The ECB's monetary policy stance has been accommodative, and very much so, for nearly ten years, and the Governing Council announced a further package of additional stimulus measures on 12 September. Beyond the inflation objective, what impact has this policy had on households and businesses, and on the economy in general? Is it true that the hawks have complained and distanced themselves from an ECB they see as too accommodative?

To test the impact of the monetary policy measures on inflation and the economy, we need to use macroeconometric models that allow to answer the following question: what would have happened to GDP, employment and inflation if the ECB had not applied these instruments as it has done, to varying degrees of intensity, since 2014? In doing so, we imagine a world in which the ECB has not implemented the measures and then observe the path of GDP and the other macro-variables in this "counterfactual" world generated by the models. We perform such "counterfactual" exercises regularly using a range of models with different characteristics. What all of these models show is that the path of GDP would have been flatter, and employment and inflation rates very much lower than those actually observed. For example, a new study to be published shortly estimates that the measures led to GDP being almost 3% higher at the end of 2018 than it would have been had the measures not been introduced. In terms of numbers of jobs, this means that close to three million people (or close to four million according to some estimates) have found work thanks to the measures applied by the ECB since 2014. These figures are very likely underestimated.

This latest package of further accommodation measures has been approved by the Council with growth forecast in the euro area in 2019, 2020 and 2021, although that growth is projected to slow. Is there also an element of "protection", a "buffer" looking ahead, also with regard to the Federal Reserve or Donald Trump's protectionism?

The series of decisions taken by the Governing Council in September is intended to boost the economy and inflation. The economy and inflation are weak, even if we ignore the possibility that some of the risks that analysts tend to identify on the horizon could materialise and become facts. At the same time, the measures are also an insurance against these risks: they make the economy stronger in the event that they should materialise. The growth and inflation that we are currently seeing are considerably lower than what we were expecting one or two years ago. The forecasts for the future have been repeatedly revised downwards. The risks that many forecasting institutions see as possible, including an implosion of international trade and a disorderly Brexit, are already having an impact on the economy and therefore on inflation, because they create uncertainty.

There is also heated debate about the ECB's exit. Some people believe that its monetary policy stance has been so amply accommodative for so long that it is difficult to get out of it. The hawks maintain that the ECB could have raised interest rates when a window opened, for example in 2017, so that it would have more firepower and would be able to lower rates more assertively in times of recession.

If the Council had seen a need to tighten the stance of monetary policy on the basis of the criteria that it had established, it would have done so. It didn't do that, because the conditions of the economy's recovery, albeit at times robust, and the strength of the path of inflation towards levels closer to 2% were not deemed to be sufficiently sustained to justify a change of direction. Having seen how fragile global growth has been over the course of this year, particularly in Europe, given the global shocks faced, you could say that the path chosen by the Governing Council has turned out to be appropriate and prescient. A monetary policy decision takes on average 18 months to two years to exert full effect. If the ECB had raised interest rates two years ago, we would probably now be dealing not with a marked slowdown but with a recession.

Let's look at the individual measures in the package approved by the Governing Council on 12 September: how important is it that the various instruments used are complementary? Is it possible to rank the instruments in terms of importance or are they all of equal value?

If we look at the package of measures that the ECB has implemented over the years, and which it recalibrated and strengthened in September, we can identify three groups of instruments: (1) negative interest rates on deposits that banks hold with the Eurosystem and forward guidance about the future path of the ECB's key interest rates; (2) purchases of government bonds; (3) purchases of securities issued by private companies along with targeted longer-term refinancing operations (TLTROs).

To put it in very simple terms: negative rates on bank reserves and forward guidance can stabilise short-term interest rates, which are usually the ones used by banks as reference rates when lending to businesses. Purchases of government bonds serve to keep long-term interest rates low. These are the rates that banks use as a reference for longer-term lending (such as mortgages). TLTROs and purchases of securities issued by private companies ensure that the lending margin earned by banks on the above-mentioned reference rates when they lend to households and businesses, and the spread that the market adds to those rates when it lends directly to companies by buying their bonds, stay at moderate levels.

