2020.

CHART 4: OVERSHOOTING



Source: Own calculations.

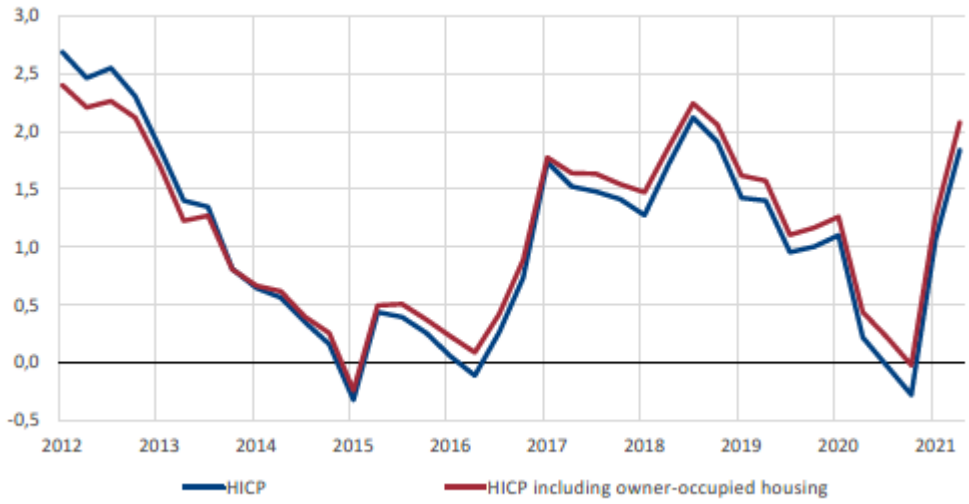
The new strategy has confirmed the medium-term orientation of monetary policy that existed under the previous strategy. As described in Section 2.1, the medium-term orientation provides room for the inevitable short-term deviations of inflation from target, as well as for lags and uncertainty in the transmission of monetary policy. The flexibility of the medium-term orientation allows an appropriate response to inflation deviations from target in each specific context, according to the origin, magnitude and persistence of the deviation.

As regards monetary policy instruments, the set of ECB policy rates remains as the primary instrument. However, in recognition of the effective lower bound on policy rates, the ECB will also employ forward guidance, asset purchases and longer-term refinancing operations, or any other instrument, as appropriate.

Turning to the measurement of inflation, the HICP remains the most appropriate indicator for quantifying the price stability objective for the euro area. This index has proved to be timely, reliable (i.e. infrequent revisions), credible and comparable over time and across countries.[22] However, the ECB recognises that the incorporation of owner-occupied housing costs in the HICP would make it more representative of the inflation rate relevant to households. For this reason, the ECB has recommended including such costs in the HICP (see Chart 5). This process, however, could take years due to methodological challenges, such as the need to separate the consumption and investment components in housing prices, where the former is the relevant one for monetary policy. Meanwhile, the ECB shall take into account, in addition, other measures of inflation that estimate the cost of owner-occupied housing in its monetary policy assessments.

[22] These criteria were also applied in the 2003 strategy review; see Issing, O. (ed.), Background Studies for the ECB's Evaluation of its Monetary Policy Strategy, ECB, 2003, p.12.

CHART 5: HICP WITH OWNER OCUUPIED HOUSING COSTS



Sources: Thomson Reuters Datastream and ECB.

The new strategy has also involved reformulating the analytical framework on which the ECB's monetary policy decisions are based. Until now, the ECB's Governing Council has grounded its decisions, including the assessment of the proportionality and possible side effects of our measures, on a comprehensive assessment of all the relevant factors. This assessment was based on two pillars: the short and medium-term economic analysis, and the longer-term monetary analysis. In particular, the economic analysis in this framework was focused on economic developments, while the monetary analysis examined the monetary and financial indicators, placing the focus on the functioning of the monetary policy transmission mechanism and on the possible risks to medium-term price stability arising from financial imbalances and monetary factors.
However, the pervasive role of macro-financial linkages in current economic, monetary and financial developments requires that the interdependencies across the two analyses are fully incorporated. Hence, in the new strategy monetary policy decisions will be taken on the basis of an integrated framework that brings together the economic analysis and the monetary and financial analysis, thus contributing to a comprehensive and robust assessment of the outlook for and risks to price stability over different time horizons.

