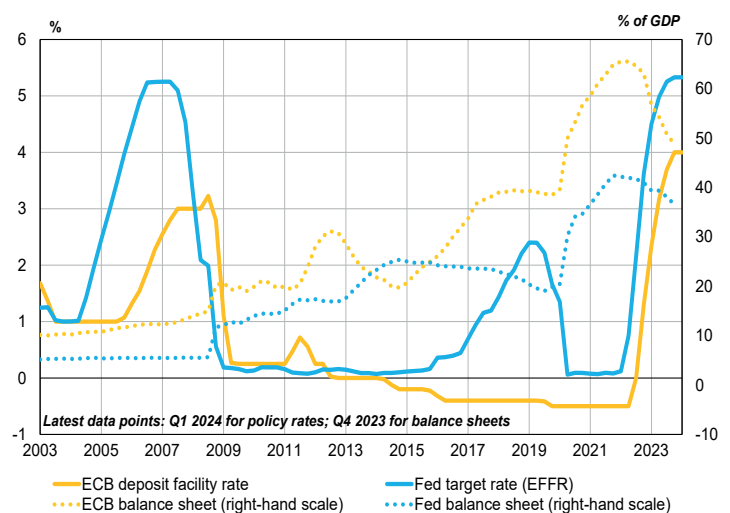


Implementation of Monetary Policy in the Euro Area and the United States

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- Monetary policy refers to the decisions made by a central bank to influence the cost and supply of money in a given economy. The primary mandate of the European Central Bank (ECB) is to maintain price stability while the United States Federal Reserve's (the Fed) dual mandate is to ensure stable prices and maximum employment. On the price stability front, both of these central banks have set a 2% inflation target over the medium term.
- Policy rates are generally the main instrument used by central banks to carry out their mandate. Policy rates are interest rates applied by central banks to the loans they grant to commercial banks and to the deposits they receive. These rates have an impact on the real economy in a myriad of ways: interest rates, asset prices and the exchange rate.
- For the past fifteen or so years, the Fed and the ECB have adjusted the way their monetary policy is implemented to cope with various crises: the 2008 financial crisis, the 2010 European sovereign debt crisis, the COVID-19 pandemic in 2020 and, most recently, an inflation shock in 2021 exacerbated by Russia's invasion of Ukraine in 2022.
- In order to handle the fallout from these crises and circumvent the zero lower bound, the ECB and the Fed have adopted a range of new "unconventional" instruments, such as asset purchase programmes (quantitative easing) to influence long-term rates as well, forward guidance on rate expectations, longer-term refinancing operations to bolster bank lending and negative deposit facility rates.
- The stances taken by the Fed and the ECB in their policies had been similar since 2008, except during a period between 2015 and 2019 when the Fed normalised its policy by raising its rates while the ECB maintained a low-rate policy. The ECB tended to have a more delayed response to the first few crises than the Fed, but it managed to adapt its instruments just as quickly and robustly to deal with the pandemic.
- Soaring inflation in the wake of the pandemic, which has been significantly above the Fed and ECB inflation targets since 2022, has driven the two central banks to tighten monetary policy rapidly (see Chart).

Change in ECB and Fed policy rates and balance sheets



Sources: Refinitiv, ECB, Fed, Eurostat and BEA.

1. The monetary policy framework in the euro area and the United States¹

1.1 The ECB and the Fed both have a specific institutional structure

The ECB, founded in 1998, is a subsidiary of the national central banks (NCBs) of the Member States of the European Union (EU),² and whose capital key reflects the share of each country in the total population and in the GDP of the EU. Its monetary policy decisions are made by the Governing Council, consisting of the governors of the NCBs of the 20 euro area Member States³ and the ECB Executive Board (comprising six members, including the President). NCBs are therefore involved in the decision-making process and monetary policy implementation (especially for asset purchase programmes, see below).

The Fed, founded in 1913, is a network of 12 regional Federal Reserve Banks whose monetary policy decisions are made by the Federal Open Market Committee (FOMC), consisting of the members of the Board of Governors, the President of the New York Fed and four of the eleven other presidents of the regional Federal Reserve Banks. All presidents of the regional Federal Reserve Banks attend FOMC meetings, but to guarantee an effective decision-making process and the “federal” nature thereof,⁴ some are barred from voting as determined by an annual rotation scheme. The ECB has a similar scheme in which a monthly rotation system of voting rights is used to select members of the Governing Council, while members of the Executive Board have a permanent voting right.

1.2 The ECB’s primary objective is to maintain price stability, while the Fed’s mandate has a larger scope

Both the ECB and the Fed are tasked with guaranteeing price stability. Price stability, construed as low, stable and predictable inflation, is conducive to growth and improving collective welfare by reducing the level of uncertainty in the economy – bolstering consumption and investment – and by encouraging an optimal allocation of resources.

However, the mandates of the two banks have their differences: according to Article 127 of the Treaty on the Functioning of the European Union (TFEU), the primary objective of the ECB is to maintain price stability, without prejudice to which it shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union (TEU).⁵ Meanwhile, the Fed has a dual mandate to ensure stable prices and maximum employment.⁶

While a price stability objective is included in both mandates, its actual definition is determined by each institution independently. From the outset, the ECB has understood this objective to be an inflation target to be attained over the medium-term. From 1998 to 2003, the ECB inflation target was “below 2%”, and from 2003 to 2021, price stability was defined as inflation that was “below but close to” 2%. Since the July 2021 strategy review,⁷ the ECB has set a symmetrical inflation target of “2% over the medium term”.⁸

(1) The data analysed in this section has a cut-off date of 15 February 2024.

(2) All the NCBs of the EU Member States and the ECB form the European System of Central Banks (ESCB) while the NCBs of countries that have adopted the euro and the ECB form the Eurosystem.

