Analysis

How will the European Central Bank control interest rates in the future?

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The European Central Bank's (ECB) monetary policy stance is implemented through market operations and other measures that aim to steer short-term money market interest rates towards the level set by the ECB's Governing Council. Before the global financial crisis, money market interest rates were steered close to the ECB's main refinancing operations rate. With the implementation of quantitative easing and longer-term refinancing operations, the ECB's overnight deposit rate has become the most important policy rate of the Eurosystem in recent years. Last December, the ECB announced that it will review how it is to control interest rates in the future. The outcome of the review will also impact the size and composition of the Eurosystem's balance sheet in the future.



Money market guided by Eurosystem monetary policy implementation framework

The monetary policy implementation framework refers to the operations through which the ECB steers short-term money market interest rates close to its target policy rate. Short-term money market rates are at the heart of interest rate control, as they also effectively transmit interest rate policy to other interest rates, thus broadening the impact of monetary policy across the economy as whole.

The euro short-term rate (€STR)[1] is the primary indicator for short-term money market rates. This reference rate reflects the average costs paid by euro area banks for wholesale euro unsecured overnight borrowing. In addition to the unsecured money market rates, secured money market rates, such as repo rates[2], are also important for the efficient transmission of monetary policy.

The control of short-term interest rates is based on banks' deposits with the central bank (reserves), which the banks need for making interbank payments and fulfilling the minimum reserve requirement. Although individual banks can borrow reserves from each other, the banking system as a whole cannot borrow reserves from anywhere other than the central bank.

This means that the central bank has a monopoly on providing reserves and can therefore decide the price, i.e. the interest rate, and the volume of reserves supplied to the banking system. These decisions, in turn, have a direct impact on the functioning of the money market, the interest rate at which banks trade reserves on the money market and, ultimately, on the interest rate at which banks lend money to households and businesses.

The Eurosystem's operational framework consists of the minimum reserve requirement, refinancing operations and the collateral used in these, and the standing facilities.[3] The ECB policy rates are linked to these instruments. The minimum reserve requirement obliges euro area banks to hold a certain amount of reserves relative to their balance sheet in their national central bank.

The reserve requirement specifies precisely the minimum amount of reserves that banks must hold over a period of just over one month, i.e. the reserve maintenance period[4]. Refinancing operations are usually used to increase the reserves in the banking system. As a general rule, banks may borrow reserves from the refinancing operations against collateral at the main refinancing operations rate.

Together, the deposit facility and the marginal lending facility constitute the standing facilities, which allow banks either to deposit reserves with the central bank at the overnight deposit rate or

to borrow reserves from the central bank at the marginal lending facility rate. The standing facilities create a framework for the interest rate at which banks trade reserves with one another, in addition to having a broader impact on the pricing and functioning of the money market.

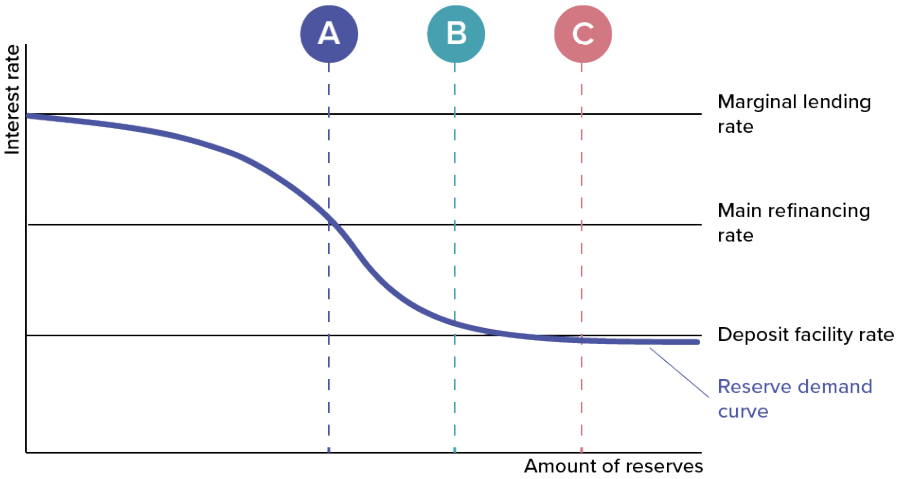
From the introduction of the euro until the global financial crisis in 2008, the implementation framework was based on the fact that without refinancing operations, banks did not have sufficient reserves to fulfil their minimum reserve requirements. There was a liquidity deficit in the banking system relative to the central bank. Banks were therefore compelled to borrow reserves from refinancing operations through tender procedures, where they were allocated reserves that only slightly exceeded the minimum reserve requirements of the banking system as a whole.