The interaction between monetary policy and financial stability will also be analysed, recognising that financial stability is a precondition for price stability. In this respect, the monetary analysis has shifted from detecting risks to medium and long-term price stability to providing the information needed to assess the monetary policy transmission mechanism.

The communication of monetary policy decisions plays an important role in the new strategy, given that the Governing Council's decisions need to be understood not only by experts, but also by the general public. As a result, new versions of the monetary policy statement, the press conference, the Economic Bulletin and the monetary policy accounts have been launched with different levels of technical detail for different audiences. In this respect, the ECB's Governing Council wishes to make communication activities a permanent feature of the Eurosystem's interaction with citizens. Specifically, we will hold

regular outreach events for the public, allowing citizens to voice their concerns and us to explain the ECB's actions and their implications for society. [23]

Finally, the ECB's strategy update has taken into account other challenges for monetary policy posed by recent major structural changes, such as globalisation, digitalisation and climate change. The latter is currently a policy priority for the European Union and will be further discussed in the next section.

Looking ahead, it will not be necessary to wait almost two decades for the next strategy review. The ECB intends to assess the suitability of its monetary policy strategy regularly and plans to conduct the next assessment in 2025.

4 Implications of climate change risks in the new strategy

Preliminary simulation results show that, without further mitigation policies, physical risks from climate change—heat waves, windstorms, floods, drought and the like—will probably increase substantially.[24] However, exactly how climate change will affect the economy and the financial system is still far from certain.

Addressing climate change is a global challenge and a policy priority for the European Union. While governments and parliaments have the primary responsibility to act on climate change, within its mandate the ECB recognises the need to further incorporate climate considerations into its monetary policy framework.

The main reason is the following. Macroeconomic and financial market disruptions linked to climate change and transition policies to carbon neutrality could affect the conduct of monetary policy and thus the ability of the ECB to deliver on its price stability mandate. The evidence suggests that, depending on the nature and speed of the transition policy, climate-related risks not only have crucial implications for price stability but also affect the transmission of monetary policy through other areas of central bank competence, such as financial stability and banking supervision. If the financial system is weakened, the transmission of monetary policy may be impaired.

In particular, several risks related to climate change may affect price stability through at least five channels.

First, the consequences of climate change might impair the transmission of central bank monetary policy measures to the financing conditions faced by households and firms, and hence to consumption and investment. Losses from the materialisation of physical risks or stranded assets (such as oil reserves that will not be tapped as the world moves away from fossil fuels) could weigh on financial institutions' balance sheets, reducing the flow of credit

[23] For further information, see the ECB's website, which has more details on the different events: Overview of listening events across the euro area.

[24] See Alogoskoufis et al. (2021).

to the real economy.[25] In addition, the longer climate change remains unaddressed, the greater the risks to monetary policy transmission from a sharp and abrupt rise in credit risk premiums. This may happen via a sudden repricing of climate-related financial risks. In fact, even central banks themselves are exposed to potential losses from securities acquired in asset purchase programmes and from the collateral provided by counterparties in monetary policy operations.

Second, climate change could further diminish the space for conventional monetary policy by reducing the natural interest rate, on top of the factors that have already driven its secular decline over the past few decades. For example, higher temperatures might impair labour productivity or increase rates of morbidity and mortality. Productive resources might be reallocated to support adaptation measures, while climate-related uncertainty may increase precautionary savings and reduce incentives to invest. Collectively, these factors can reduce the real equilibrium interest rate and therefore increase the likelihood that a central bank's policy rate will be constrained. But, on the other hand, climate change could trigger effects in the opposite direction. First, higher demand for investment for adaptation and mitigation purposes may push up equilibrium rates, all else being equal. Second, an increase in productivity related to green innovation may also exert upward pressure on the natural rate and chart a path out of the low-inflation, low-interest-rate environment. The net effect of these two opposing forces is uncertain ex ante. However, should the forces dampening the natural rate prevail, the policy rate could hit the effective lower bound more often, limiting the space for conventional monetary policy.[26]

Third, both climate change and policies to mitigate its effects can have a direct impact on inflation dynamics. Although most empirical estimates suggest that climate change will likely have a limited impact on the European economy in the next few decades, the probability distribution of climate-related risks observed in historical data may be a poor indication. It cannot be taken for granted that past relationships will hold in the future due to non-linearities and the development of new technologies. For example, model-based scenario simulations that calibrate the economic effects of climate change for alternative greenhouse gas (GHG) concentration trajectories find larger negative effects on the level of global GDP, in particular as of the second half of this century.[27] Additionally, how the transition to carbon neutrality will be addressed remains uncertain. However, academics, public authorities and policymakers have so far mainly focused on two main types: carbon-penalising policies, which aim to reduce emissions through their pricing, such as a carbon tax or cap-and-trade emissions trading schemes; and green-supporting initiatives, which aim to create incentives for financial agents to invest in green projects by lowering their relative cost of funding. Both

[25] A number of recent stress tests have pointed to financial stability risks in the euro area arising from stranded assets created by the sudden and unexpected introduction of carbon-penalising policies. See, for instance, Vermuelen et al. (2018).