In observing the effects of these instruments on the financial conditions and the economy, we have seen that there is considerable complementarity between them, which means that the total effect of the package is greater than what would result from the sum of its parts. Each instrument supports and reinforces the other. Let's take two examples. First, buying securities creates liquidity, which is held by the banks. Because this liquidity is "taxed" by the negative rates applying to bank deposits with the Eurosystem, banks have a considerable incentive to lend that liquidity to customers rather than to accumulate it. In other words, the negative interest rates combine with the securities purchases to make credit within the economy more abundant and cheaper for borrowers. Second, banks that borrow TLTRO funds are required to pay an interest rate indexed to the rate on our main refinancing operations, which is currently zero. But if they use these funds to expand their own lending to customers, the TLTRO rate can become negative. In other words, the negative interest rates and TLTROs combine to strengthen the incentive for banks to create credit and, again, ensure that bank borrowing is affordable for households and businesses.

You said that "liquidity is taxed by the negative interest rates": hasn't this "tax" been reduced at least by tiering?

The two-tier system for reserve remuneration is a new mechanism introduced in September. This system exempts part (but only part) of banks' excess liquidity holdings from the payment of the negative interest rate on their Eurosystem deposits. It is essentially a mechanism that maintains the benefits of the negative rates for transmission – as I said, the incentive for banks to lend rather than build up idle reserves – but without overly strain banks' balance sheets. Keeping banks active in the credit market is essential in the euro area.

What is the cost at margin? Is it a criterion for measuring the effectiveness of tiering?

When a bank decides whether to lend on the money market and at what rate, say €1 million of liquidity held in its reserves, it does not look at the rate it pays on average on the total volume of its liquid reserves with the Eurosystem, but at the cost that it would incur if that €1 million were parked in the Eurosystem's deposit facility. In other words, it looks at the marginal rate, not the average rate. And the marginal rate on overnight funds is still the rate applied in the deposit facility. The exemption of part of the bank reserves affects the average rate, not the marginal rate. So the rate of -0.5% applying to the deposit facility is still the benchmark for money market interest rates.

At its last meeting, the ECB's Governing Council amended its so-called forward guidance: how and why?

I should first say something about what forward guidance is: it is forward-looking information about the expected future path of the ECB's key interest rates. This sentence is included in the statement issued following the monetary policy meetings of the ECB's Governing Council, which expresses the collective view of the Council. The ECB has used forward guidance for six years to guide interest rate expectations and therefore minimise uncertainty about its monetary policy intentions. Under normal conditions, such as those prevailing before the financial crisis, the Council did not need to provide an indication of the future direction of interest rates, because the markets had a clearer view on the future. But after the crisis, uncertainty increased, and the ECB has contributed to mitigating that uncertainty through its forward guidance.

In September the sentence was changed, with two things in mind. First, the ECB confirmed what was said in July, namely that the Governing Council considers the inflation rates seen recently for actual and forecast inflation to be too low and not in line with its mandate. The new wording therefore says that the ECB's key interest rates will remain at their present or lower levels until the inflation outlook reaches a level "*sufficiently close to*", but below, 2%. The rates seen hitherto are not "*sufficiently close to 2%*". There is a second condition: it will not be enough to see the inflation outlook converge to a level "*sufficiently close*" to 2%. The future inflation rate in the forecasts must "*robustly converge*" to those levels.

What did the ECB mean by using this new term "robustly converge"?

According to the Governing Council, we must see an inflation outlook that converges to those levels and remains there, in other words that stabilises around those levels, within our projection horizon. In addition, to make sure that we do not raise interest rates on the basis of projections that are too optimistic, we want to see this expected convergence confirmed by the core inflation dynamics observed.

What does the ECB monitor more, core inflation or headline inflation?

The ECB's inflation aim is stated in terms of headline inflation, because the total increase in all prices is what counts for household budgets. It is therefore headline inflation that the ECB seeks to stabilise. But the ECB will also look (as it has always looked) at core inflation, namely the inflation rate excluding more erratic factors that cause short-term fluctuations. Core inflation helps to measure the strength and robustness of price recovery and to confirm the forecast inflation dynamics.