(3) When it was introduced in 1999, the euro area covered 11 countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. Since then, the euro area has undergone eight enlargements: Greece in 2001, Slovenia in 2007, Cyprus and Malta in 2008, Slovakia in 2009, Estonia in 2011, Latvia in 2014, Lithuania in 2015 and Croatia in 2023.

(4) Fed Governors are nominated by the President of the United States, and are subsequently confirmed by the Senate. On the other hand, presidents of regional Federal Reserve Banks are nominated by the local board of directors, and are subsequently confirmed by the (federal) Board of Governors. In doing this, an FOMC meeting with a majority of governors (seven out of twelve) ensures the federal legitimacy of the Fed as a central bank.

(5) The following paragraph is one notable example of these objectives: “The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, 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. It shall promote scientific and technological advance”.

(6) Technically the Federal Reserve Act sets out a third objective (ensure moderate long-term interest rates) but this is generally considered an outcome of achieving the two other objectives.

(7) The strategy review is a self-assessment exercise carried out by a central bank in relation to the objectives and terms of its monetary policy. The review is designed to determine a global strategy for monetary policy. For more information, [visit the ECB website](#) or check out the summary on the [Banque de France Eco Notepad](#).

(8) See “[The ECB’s monetary policy strategy statement](#)”, 8 July 2021.

It was only much later that the Fed adopted an inflation target (in 2012), also setting it at 2%. In August 2020, following its Review of Monetary Policy Strategy,⁹ it replaced its 2% target with an “average of 2% over the long run”. No employment rate targets are set but the monetary policy seeks to bring the unemployment rate close to the long-run natural unemployment rate.¹⁰ Since the COVID-19 pandemic, the Fed has factored in a set of labour market indicators¹¹ to assess the achievement of its maximum employment goal.

1.3 The Fed and the ECB use different policy rates

Central banks’ key instrument to conduct their monetary policies – deemed “conventional” – is setting policy rates. The Fed and the ECB both use policy rates but in different ways: while the ECB’s policy rates are those paid by banks when they borrow money from it, the Federal Reserve’s policy rates are a range of interbank rates. In both cases, adjustments to policy rates, in conjunction with open market operations for the Fed, allow central banks to steer the interbank rate and as a result the cost of credit (see Box 1). By changing financing conditions, the monetary policy of central banks has effects on the real economy (see Box 2).

The ECB uses three key interest rates:

- The deposit facility (DF) rate, the rate paid to commercial banks on sums of money deposited overnight with the central bank (beyond minimum

reserve requirements) and which is the lowest of the three ECB key interest rates.

- The main refinancing operations (MRO) rate, the rate commercial banks pay when they borrow money from the ECB for one week subject to them providing collateral¹² in relation to regular refinancing operations, generally with a weekly frequency and a maturity of one week.
- The marginal lending facility (MLF) rate, which is higher than the MRO rate and is paid by commercial banks so that they can borrow money overnight in the event of an emergency.

The Fed sets a range¹³ (currently of 0.25 point) for banks borrowing and lending to each other overnight (known as the Federal Funds Rate):

- The lower end of this range, much like the DF rate, comprises the interest on reserves (IOR), the interest rate paid overnight by the Fed on the funds deposited by financial institutions with the regional Federal Reserve Banks.
- The higher end of this range, similar to the MLF rate, is the Discount Rate,¹⁴ i.e. the interest rate charged to commercial banks on loans provided by their regional Federal Reserve Banks when the need arises.

(9) Launched in 2019, the Fed’s strategy review resulted in the revision of its “*Statement on Longer-Run Goals and Monetary Policy Strategy*” in January 2021.

(10) A reference comparative value, the long-run natural unemployment rate is attained once all positive and negative economic shocks, which have shifted the economy away from its trend, recede. It is important to distinguish this rate from non-accelerating inflation rate of unemployment (NAIRU), which is the level of unemployment associated with price stability, and which can be achieved in the shorter term.

(11) In addition to unemployment, labour market participation and payroll employment, the Fed also monitors the hires and quits rates – in full-time and part-time employment – and indicators giving signals as to future changes in the labour market, such as new initial claims for unemployment insurance or survey data on the difficulty of finding work.

(12) A refinancing operation is a loan granted in exchange for a reverse repo on an asset provided as collateral. This allows lending banks to trade securities for cash under ECB terms, which can thereby anchor short-term market rates to policy rates.

(13) The Fed used to set a specific target until December 2008, when it then decided to set a target range. See the Minutes of the Federal Open Market Committee (FOMC) of 15-16 December 2008.

(14) The discount window (introduced in 2003) is a short-term emergency loan mechanism (no more than 90 days) for credit institutions facing problems with securing financing on the interbank markets. By providing loans, the Fed ensures the upper limit of its target range is not exceeded.

Box 1: The Fed and the ECB's steering of the interbank rate

In the United States, the Fed does not directly grant loans to banks (except during periods of stress, see below) but undertakes to carry out market operations to adjust the cash volume on the interbank market and thereby rectify any deviation observed from its target rate range. Permanent facilities (discount windows for the upper limit and a deposit facility for the lower limit) ensure that the Effective Federal Funds Rates (EFFR) stay within this range.