Before the global financial crisis, the banking system was almost devoid of any excess reserves or liquidity. The banks evened out the scarce reserves by trading them with one another to the point where all banks were only just able to fulfil their minimum reserve requirements. The interest rate corridor was wide, usually up to 2 percentage points[5], thereby encouraging banks to trade in interbank markets instead of resorting to the central bank.

The monetary policy implementation framework that was used up to the global financial crisis is referred to as a *classical corridor*. In this type of system, short-term money market interest rates are steered close to the policy rate in the middle of the interest rate corridor, i.e. the main refinancing operations rate, by keeping the supply of reserves in the banking system scarce, which keeps banks' incentives to lend reserves to and from each other in balance (Chart 1, a).

Chart 1.

Money market interest rates in a corridor under scarce and ample reserves



A By holding the supply of reserves scarce, market interest rates can be steered to the middle of the interest rate corridor.

B By offering ample reserves, market interest rates start to drop to the bottom of the interest rate corridor.

C With abundant reserves market interest rates are at the bottom of the interest rate corridor or even below it.

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Change in Eurosystem monetary policy after global financial crisis

The Eurosystem's monetary policy has changed substantially since the global financial crisis. The biggest change in the implementation framework has been that in its accommodative monetary policy, the Eurosystem has repeatedly relied on asset purchase programmes, i.e. quantitative easing and targeted (TLTROs) or other longer-term refinancing operations, to create significant volumes of new reserves in the banking system.[6] Due to these measures, the banking system now contains considerable excess reserves, i.e. reserves that exceed the minimum reserve requirements.

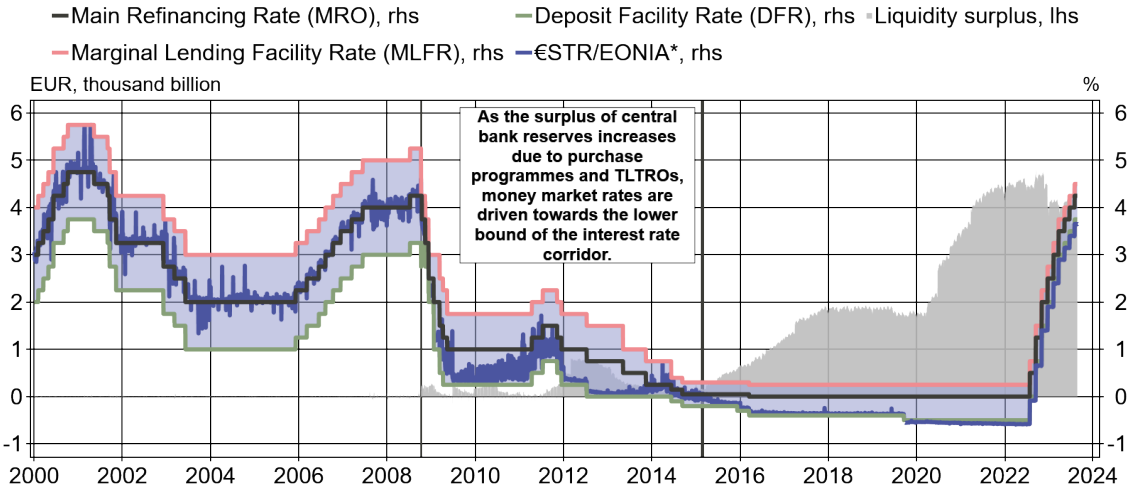
With the growth of excess reserves, euro area banks have no longer needed to borrow reserves from each other because almost all of them have reserves that exceed their own needs. This is why

banks are unwilling to pay an interest rate higher than the deposit rate on the reserves, which is reflected as a decline in money market rates towards the bottom of the interest corridor, close to the deposit rate, or even below it[7] (Chart 1, b and c).