The hawks are looking at the figure of 1.5% forecast for 2021 and consider this to be a level sufficiently close to 2% and they do not agree with the package of measures approved on 12 September.

July's statement expressing dissatisfaction with recent levels of inflation, both actual and forecast, is a joint statement signed by the entire Council. In July, forecast inflation for the medium term was 1.6%. That value was adjusted downwards in the September forecasts to 1.5%. If it was too low in July, it was even more so in September.

The forward guidance was also changed by removing the reference to the “calendar date”, a specific time-based commitment. Why?

That part of the forward guidance had lost a large part of its informative value. Markets today look more at the state-contingent element, namely the wording that ties the interest rate path to inflation performance. Calendar-based information was very useful in the past, when it related to the asset purchase programme (APP).

The new asset purchase programme of €20 billion a month has been called open-ended by the markets, not to mention “QE infinity”. Under what conditions can interest rates start to rise? And, consequently, when will the APP end and when will APP reinvestments end? Moreover, how much room is there still to continue net purchases of assets without changing the mechanism (capital key, cap of 33%, risk-sharing limited to 8%)?

You could say that the forward guidance on purchases is linked to the forward guidance on interest rates. The Governing Council has said that it expects the new bond purchases to run for as long as necessary to reinforce the accommodative impact of its key interest rates, and to end shortly before it starts raising interest rates. It is the timing and conditions for a change of course, as mentioned by the Council in its forward guidance on key interest rates, which will determine the timings and conditions for the net purchases to be recommenced in November. We do not see a risk of limitations on the availability of securities to be purchased on the market. So far, the private holders of securities that we have purchased on the secondary market have been sensitive to price conditions and have sold if they saw only a slight adjustment in the price of their securities. And this has systematically resulted in a review of our availability estimates, which have been consistently higher than our expectations.

Is it important to preserve the duration effect of the APP portfolio? Does this mean that after a certain period of time, the APP must in any case be reopened to maintain the duration?

When a central bank buys long-term bonds, it absorbs from the market a certain quantity of exposure to the interest rate risk that those bonds incorporate and that the market would otherwise hold (duration effect). If the private investors that previously held those bonds and, by holding them, were exposed to interest rate risk, now have that risk removed, they are encouraged to take on other types of risk, investing in assets that have a greater positive impact on the economy. For example, they invest in fixed capital, which expands employment and production capacity in the economy. This mechanism sustains the economy when that economy is struggling and inflation is too low, and when the central bank has limited scope to adjust its key interest rates downwards.

But this duration-related mechanism tends to weaken over time. On the one hand, governments continue to issue long-term debt and this increases the risk that the private sector is required to assume, and, on the other hand, the bond portfolio held by the central bank loses residual life, and therefore duration, like an iceberg that is slowly melting. When the economy starts to recover again and moves on a path of more robust growth, also owing to these monetary policies, this endogenous loss of monetary accommodation potential in the bond portfolio held by the central bank is not a problem. However, when the economy needs a new impetus, this process can become an issue. This is one of the reasons arguing in favour of a resumption of net purchases: by increasing the volume of the portfolio, namely the quantity of bonds held, the central bank can restore the duration effect.

But to what extent do banks lend more because of the APP? There is still a lot of unused excess liquidity in the euro area.

The fact that banks, collectively, hold a large quantity of excess liquidity does not mean that, individually, they do not seek to offload that liquidity by lending to other banks or to customers. Put simply, when the central bank purchases bonds, it does so through the banks and pays for these purchases by creating electronic reserves that the banks hold with the Eurosystem. The banks, collectively, have no choice but to hold those reserves. But each bank has an incentive to lend excess liquidity because the electronic reserves are subject to negative interest rates. By lending that liquidity, a bank transfers it to another bank. What is important for the economy is the "velocity of circulation" of bank reserves among banks. If this is high, it means that ECB purchases are having an impact in terms of creating credit. And that speed has increased as a result of our accommodative monetary policy stance.