However, certain credit institutions experiencing cash shortages could agree to pay a premium in relation to the upper limit of the rate corridor. This resulted in the Fed conducting discretionary repurchase agreements (repos) transactions^a with credit institutions so as to reduce upward pressure on interbank rates, when there was a need to rapidly increase bank reserves so that credit institutions could meet liquidity needs on the money markets. These recurring situations during the most recent monetary tightening (in September 2019) and then at the onset of the COVID-19 pandemic (in March 2020) led the Fed to formalise its discretionary operations in a permanent facility set up in July 2021: the Standing Repo Facility (SRF). The SRF uses an auction format, and involves an eligible institution requesting a certain amount of cash at a certain rate. The Fed then handles this request accordingly, based on the rates requested by other eligible participants. Following stresses in the US banking sector in March 2023, the Discount Window, the emergency mechanism that up to that point had scarcely been used given the stigma attached to it, was actively rolled out. This mechanism allows depository institutions to quickly access three types of credit:^b (i) primary credit, for institutions in sound financial health and with no restrictions on the use of funds borrowed, (ii) secondary credit, for institutions not eligible for primary credit, granted on a very-short term basis, typically overnight, at a higher rate than the primary credit rate; and (iii) seasonal credit to assist small depository institutions with pressures of a seasonal nature, issued at variable rates.

In the euro area, the ECB is not responsible for directly steering the reference interbank rate (€STR, which replaced EONIA). However, it sets the rate for its three key facilities (see above). Unlike in the United States, the reference interbank rate has never exceeded the rate of main refinancing operations (MRO) over a considerable period of time since the single currency was created. Akin to the Fed's Discount Window, the marginal lending facility is an emergency mechanism for credit institutions which is virtually unused in the euro area. Even amid rapid monetary tightening, the possibility now that the €STR could exceed the ECB's MRO rate appears highly unlikely given how the main refinancing operations work. For example, after 2008 the ECB switched from conducting refinancing operations through auctions to a flat-rate offer without limitations on the quantity, against collateral. The upper limit of interbank rates in euros should therefore not be exceeded, as a bank looking to borrow cash will always be able to do so with the ECB at the marginal lending rate.

- a. For a financial institution, a repo involves selling (to the Fed in this case) a security (usually a sovereign bond) subject to an agreement to repurchase it at a later specified date (the following day for Fed repos). Repos allow counterparties to secure short-term liquidity. The repo rate is the difference between the purchase price (for the Fed) and the resale price the day after.
- b. The discount window differs from the SRF in the eligible securities: while a wide variety of securities can be used as collateral for the discount window mechanism, the SRF is only applicable to repos on sovereign and agency securities.

2. Changes in strategies and instruments

2.1 The central banks have adopted new unconventional instruments since the financial crisis

The 2008 financial crisis led to a severe tightening of financing conditions, causing a sharp slowdown in interbank transfers as a result of distrust between stakeholders. The central banks had to take wide-reaching action to maintain these transfers and avoid a credit crunch risk. In the euro area, the financial crisis was followed by the sovereign debt crisis, which

worsened deflationary pressures. The ECB worked to combat these pressures.

These shocks prompted the central banks to considerably ease their monetary policies. The Fed was the first to act, lowering its rates in mid-August 2007: its fed funds target fell from 5.25% in August 2007 to 0.00-0.25% in December 2008. The ECB lowered its key interest rates starting from October 2008: the MRO rate dropped from 4.25% in summer 2008 to 1% in May 2009, and then to 0% in March 2016. The ECB also changed how its liquidity lines are granted by switching

from an auction system – as in the United States – to a fixed-rate full allotment system, which is subject to banks having a sufficient supply of collateral.

However, lowering policy rates was not enough to guarantee lasting economic recovery and keep deflationary risks at bay. Once the zero lower bound

was reached, policy rates were no longer of use. The central banks therefore had to rely on new instruments to circumvent this limit that rendered their monetary policies ineffective. In this respect, their unconventional policies have brought in quantitative easing (QE), forward guidance and, in the ECB's case, negative interest rates¹⁵ (see Box 2).

Box 2: Monetary policy transmission channels

The decisions made by central banks affect the real economy through various channels,^a and their effectiveness varies depending on the features of the economy.

There are several transmission channels for monetary easing implemented using conventional instruments:

- **The interest rate channel:** policy rates affect all rates as well as demand for financing. Therefore, the effect of lowering policy rates is passed on by commercial banks to the credit rates they offer to households and businesses. The impact of this move is passed on more generally by financial stakeholders to the financing options available. The resulting lower borrowing cost drives up demand for credit, positively affecting private demand and ultimately inflation.
- **The asset price channel** (financial and property) operates thanks to the wealth effect: lower interest rates tend to raise the value of assets, in turn increasing the wealth of agents who, with a view to accumulating savings, may ramp up their investments and consumption. This channel has a key role in the United States, where financial assets (excluding deposits and foreign currencies) and property respectively account for 60% and 31% of household net worth (compared to 15% and 66% respectively in the euro area in Q4 2022). The wealth effect also has an impact on the balance sheets of economic agents: a rise in asset prices increases the borrowing capacity of both businesses and households.
- **The exchange rate channel** influences the relative price of foreign goods and services: lower policy rates reduce the appeal of domestic investments and deposits, resulting in a depreciation of the currency, in turn raising the price competitiveness of domestic production and stoking imported inflation. This mechanism is less notable in the United States, given the dollar's predominance in the international monetary system.

The unconventional instruments have different mechanisms of transmission to the real economy during monetary easing:

- **The asset price channel:** while lower interest rates raise the value of assets through the discount rate, asset purchase programmes directly drive up their prices (and lower the return on them), increasing demand for these assets and substitutable assets on the markets. Lowering these rates therefore also triggers a wealth effect. Unlike policy rates, which influence first and foremost short-term interest rates, asset purchases may target long-term securities and consequently affect the entire yield curve.^b The QE effect is therefore also transmitted through the interest rate channel.
- **The portfolio rebalancing channel:** the increase in prices and decrease in returns on public-sector securities resulting from the purchase of these assets encourage investors, who receive cash from the central bank, to change the structure of their portfolios to favour more high-risk assets that are better remunerated, particularly corporate bonds. Investors seek to maintain a return on their portfolio and are faced with a lack of low-risk securities. Through this channel, asset purchases made by central banks affect all financial assets, which will facilitate private investment financing and generate a widespread wealth effect.
- **The expectations channel:** forward guidance directly targets this channel, which looks to anchor the expectations of economic agents. Economic agents' expectations of inflation returning to target levels is vital

a. See the speech by Philip Lane, member of the ECB's Executive Board, "The transmission of monetary policy", 11 October 2022.

b. See L. Baquero, M. Ezzaim & S. Sorbe (2018), "The size of central bank balance sheets: a new monetary policy instrument", *Trésor-Economics*, No. 213.