[26] Various studies argued that climate change is on net likely to put downward pressure on the natural rate (r*) through several channels, yet the extent and timing, and possibly even the direction, of the impact are still highly uncertain. See, for instance, Cantelmo (2020) and Brand et al. (2018).

[27] Two benchmark studies are Nordhaus (2017) and Dietz and Stern (2015), who allow climate change to affect total factor productivity (TFP) growth, which suggests strong non-linear effects. Depending on the assumptions about the various representative concentration pathways (RCPs), estimates of long-run losses in global GDP vary from 0.7% in a mild scenario to 62% of global GDP in a severe scenario.

types of transition policies may also have non-negligible effects on financial activities, relative prices, inflation, output growth and productivity.[28]

Fourth, climate risks may complicate the correct identification of the shocks relevant for the medium-term inflation outlook, making it more difficult to assess the optimal monetary policy stance and potentially increasing the prevalence of output and price stabilisation trade-offs. For example, the transition to a carbon-neutral economy, even if smooth, is likely to have a significant effect on the optimal response of monetary policy, particularly if it occurs in a disorderly fashion.[29] In an orderly scenario, however, where transition policies are well-communicated and anticipated by households and businesses, the impact would be contained and pose little threat to the ability of the central bank to maintain price stability.

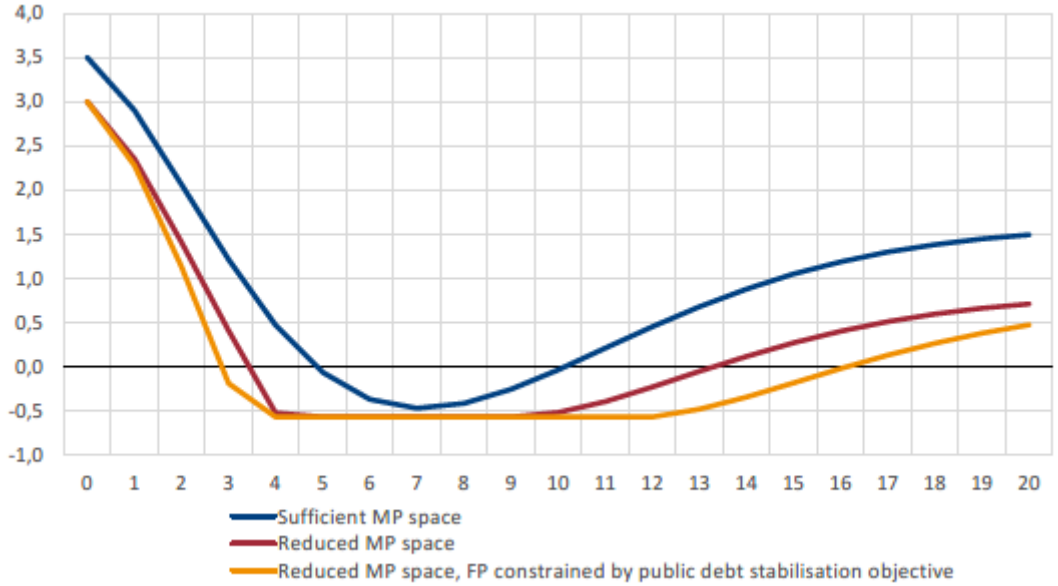
Fifth, uncertainty about the magnitude of the effects of climate change and the horizon over which they will play out in the economy may compound the foregoing effects. A set of ECB model-based simulations show how climate-related physical and transition risk could interact with financial fragilities, which themselves could be the result of climate risks materialising, and how this could significantly restrict the ability of monetary policy to respond to standard business cycle fluctuations[30] (see Chart 6).

[28] Acemoglu et al. (2012) argued that the overall economic impact of carbon-penalising measures depends on the speed of transition and the availability of alternative energy sources.