To what extent is the accommodative effect reduced or cancelled out by the increase in the spread and amplified when the yield on risk-free assets (Bund) falls more than others? Can you provide a specific example of how the EONIA improves lending conditions for businesses and households, when it only passes through banks that are supervised intermediaries and subject to so many restrictions on lending? The banks are complaining. On the one hand, the monetary policy arm of the ECB is encouraging them to lend by cutting interest rates, and on the other hand the ECB (through the Single Supervisory Mechanism or SSM) is doing everything to rein in lending.

For transmission of the ECB rates to the lending conditions in the various countries, what is important is not the spread but the rate levels. For example, the rate on 10-year BTP fell in three months by around 130 basis points, from 2.1% to just above 0.8%. The spread narrowed by 110 basis points. These are enormous adjustments due in part to a more favourable assessment of Italy's creditworthiness on the markets, and in part to the more expansive monetary policy.

In terms of the transmission of short-term money market rates to the lending conditions for households and businesses, the banks would benefit much less from the TLTRO credit and would therefore lend less and at higher interest rates to their own customers, if they had not established a stronger capital base. The fact that this happened is due in large part to the SSM and national supervision. Supervisory action has strengthened lending, not weakened it, creating the balance sheet conditions to enable banks to continue to lend.

TLTRO III: why has the third series of targeted loans been modified before it has even been used? Was the adjustment needed because the economic context has deteriorated significantly in just a few months?

When the ECB announced the details on the lending conditions that would be applied to TLTRO loans to banks, it stated that those conditions would take into consideration an in-depth assessment of the bank-based transmission mechanism, and any changes in the economic outlook. Since that time, the economic outlook has deteriorated. It has therefore been determined that TLTRO III, along with the other instruments implemented, could help to ease the monetary policy stance.

How much further can the rates of the deposit facilities fall? Is there a lower bound? Are we close to the reversal rate?

The lower bound and the reversal rate are two separate things. In the past few years, it has been acknowledged that the lower bound, which is the downward lower limit for the base interest rates of a central bank, is not zero, as was thought to be the case before the financial crisis, and is not even -0.5%. This means that, if there were a need to further reduce the rate on banks' deposits with the Eurosystem, this could be done.

The reversal rate is something different. It is possible to imagine interest rate scenarios (short-and long-term) so low, and economic scenarios so unfavourable to growth, that banks are encouraged to restrict lending in the belief that lending at those rates and in view of that outlook is too unprofitable and too risky. In very simple terms, a level of interest rates of this kind, combined with major pessimism about the prospects for the economy, can be defined as the reversal rate. Have we reached this level and are we seeing economic scenarios so discouraging that banks feel the incentive to retrench? Our analyses indicate the opposite. That said, one of the reasons behind September's particularly assertive stimulus policy was specifically the intention of averting the risk of the kind of scenario I have been trying to describe.

The role of the ECB, the limits of monetary policy and the absence of appropriate fiscal policies to accompany the ECB's measures: is it true that the ECB has reached the end of the line?

No. The mandate given to the ECB is not contingent upon the initiatives that other economic policy authorities can or wish to implement. It is an absolute mandate: maintain price stability. The ECB has defined price stability as an inflation rate below, but close to, 2% over the medium term. The ECB will therefore continue in its work to recalibrate its instruments for as long as it is necessary to achieve that aim. Expansive intervention by other authorities, including tax authorities, would serve today to accelerate the effects of monetary policy.

The package of measures announced on 12 September does not include a green targeted lending instrument. Is the ECB's monetary policy green? To what extent were green bonds purchased in the €2,600 billion of APP purchases? And will the ECB be greener in future?

Serious discussion is under way within the ECB on the sustainable economy. A working group has been created recently, in which the national central banks are also participating, and this issue is being addressed comprehensively. In terms of green bonds, there are still few of them in circulation, and the market is limited in size and depth. However, it is possible that purchases of green bonds by the ECB could have a supply-stimulating effect in this market. That is what happened with the corporate sector purchase programme (CSPP): corporate bond issues increased when the ECB started to buy. It did not happen for asset-backed securities (ABS), but this was also due to the fact that regulation of these instruments has remained punitive. But I am optimistic. It is reasonable to expect that, for green bonds, regulation could promote growth in that market.