(15) The ECB's marginal deposit facility rate.

in that this expectation influences their decisions and as a result future demand, production and inflation. Whether this channel is effective or not depends on the central bank's credibility and its capacity to provide information.

Conventional instruments such as adjustments to policy rates continue to be the main mechanism used by central banks. Unconventional instruments are used to supplement their conventional counterparts, but can generate knock-on effects given their more interventionist nature on the financial markets. The fact that they have not been used for as long also means that their impact and transmission timeframes are not as precisely understood.

In the United States, the Fed has developed new instruments to keep the interbank market running smoothly and subsequently bring inflation back down to its target. Specifically, it used two new unconventional instruments. The first one was the first round of large-scale asset purchases (LSAP1), which began in November 2008 and involved the Fed purchasing assets on the secondary market. At the time, these purchases only related to mortgage-backed securities (MBS), but the scope was gradually extended to include Treasury securities with the second round of purchases (LSAP2) in November 2010. LSAP2 was then followed by the LSAP3 in September 2012. The Fed also introduced forward guidance in 2009¹⁶ in order to bring long-term interest rates down. It subsequently used other types of forward guidance: qualitative, time-contingent and state-contingent guidance.¹⁷

In the euro area, with the sovereign debt crisis compounding the economic crisis, the ECB was compelled to also adopt unconventional measures. In May 2010, the ECB launched its first asset purchase programme, the Securities Markets Programme (SMP), targeting sovereign bonds from the most vulnerable countries (Greece, Ireland, Italy, Portugal and Spain) so as to avoid the fragmentation of the euro area and ensure an adequate transmission of the monetary policy. The ECB thus purchased the equivalent of €218 billion in securities, which were "sterilised".¹⁸ In September 2012, the ECB phased out the SMP, announcing the creation of a permanent mechanism:

outright monetary transactions (OMT). OMTs allow the ECB to purchase as many sterilised sovereign bonds as required to safeguard the integrity of euro area on the proviso that the Member State whose sovereign bonds are bought is receiving support from a European Stability Mechanism (ESM) programme.¹⁹ The announcement alone helped to reduce tension on the markets without ever having to make use of the instrument.

As from November 2011, the ECB once again started to reduce its key interest rates: the MRO rate was gradually brought down to 0% (in March 2016), and the deposit facility rate was in the negative in 2014, close to the effective lower bound.²⁰ In an effort to continue the easing of its monetary policy, the ECB also launched targeted long-term refinancing operations (TLTRO) in 2014. TLTROs are conducted on a quarterly basis, provide financing to banks and have a long maturity (between three and four years) and an applicable interest rate that is linked to the lending patterns of the banks to encourage them to lend to the private sector: the more a bank lends to the real economy, the lower the interest rate applied. Following in the Fed's footsteps six years later, the ECB launched, in March 2015, a wide-reaching non-sterilised asset purchase programme (the Asset Purchase Programme, or APP).²¹ From early 2015 to early 2019, the APP reached a total amount of €2,600 billion in net purchases, of which nearly €2,200 billion related to public-sector securities. The ECB also introduced

(16) See, for example, the Minutes of the FOMC of March 2009: "The Committee will maintain the target range for the federal funds rate at 0 to ¼ percent and anticipates that economic conditions are likely to warrant exceptionally low levels of the federal funds rate for an extended period".

(17) Silvio Contessi & Li Li (2013), "Forward Guidance 101A: a Roadmap of the U.S. Experience" and "Forward Guidance 101B: a Roadmap of the International Experience", Federal Reserve Bank of Saint Louis.

(18) With regard to a central bank, sterilisation involves offsetting the liquidity injected into the economy by means of its monetary policy interventions, in particular the purchase of public-sector or corporate securities on the markets.

(19) The EMS is an intergovernmental organisation founded in September 2012 to provide financial assistance to euro area Member States.

(20) The effective lower bound is the yield of fiat money (cash), i.e. 0%, from which transport, storage and insurance costs must be deducted. This yield determines the lower bound of the monetary policy. A rate that is too heavily in negative territory could cause a mass withdrawal of deposits and thereby jeopardise the effectiveness of the monetary policy.

(21) The APP comprises a set of programmes: the corporate sector purchase programme (CSPP), the public sector purchase programme (PSPP), the asset-backed securities purchase programme (ABSPP) and the third covered bond purchase programme (CBPP3).

forward guidance in July 2013 to give credibility to its commitment to bring inflation in line with its target.

In the period from 2015 to 2019, monetary policies conducted by the Fed and the ECB diverged: improved economic conditions in the United States prompted the Fed to normalise its policy, engaging in tapering and raising rates from December 2015. Meanwhile, the economy continued to be frail in Europe, leading the ECB to maintain an accommodative unconventional policy.

2.2 The toolkit of central banks has expanded since the COVID-19 pandemic

The pandemic caused the economy to markedly slow down (a decrease in GDP of 6.1% in the euro area and 2.8% in the United States in 2020) and was grounds for central bank intervention to ensure financing for the economy. Both banks used existing conventional and unconventional instruments and expanded upon them for maximum impact.

The ECB resorted to unconventional measures to tackle the pandemic, since its policy rates had been set at the lower bound since 2016. A variety of instruments were used: forward guidance,²² asset purchase programmes, long-term refinancing operations and a more flexible collateral framework for accessing refinancing from the ECB.