[29] In this scenario, ECB model-based simulations show that the increase in energy prices is delayed, but then implemented suddenly, coming as a surprise to households and businesses. In this sudden scenario, energy prices rise by 13.5% per year. Headline inflation diverges from target for a prolonged period. If the central bank looks through the increase and targets core inflation, the impact reaches 0.5 percentage points by the fourth year. Conversely, targeting headline inflation results in a much greater reduction in GDP growth. For further details, see Section 2.4 of ECB Work stream on climate change (2021).

[30] For more details on model simulations using the ECB's New Area-Wide Model (NAWM) see Section 5.4 of ECB Work stream on climate change (2021) and Darracq Pariès et al. (2020).

CHART 6: ECB CLIMATE-RELATED SIMULATIONS



Magnitude: deviation from steady-state, annual rate in percentage points.
Source: ECB simulations based on the NAWM model.

As a consequence, central banks are starting to integrate climate-related risks into their monetary policy operations. Indeed, climate change considerations are an integral part of the ECB's monetary policy strategy review. The ECB has committed to an ambitious action plan to include climate change considerations in its monetary policy framework.[31] With this decision, the Governing Council underlines its commitment to reflect environmental sustainability considerations more systematically in its monetary policy.

These considerations include the incorporation of climate-related factors into at least four fundamental areas. First, in its monetary policy assessments and macroeconomic modelling, by accelerating the development of new models and conducting theoretical and empirical analyses to monitor the implications of climate change and related policies for the economy, the financial system and the transmission of monetary policy through financial markets and the banking system to households and firms. Second, in the statistical framework, by developing new experimental indicators, covering relevant green financial instruments and the carbon footprint of financial institutions, as well as their exposures to climate-related physical risks. Third, in the adaptation of its operational framework in relation to the introduction of disclosure requirements for private sector assets, either as a new eligibility criterion or as the basis for differentiated treatment for collateral purposes and asset purchases, which could help speed up disclosure in the corporate sector. And fourth, in the adoption of other climate change criteria in these two latter areas and the assessment of the climate-related risks in the Eurosystem's balance sheet, the strength of which is indispensable to allow the ECB to achieve its monetary policy objectives and which I will now further discuss.

[31] See the ECB's press release "ECB presents action plan to include climate change considerations in its monetary policy strategy" of 8 July 2021.

Climate stress tests of the Eurosystem balance sheet will be conducted from 2022 onwards based on the methodology of the ECB's ongoing economy-wide climate stress test. The ECB will be one of the first central banks to perform a review to gauge the extent to which credit ratings and asset valuations under our collateral framework reflect climate-related risk exposures.

In addition, the ECB will incorporate climate-related criteria into its corporate sector purchase programme (CSPP). First, the ECB has already started to take relevant climate change risks into account in its due diligence procedures for its corporate sector asset purchases in its monetary policy portfolios. In particular, it is envisaged that the ECB will adjust the framework guiding the allocation of corporate bond purchases to incorporate climate change criteria in the near future, by including the alignment of issuers with, at a minimum, EU legislation implementing the Paris agreement through climate change-related metrics or commitments of the issuers to such goals. Second, by the first quarter of 2023, the ECB will start disclosing climate-related information on the CSPP, thus complementing the disclosures on the non-monetary policy portfolios.

Looking ahead, the implementation of the action plan will be in line with progress on the EU policies and initiatives in the field of environmental sustainability disclosure and reporting, including the Corporate Sustainability Reporting Directive, the Taxonomy Regulation and the Regulation on sustainability-related disclosures in the financial services sector.

5 Adapting forward guidance to the new strategy

Following the strategy review, it was necessary to adapt the conduct of monetary policy to the new strategy. This process began with the change in the forward guidance on interest rates, announced on 22 July 2021.

The revised forward guidance incorporates the symmetric 2% inflation target and indicates that "the Governing Council expects the key ECB interest rates to remain at their present or lower levels until we see inflation reaching 2% well ahead of the end of our projection horizon and durably for the rest of the projection horizon, and we judge that realised progress in underlying inflation is sufficiently advanced to be consistent with inflation stabilising at 2% over the medium term". In this way, the ECB establishes conditions, not only in terms of the medium-term outlook for headline inflation but also of underlying inflation, before considering an increase in its interest rates. In addition, in accordance with the new strategy, the new forward guidance stresses that meeting these conditions "may also imply a transitory period in which inflation is moderately above target".