A system in which money market interest rates are steered towards the bottom of the interest rate corridor by keeping an ample or even abundant supply of reserves is called a *floor system*. The Eurosystem has, in practice, been operating with a floor system since 2015, when excess liquidity increased as a result of the asset purchase programmes and TLTROs. Since then, money market interest rates have followed the deposit facility rate rather than the main refinancing operations rate. *Therefore, the deposit facility rate has long been the ECB's most important policy rate*, with the most direct impact on money market interest rates (Chart 2).

Chart 2.

Euro area overnight money market rates, ECB's interest rate corridor and excess liquidity in the Eurosystem



*In October 2019, €STR replaced EONIA as the overnight reference rate.
Source: ECB, Bloomberg.
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Normalisation of monetary policy is a natural time to review the policy implementation framework

Since December 2021, the Eurosystem has been normalising and tightening its monetary policy at an unprecedented pace in order to bring inflation back to its target of 2% in the medium term. This has been done mainly by raising the policy rates. At the same time, the Eurosystem has also begun to wind down the other stimulus measures that were utilised to stimulate economic recovery when the effective lower bound for short-term interest rates limited the use of interest rate policy. As shown in the article Eurojärjestelmän tase pienenee rahapolitiikan kiristyessä ('Eurosystem

balance sheet shrinking as monetary policy tightens'), the Eurosystem's balance sheet has contracted since last autumn due to TLTRO loans maturing or being repaid early and the reduced pace of asset purchase programme reinvestments. This has also reduced the number of excess reserves in the banking system.

With time, the decline in excess reserves resulting from the shrinking balance sheet will begin to push up money market interest rates towards the main refinancing operations rate. The consequence of this would then be a gradual return of the monetary policy implementation framework to the corridor system that preceded the global financial crisis. However, before this point is reached, the Eurosystem will have to consider whether a return to the old monetary policy implementation framework is desirable, or if a system similar to the current framework, where there are more reserves and money market rates follow the deposit rate, would be a better fit for the modern environment.

In December 2022, the ECB's Governing Council announced that it would be reviewing its operational framework for implementing monetary policy in the future. Specifically, the assessment will consider how short-term interest rates should be controlled in the euro area once the normalisation of monetary policy has been completed.

The normalisation of monetary policy is a natural time to review the policy implementation framework. The assessment will provide a clearer picture of the effects of shrinking the balance sheet and the desired end point of this shrinking.

The necessary balance sheet size will depend on which implementation framework the ECB chooses, as this will affect the size required for controlling interest rates and transmitting monetary policy efficiently.

The choice will also shape other details of the future implementation framework, such as whether reserves should be supplied to the banking system primarily through asset purchases or credit operations.

Several central banks have renewed their monetary policy implementation frameworks

The ECB is by no means the only central bank reassessing its monetary policy implementation framework. A number of other central banks have been confronted by the same question in recent years. The pandemic then finally triggered the global use of asset purchases and various credit operations in monetary policy stimulus, resulting in a worldwide growth in reserves. In winding down the stimulus measures, each central bank has been forced to consider how to best control

short-term market interest rates in the new environment. Interestingly, different central banks have decided on very different approaches to reforming their implementation framework.

The US Federal Reserve System announced already in January 2019 that it intends to continue the use of a floor system, steering short-term money market interest rates close to the interest rate paid to banks and other money market participants[8]. In its framework, the Federal Reserve continuously assesses the necessary amount of reserves in the banking system to keep money market interest rates at the bottom of the interest rate corridor. However, given the considerable uncertainty surrounding the assessment, the amount of reserves supplied to the system must always exceed this in order to ensure stable operation of the framework. More precisely, the Federal Reserve framework is called a *supply-driven floor system*, as the central bank decides the amount of reserves supplied.

Many other central banks too, for example the Bank of England, the Bank of Canada and the Reserve Bank of New Zealand, have announced since the pandemic that they will apply the floor system for controlling interest rates. Whereas the implementation frameworks of the Bank of Canada and the Reserve Bank of New Zealand are very similar to that of the Federal Reserve, the Bank of England has a different approach to the level of reserves needed in the banking system.