The ECB reintroduced the APP in November 2019 (for a total of €20 billion per month in net purchases) and then decided to add an envelope of €120 billion for the period from March to December 2020. It also announced, in March 2020, the creation of the new Pandemic Emergency Purchase Programme (PEPP), of which approximately €1,700 billion of the €1,850 billion envelope was used. The PEPP targeted the same asset categories as the APP, and similarly consisted mainly of purchasing government bonds. While the allocation of purchases between Member States was supposed to respect the ECB's capital key (just as for the APP), one particular feature of the PEPP was that purchases could be made with some degree

of flexibility, so as to prevent financial fragmentation in the euro area.²³

The Governing Council of the ECB also decided to temporarily ease TLTRO terms between June 2020 and June 2021, and to extend this easing by a year to late June 2022. The first TLTRO III operation²⁴ demonstrated the banking sector's strong demand for liquidity. The uptake was significantly lower for the subsequent operations.

The ECB relaxed the collateral framework, which was dubbed "qualitative easing", until June 2022. Each refinancing application made by a bank to the ECB requires assets to be provided as collateral as part of a secure operation that allows the ECB to safeguard its balance sheet against any defaults in respect of its refinancing operations. The ECB applies a haircut – the amount of which depends on the quality of the asset provided as collateral – requiring banks to provide collateral of a value greater than the refinancing amount granted. To combat the negative impact of the pandemic, the ECB announced a 20% reduction in collateral valuation haircuts and extended the range of collateral eligible for refinancing operations.

In the United States, in mid-March 2020, the Fed introduced a range of measures to support the economy and stabilise the financial system amid the COVID-19 pandemic, drawing largely on lessons learnt from the 2008 financial crisis. The Fed lowered its target fed funds rate range (from 1.50%-1.75% in February 2020 to 0.00%-0.25% in late March 2020) in order to bolster the economy and ease access to credit for businesses, and introduced unconventional measures (asset purchases, lending and refinancing facilities and forward guidance) to support the fiscal stimulus measures introduced by the Trump and subsequent Biden administrations.

In addition to the purchase of Treasury and mortgage-backed securities, a measure taken during the financial crisis, the Fed introduced purchase programmes on the primary and secondary markets involving new types of securities: corporate bonds (the Corporate Credit Facility²⁵ for \$750 billion in March 2020, and

(22) In its monetary policy decision of 12 March 2020, the Governing Council stated that: "The Governing Council expects the key ECB interest rates to remain at their present or lower levels until it has seen the inflation outlook robustly converge to a level sufficiently close to, but below, 2 per cent within its projection horizon, and such convergence has been consistently reflected in underlying inflation dynamics".

(23) Another feature that the Governing Council had introduced for the PEPP was the waiver of eligibility requirements for securities issued by the Greek government.

(24) The ECB launched three series of TLTROs (targeted longer-term refinancing operations): TLTRO I in 2014, TLTRO II in 2016, and TLTRO III for the programme introduced in 2019.

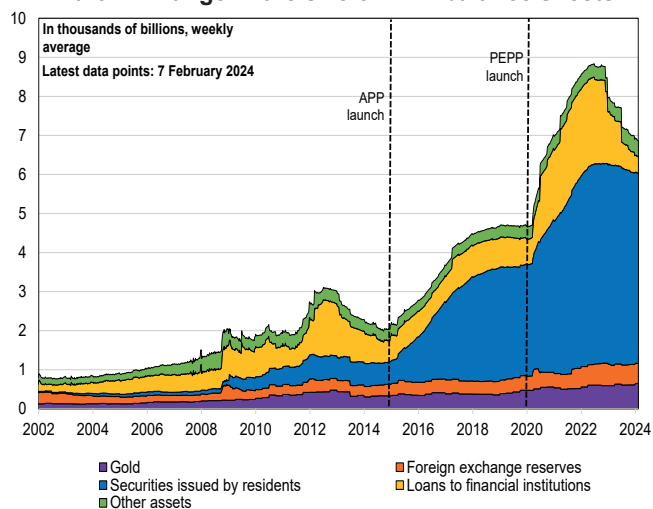
(25) In an unprecedented move, the Fed included in its purchase programmes the debt securities of fallen angels, businesses that had an investment-grade rating before March 2020 and whose rating has since been downgraded.

then the Main Street Lending Program²⁶ for \$600 billion in April 2020), and municipal bonds (the Municipal Lending Facility²⁷ in April 2020).

Given the rollout of long-term debt and asset purchase programmes in the wake of the financial crisis and the subsequent COVID-19 pandemic, the size of Fed and ECB balance sheets ballooned (see Charts 1 and 2)

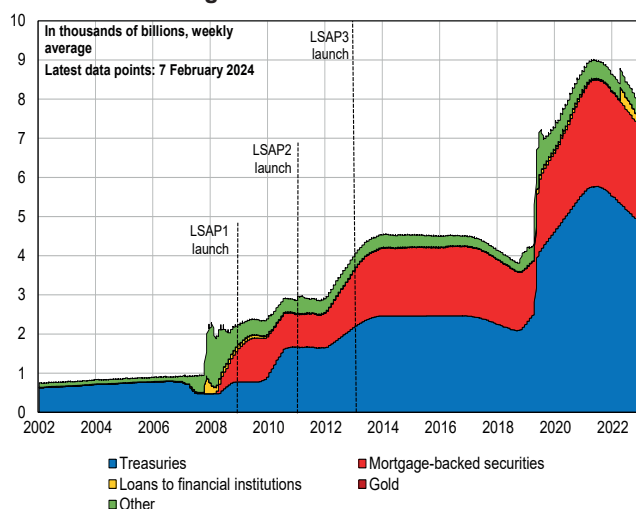
and peaked before the start of monetary tightening in 2022. The Fed's balance sheet rose sharply from \$900 billion (i.e. 6% of US GDP) to \$9,000 billion (i.e. 42% of GDP) in Q4 2021. The Eurosystem's balance sheet surged from €1,400 billion (i.e. 15% of euro area GDP) in Q3 2008 to €8,800 billion (i.e. 65% of GDP) in Q3 2022, particularly as a result of the APP and the PEPP.