As ECB President Christine Lagarde explained following the announcement of the new forward guidance, "well ahead" basically refers to the mid-point of our projection horizon, which covers two to three years.[32] The conditions related to the medium-term inflation outlook, together with the condition linked to underlying inflation, seek to avoid premature tightening of monetary policy in the face of increases in inflation above target when they are

[32] For more details, see the full transcript of the "Interview with the Governor published in Bloomberg" of 27 July 2021.

deemed to be temporary or to owe to more volatile and exogenous components, such as energy prices.

Lastly, the forward guidance on all the other monetary policy instruments remained unchanged. In the case of the APP, the ECB Governing Council expects net purchases under the programme to end shortly before it starts raising the key ECB interest rates. This "chained forward guidance" implies therefore that the horizon for net asset purchases remains linked to the next interest rate hike.

The immediate reaction on the financial markets to the new strategy and the new forward guidance announcements was moderate in both cases. This suggests that both announcements were in line with investors' expectations and that investors need some time to fully adapt their monetary policy expectations to the new strategy.

6 The ECB's response to the recent economic and inflationary developments

Finally, it is relevant to discuss how the ECB, within its new strategic framework, has responded to recent economic developments, and most notably to the rapid increase in inflation. Indeed, euro area inflation rose almost continuously throughout 2021, from 0.9% in February to 5% in December, mainly due to three drivers.

The first factor is the positive base effect linked to the recovery in prices after their sharp fall at the beginning of the pandemic. This base effect is already being reabsorbed, such that, as of spring 2022, it is not expected to make any additional contribution to inflation. A second factor is related to the strong recovery in demand after the gradual overcoming of the most critical phases of the pandemic. Looking ahead to 2022, it is to be expected that, as supply adapts to existing demand, some of the observed cost increases will be corrected. The third and last additional factor has been the prices of energy goods. The rise in gas prices in 2021 has been particularly pronounced, having very relevant effects on electricity prices. The gas futures markets point to a significant decline in gas prices from next spring onwards. However, it is very difficult to predict future developments in this market, in particular in a context of high and increasing geopolitical risks.

Looking ahead, most analysts and survey-based measures stand project inflation to remain elevated in 2022 but to remain at around 2% in 2023 and 2024. And market-based measures of medium and longer-term inflation expectations remain just below 2%.

On the other hand, the economic recovery is expected to continue and growth to rebound strongly over the course of 2022, driven by robust domestic demand. In this context, output has exceeded its pre-pandemic level by the end of 2021, if the preliminary estimate of EMU GDP for the fourth quarter of 2021 is finally confirmed.

However, this scenario of gradual decline in inflation and strong economic recovery is subject to considerable uncertainty. In the case of the economic outlook, risks are considered to be as broadly balanced over the medium term. The economy could perform more strongly than expected if households become more confident and save less than expected. By contrast, although uncertainties related to the pandemic have abated

somewhat, geopolitical tensions have increased. Furthermore, persistently high costs of energy could exert a stronger than expected drag on consumption and investment. The pace at which supply bottlenecks are resolved is a further risk to the outlook for growth.
In the case of the inflation outlook, risks are tilted to the upside, particularly in the near term. A lower decline of energy prices that initially expected due, for example to geopolitical tensions, or a slower pace of resolution of supply bottlenecks would lead to higher price pressures. And these price pressures could feed through into higher than anticipated wage rises, leading to higher inflation.

In December, the Governing Council decided to continue reducing the pace of asset purchases step by step over the coming quarters, and ending net purchases under the pandemic emergency purchase programme (PEPP) at the end of March.