The Bank of England does not take a stand at all on the level of reserves, but instead allows banks to decide themselves on the level of their reserves by providing them the possibility to borrow reserves freely at the same rate paid by the Bank on reserves. The Bank of England's justification for its decision was the uncertainty related to the level of reserves needed. The framework is a *demand-driven floor system*.

Sveriges Riksbank and Norges Bank are, in turn, examples of central banks that continue to implement monetary policy using the corridor system, in which the supply of reserves is kept scarce. This encourages banks to trade actively on the money markets. To encourage trading activity, Sveriges Riksbank and Norges Bank have nevertheless ended up with very different interest rate corridors. The interest rate corridor of Norges Bank is as wide as 2 percentage points, whereas that of Sveriges Riksbank is only 0.2 percentage points.

The variety of implementation frameworks underlines well the fact that the problem can be resolved in many ways. Moreover, the best solution is not necessarily a universal one. Instead, the implementation framework most suitable for a central bank depends very much on the special characteristics of the banking system and financial markets of the country or economic area in question.

The number of participants in the banking system, the preferences of these participants, and

whether the group of participants is heterogeneous or homogeneous, are all examples of questions whose answers will very much shape the optimal implementation framework.

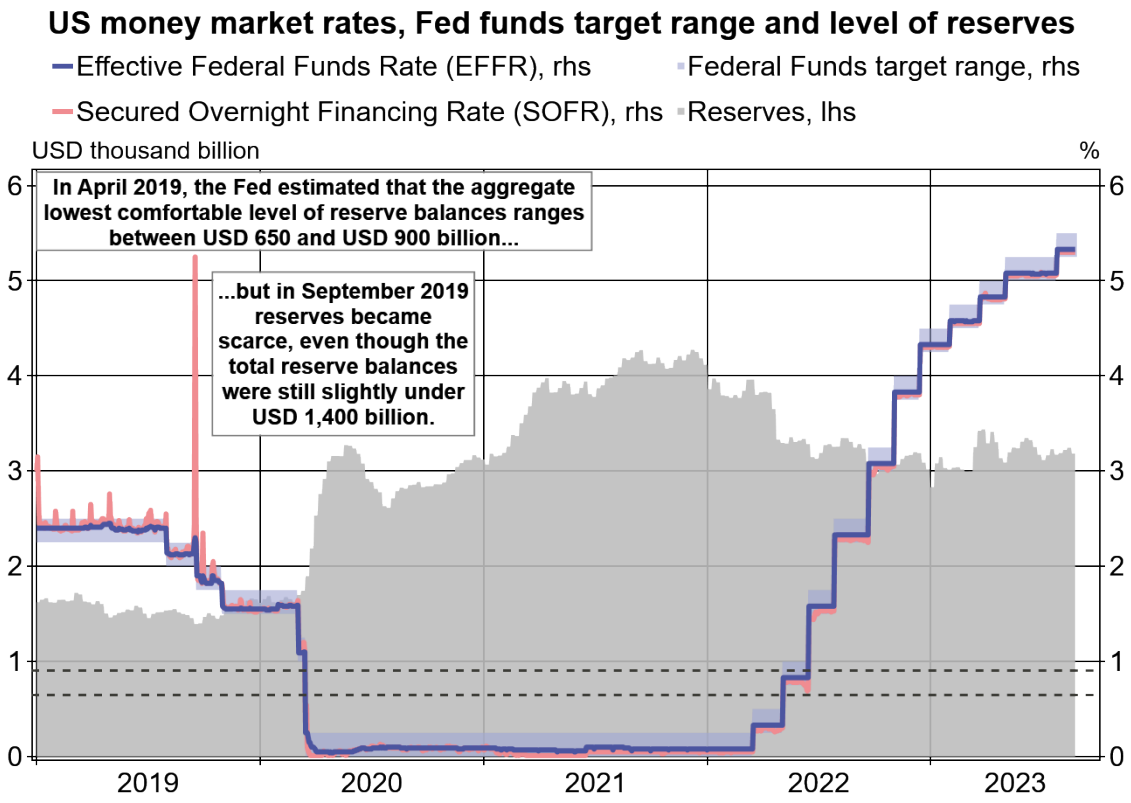
Suitable level of reserves difficult to estimate

Choosing a suitable implementation framework essentially involves the question of the level of reserves needed in the banking system. To determine the level of reserve balances, the central bank must be able to estimate the demand curve for reserves. In other words, a central bank must have some kind of an estimate of the stage at which a contraction in reserves will become visible as a rise in money market rates from the bottom of the interest rate corridor towards the main refinancing operations rate. The task is challenging, as the amount of excess reserves in the euro area banking system has remained considerable since 2015.