Chart 1: Change in the size of ECB balance sheets



Source: ECB.

Chart 2: Change in the size of Fed balance sheets



Source: The Fed.

How to read these charts: in the ECB balance sheet, “Loans to financial institutions” covers main refinancing operations (MROs) and (T) LTROs, while the asset purchase programmes are included under “Securities issued by residents”. In the Fed balance sheet, “Treasuries” and “Mortgage-backed securities” cover both securities purchased under open market operations (OMOs) and under asset purchase programmes.

3. Monetary tightening instruments

The end of the COVID-19 pandemic resulted in a rise in inflation for the two economies (see Chart 3), triggering a negative supply shock – caused by supply chain disruptions and labour shortages – and a positive demand shock relating to excess liquidity (excess of household savings and the liquid assets of businesses) accumulated during the pandemic. Furthermore, robust global recovery as a result of the reopening of the economy caused commodity and energy prices to surge and they rose again with the Russian invasion of Ukraine in February 2022.

In the euro area, inflation was more directly affected by energy prices than in the United States, particularly gas prices, due to a greater exposure to Russia. Hikes in energy import prices resulted in a deterioration in the terms of trade, dampening demand. Despite efforts

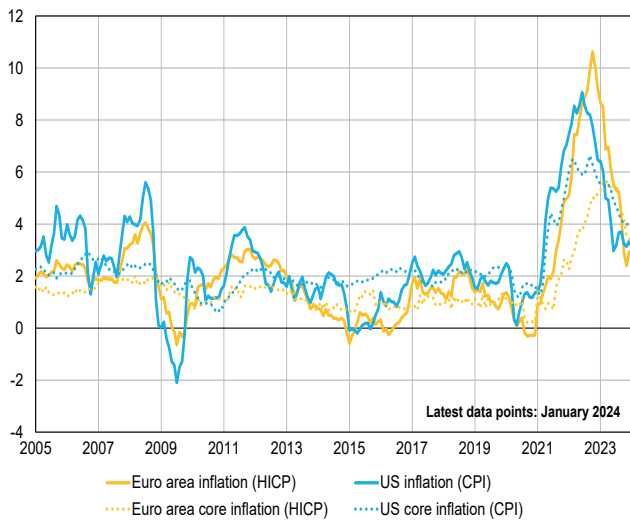
from European countries to support households and businesses, production input prices influenced producer prices and subsequently consumer prices, resulting in record-level inflation at 10.6% (year-on-year) in October 2022.

The US's energy independence shielded the country from a significant deterioration in the terms of trade, and far-reaching fiscal stimulus programmes (the \$1.9 trillion American Rescue Plan launched in March 2021) buttressed demand, in particular by American households accumulating excess savings during and after the COVID-19 pandemic. This led to fears of a longer-lasting inflation in the United States, or even an inflationary spiral (a wage-price spiral). Inflation hit record levels of 9.1% in the United States in June 2022.

(26) This programme was authorised by Congress under the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), which provided economic assistance to workers, families and small businesses and industries in the United States during the COVID-19 pandemic. It entailed buying loans made by banks to intermediate-sized enterprises (fewer than 15,000 employees or less than \$5 billion in turnover).

(27) This programme was set up to buy, on the primary market, up to \$500 billion in debt with a maturity of less than 24 months and that was issued by certain local governments such as Federal States, counties with more than two million residents, and cities with more than one million residents.

Chart 3: Change in euro area and US inflation rate (%)



Sources: Eurostat and Bureau of Labor Statistics.

The Fed and the ECB initially believed that this peak in inflation would be temporary and therefore decided to leave their monetary policies unchanged in 2021. In 2020, the Fed had decided to adopt average inflation targeting, particularly with a view to restraining any overreaction to temporary shocks and to taking the historical inflation path into account. The ECB had opted for a symmetric inflation target over the medium term in 2021, meaning that it was acceptable for inflation to rise above or drop below the target provided that this deviation was limited and temporary. To address persistent and increasing inflation in 2022, the ECB and the Fed embarked on major monetary tightening that was quickly implemented so as to prevent high levels of inflation from taking hold and the risk of de-anchoring medium- and long-term inflation expectations.

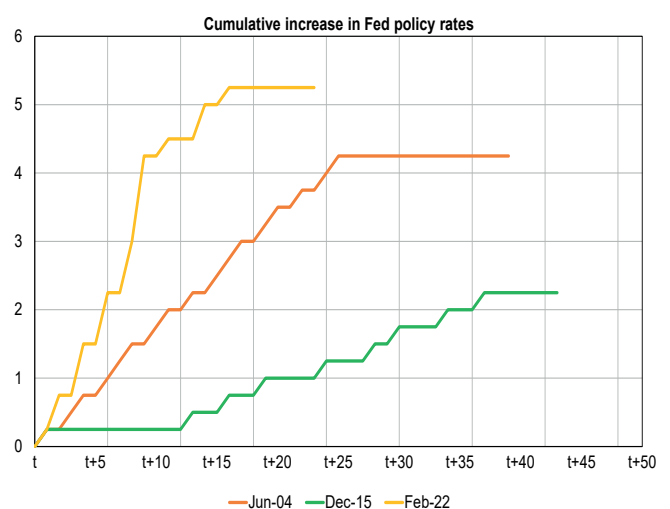
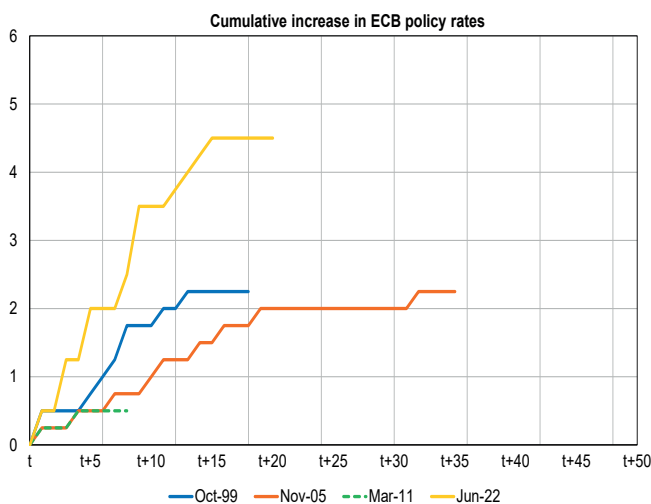
In the euro area, the ECB raised its policy rates by 450 basis points (bp) between July 2022 and September