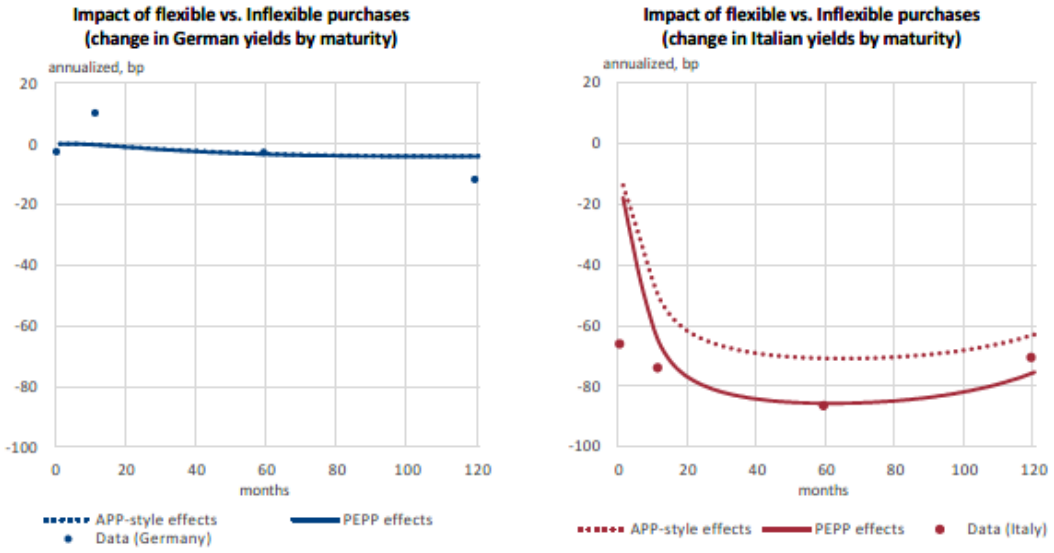
Second, the Governing Council took a number a measures aimed at preserving the flexibility in asset purchases after the end of PEPP net purchases. Indeed, the Governing Council established that flexibility in the design and conduct of asset purchases has helped to counter the impaired transmission of monetary policy and made its efforts to achieve its goal more effective. Thus, within the ECB mandate, under stressed conditions, flexibility will remain an element of monetary policy whenever threats to monetary policy transmission jeopardise the attainment of price stability.

In this vein, the Governing Council decided that, in the event of renewed pandemic-related market fragmentation, PEPP reinvestments can be adjusted flexibly across time, asset classes and jurisdictions at any time. The horizon of PEPP reinvestment was itself extended by one year, to at least the end 2024. And it was decided that net purchases under the PEPP could be resumed, if necessary, to counter negative, pandemic-related shocks.

Analysis by Banco de España staff has confirmed the importance of flexibility in the distribution of asset purchases to address cross-country fragmentation problems and make the ECB's asset purchases more effective.[33] According to this analysis, flexibility in PEPP purchases made it possible to significantly increase the programme's impact on sovereign yields in the euro area, especially in countries with higher risk premiums (see Chart 7).

[33] See Costain, Nuño and Thomas (2021), who study the transmission channels and the impact of PEPP purchases on the sovereign yield curves of different euro area countries. For an analysis of the macroeconomic and financial effects of the PEPP, see Aguilar et al. (2020) and Banco de España (2020, 2021).

CHART 7: ESTIMATED IMPACT OF FLEXIBILITY ON ASSET PURCHASES



Sources: Costain, Nuño and Thomas (2021) "The term structure of interest rates in a heterogenous monetary union." Banco de España, forthcoming.

Third, the ECB confirmed its forward guidance, discussed in Section 5 that sets the conditions that must be fulfilled before the Governing Council raises interest rates and concludes (shortly before the rate increase) net asset purchases under the APP. As a recap, the Governing Council must see inflation reaching the 2% target over the second half of its projection horizon, and it must judge that sufficient progress in underlying inflation towards that goal has been made. This forward guidance establishes a state-contingent plan that will determine when the ECB will start tightening its monetary policy.

Fourth, beyond the asset purchase programmes, it was confirmed that the special conditions applicable under the third series of TLTROs are expected to end in June 2022.
Finally, in view of the current uncertainty, the Governing Council considers that it needs more than ever to maintain flexibility and optionality in the conduct of monetary policy. The Governing Council stands ready to adjust all of its instruments, as appropriate, to ensure that inflation stabilises at its 2% target over the medium term.

7 Conclusions

The ECB's new monetary policy strategy is the result of an in-depth review of all the relevant dimensions that may affect the conduct of monetary policy in the years to come. During this process, the ECB's Governing Council members, and the staff of all the Eurosystem central banks (including, naturally, the Banco de España), have participated in numerous seminars, presentations and debates addressing all the aspects of this review, under the general premise, in the words of the ECB's President, of "leaving no stone unturned".

Bearing in mind that the ECB's main mandate is to maintain price stability, the monetary policy strategy review has allowed us to challenge our thinking, engage with numerous stakeholders, and reflect, discuss and reach common ground on how to adapt our strategy.

I am convinced the new strategy will constitute a strong foundation that will help guide us in the conduct of monetary policy and significantly improve our ability to fulfil the price stability mandate conferred upon the ECB.

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