2023, bringing the deposit facility rate to 4.00% – the highest rate increase recorded since the creation of the euro area (see Chart 4). At the same time, the ECB’s Governing Council decided to shrink its securities portfolio by, initially (July 2022) putting an end to net purchases (in March 2022 for the PEPP and July 2022 for the APP), and then, only for the APP, by reducing the reinvestment of maturing securities (March 2023) before it was completely discontinued (July 2023). For the PEPP, there will be full reinvestments until June 2024, after which they will be halved before their discontinuation as from January 2025.

In October 2022, the ECB also decided to recalibrate the conditions of TLTROs: starting in November 2022, the interest rate of this financing is indexed to the ECB’s deposit facility rate over the remaining repayment period and not over the lifetime of the financing. This change increases the costs of TLTROs by more quickly incorporating the increase in ECB interest rates, encouraging banks to repay them early rather than keeping them until maturity, thereby reducing the liquidity available. In that regard, this measure helps tighten monetary policy.

To enable monetary tightening – a necessity given rising inflation – whilst avoiding tensions on the European bond markets that could widen spreads, the ECB unveiled a new instrument in August 2022: the Transmission Protection Instrument (TPI). It should prevent the financial fragmentation risk by allowing the ECB to purchase public-sector securities in the event of a sovereign rate increase disconnected from economic fundamentals, subject to certain conditions relating particularly to fiscal sustainability and the macroeconomic balance of the relevant country.

Chart 4: Increase in ECB and Fed policy rates during various periods of monetary tightening (percentage points)



Sources: ECB, the Fed (Refinitiv data, DG Trésor calculations).

How to read these charts: The rate plotted is the deposit facility rate for the ECB and the Effective Federal Funds Rate for the Fed.

In the United States, from March 2022 to August 2023, the Fed raised its fed funds rate by 525 basis points, shifting the target range to 5.25%-5.50%, considering that the economic cost of de-anchoring inflation expectations was higher than that of possible excessive tightening. Like for the ECB, the pace of this rate hike was more rapid than for previous tightening (see Chart 4). The Fed also began to reduce its balance sheet (known as quantitative tightening, or QT) by lowering the volume of asset purchases from November 2021, and then by not reinvesting maturing securities for a maximum amount of \$47.5 billion each month from June to August 2022 and subsequently a maximum amount of \$95 billion each month starting in September 2022.

In the United States, the tightening of financial conditions resulting from monetary tightening led to major adjustments for (i) the United States' main stock market indices – a 20% decrease for S&P 500 (see Chart 5) and a 35% decrease for Nasdaq in 2022, followed by an upturn in 2023 owing to the US economy's resilience; (ii) property prices, given interest rate increases (the yield of 30-year mortgage-backed loans, used as a benchmark rate for new loan applications, rose from below 3% in 2021 to over 7% in early 2023); and (iii) the bond market, which became very tense (10-year yields stood at an average of 1.8% in January 2022 and increased to 4.8% in October

2023), making the financing of the government and businesses more costly. This impairment of fixed-rate assets weakened the balance sheets of certain commercial banks with a more vulnerable economic model, resulting in the collapse of Silicon Valley Bank in March 2023, followed by the closure of Signature Bank. The Fed was quick to act together with the Federal Deposit Insurance Corporation (FDIC) and the Treasury, fostering banking sector stability. However, according to the Fed's Senior Loan Officer Opinion Survey (latest edition released in February 2024), lending terms continued to tighten, which could increase the financial instability risk.

In Europe, the tightening of financial conditions also took on many forms: (i) stock market indices fell sharply in 2022 before rising towards the year-end (a 14% decrease in 2022 for euro Stoxx 50); (ii) the rise in ECB interest rates was passed on to bond yields,²⁸ applying further pressure on European countries by increasing their interest expense; and (iii) credit conditions started to tighten when monetary tightening was introduced in 2022. For example, the interest rates for loans to corporations²⁹ increased from 1.4% in January 2022 to 5.2% in December 2023. Interest rates for mortgages granted to households rose from 1.3% to 4.0% over the same period, causing the demand for mortgages to plummet, and with it, property transactions as well as property prices, which started to fall.³⁰

Chart 5: Change in inflation, housing prices and stock market indices



Source: Refinitiv.

How to read these charts: The stock market and housing price indices have a base of 100 at 1 January 2020; year-on-year inflation is expressed as a percentage.

(28) French and German ten-year government bond yields stood on average at 0.33% and 0.78% respectively in March 2022. They peaked in October 2023, at 2.97% and 3.55% respectively, before falling (2.21% and 2.74% on average in January 2024).

(29) ECB composite indicator on the cost of credit for corporations and households, on a monthly basis.

(30) In France, the National Real Estate Federation (FNAIM) estimated in November that the number of property sales is expected to total 885,000 by late 2023, i.e. a 21% decrease on the 2022 figure.

Monetary tightening by the Fed and the ECB puts downward pressure on the economy and inflation through a reduction in lending volumes and lower demand, over a period the length of which depends on the monetary policy lag (see Box 3). Avalos et al. (2023)³¹ stress that the tightening of financial conditions (money market rates and bank interest rates) was more pronounced than in previous cycles in advanced economies. The global impact of tightening was compounded by the magnitude and synchronisation of rate hikes – particularly those carried out by the Fed,

whose influence is strengthened by the dominance of the dollar in the international monetary system. The determined efforts of central banks in their mandate to restore price stability, as well as increased transparency on the policy rate path, has allowed the private sector to more effectively adapt to these adjustments. At the same time, negative supply shocks ushered in inflationary pressures, particularly in the euro area, that monetary policy is less able to directly combat but which put greater pressure on financial conditions and hamper the economy.³²

Box 3: Monetary policy transmission lags

The speed and magnitude of monetary policy transmission is dependent on the economy's structure, the shocks experienced by the economy, and the response of the financial markets, businesses and households. Friedman (1961)^a highlighted the existence and determining factors of this lag, but its duration continues to be subject to debate. Deb et al. (2023)^b estimate that a 100-basis point increase of the policy rate causes a 0.3%-reduction in GDP one quarter following the shock, and a 1.5% decrease over an 18- to 24-month period. The effect on inflation should come later, and should peak around 18 months after the shock. These findings are supported by Romer & Romer (2023)^c, who estimate that the lag in monetary policy and its effects on the real economy is approximately 18 months for inflation, while growth falls from the moment of the monetary policy shock to reach its lowest point after two years.

Lags in monetary policy and its effect in the real economy vary from country and macro-region depending on a number of factors:^d

- The financial development and structure of a country: in economies where the financial markets are more developed, stakeholders have access to instruments to hedge against a rise in policy rates, postponing its effect. In addition, the prevalence of fixed-rate loans over variable-rate loans slows down monetary policy transmission.
- Household income and the distribution of liquid assets: households with mortgages are more affected by monetary tightening than other households (except in countries which apply fixed rates to mortgages to a greater extent, such as France and Germany), and so react more strongly, reducing their consumption of goods.
- The national central bank's credibility and its ability to effectively provide information: this is a particularly important factor in emerging economies. Monetary policy transmission is more effective when inflation expectations are well anchored and the central bank's actions are credible. Financing conditions therefore tighten quickly and the exchange rate shifts as a result, thereby restricting imported inflation.

Monetary policy also has an asymmetrical effect: monetary easing has a greater influence on prices than on the real economy, the opposite effect of monetary tightening.^e

- M. Friedman (1961), "The lag in effect of monetary policy", *Journal of Political Economy*, vol. 69, No. 5, pp. 447-466.
- P. Deb et al. (2023), "Monetary Policy Transmission Heterogeneity: Cross-Country Evidence", *FMI WP/23/204* and related references.
- Christina D. Romer & David H. Romer (2023), "Presidential Address: Does Monetary Policy Matter? The Narrative Approach after 35 Years", *American Economic Review*, 113 (6): 1395-1423.
- See T. Havranek & M. Rusnak (2013), "Transmission Lags of Monetary Policy: A Meta-Analysis", *International Journal of Central Banking*, 9(4), pp. 39-75.
- This asymmetrical relationship of monetary policy to prices and the economy is attributable to: the presence of downward nominal rigidities on prices; the fiscal policy which is more often expansionary than restrictive and sometimes at variance with monetary policy; and the price-setting patterns of businesses, which change in times of inflation. See Box 1.2 of Chapter 1 of the IMF's World Economic Outlook, April 2023.

(31) F. Avalos et al. (2023), "Monetary policy, financial conditions and real activity: is this time different?", *BIS Bulletin* No. 80.

(32) For example, credit spreads tend to widen as a result of tightening in cases where inflation is triggered by supply problems, but tend to shrink when inflation is caused by demand.

In early 2024, it seemed that the full effect of tightening on the economy had not yet been felt. Advanced economies, and in particular the US economy, showed some resilience. During the low-rate period preceding the surge in inflation there was an increase in fixed-rate loans, which allowed businesses and households to defer the impact of rate hikes on their financing costs. The fiscal stimulus measures limited purchasing power losses and partly shielded the private sector from price increases. Despite high inflation, real interest rates remained low compared to their historical average, bolstering the value of high-risk assets amid a rise in policy rates.

Inflation has significantly retreated since its peak in 2022 (at 2.7% and 3.1% in the euro area and the United States respectively in January 2024), due

in particular to improving supply conditions. Energy prices have been on a downward trend since early 2023: year on year, in January 2024, they had fallen by 6.3% in the euro area and 4.6% in the United States. Against this backdrop, the Fed and the ECB stopped raising their policy rates in July and September 2023 respectively, deeming that they were restrictive enough while reiterating their commitment to bringing inflation rates back to target by 2025. The degree of uncertainty however remains high with regard to the monetary policy path, as several factors can help to sustain inflation, both in the short (oil price shock) and long run, since they represent structural changes to the economy (the green transition, ageing population, and the fragmentation of value chains due to lingering geopolitical tensions).

Recent Issues in English

Publisher:

Ministère de l'Économie,
des Finances
et de la Souveraineté
industrielle et numérique
Direction générale du Trésor
139, rue de Bercy
75575 Paris CEDEX 12

Publication manager:

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Editor in chief:

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(01 44 87 18 51)
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English translation:

Centre de traduction
des ministères économique
et financier

Layout:

Mimose Mellia
ISSN 1962-400X
eISSN 2417-9698

March 2024

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