The Federal Reserve was faced with this challenge in a very concrete manner in September 2019 when monetary policy normalisation and the related reduction of its balance sheet came to an abrupt halt as short-term money market rates rose sharply despite the fact that the level of reserves in the banking system was still significantly higher than that which the Federal Reserve and the banks themselves had estimated as being the lowest comfortable level of reserves (LCLoR).[9]

In the United States, the largest increases were in secured rates, due to the significant shortage of collateral, but unsecured money market rates also rose briefly above the Federal Reserve's target range used for interest rate control (Chart 3). Even though the Federal Reserve took swift action to remedy the situation by feeding reserves into the banking system through conducting securities purchases and providing credit, it briefly lost its hold on controlling interest rates.

Chart 3.



Source: Bloomberg.
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There are several reasons for the events in September 2019[10], but ultimately it was a question of the Federal Reserve and the banks having made a very low estimate of the level of reserves needed. The estimate failed to take sufficient account of the fact that, in a post-financial crisis world, the level of reserves needed is considerably higher than before.

On the same grounds, the need for excess reserves in the banking system has probably increased in the Eurosystem, too. In the pre-financial crisis period, a surplus of reserves of as little as a couple of billion euros towards the end of the maintenance period were sufficient to push the overnight rate (EONIA) close to the deposit facility rate, and a shortfall of reserves of a similar size had the opposite effect, i.e. interest rates rose close to the main refinancing operations rate.

Nowadays, a significantly higher level of excess reserves would be needed to keep the money market rates close to the deposit facility rate. Excess liquidity would also be needed today when steering money market rates to the middle of the interest rate corridor, as there would probably be demand among banks for excess liquidity that is not sensitive to changes in interest rates.

The higher demand for reserves is due, in particular, to the introduction in 2015 of the liquidity

coverage ratio (LCR) requirement in the EU, under which banks must hold sufficient liquid assets on their balance sheet to meet their net liquidity outflows.[11] Even though certain securities, such as government bonds, are also considered liquid assets, reserves are the easiest and safest way for banks to fulfil the regulatory requirements.[12] The higher demand for reserves also reflects, for example, advances in payment systems and the increase in collateral needs, as they require banks to keep assets in a form that is as liquid as possible.

Demand for reserves is also endogenous, i.e. the selected monetary policy implementation framework and detailed content also have an impact on the demand for reserves. The mechanism operates in particular via the remuneration rate on reserves: the closer the remuneration rate on excess reserves is to money market rates, the larger the demand for reserves by banks, and vice versa.

However, tighter regulation has made money market trading between banks more expensive, which limits the banks' ability to effectively balance reserves between themselves. Even substantial incentives for balancing reserves may thus not encourage banks to balance reserves as efficiently as before. This contributes to a structural increase in the level of reserves needed in the banking system.

Estimating the level of reserves needed in the euro area is particularly challenging due to the fact that at least currently, the reserves are distributed very unevenly among banks and among countries. Moreover, in the eyes of the markets, there is still a 'sovereign-bank nexus', which could cause an outflow of reserves from a country whose economy the markets consider a case for concern. An uneven distribution of reserves could thus push up money market rates throughout the euro area if a large proportion of banks have to acquire financing from the money markets at considerably high interest rates.

A fragmentation of the euro area could therefore contribute to an increase in the structural demand for reserves. It could also increase fluctuations in the demand for reserves over time. Other elements increasing fluctuations in the demand for reserves include growth in autonomous factors, such as banknotes.

As uncertainty increases, the level of reserves needed may be considerably higher than in normal conditions. As a result, in addition to the sufficient level of reserves during normal times, the banking system may need an additional buffer of reserves. Alternatively, or to supplement the buffer, the terms of refinancing operations could be formulated to make the supply of reserves flexible and responsive to changes in demand, to avoid excess volatility in money market rates.

Choice of monetary policy implementation framework depends on many factors

The primary objective of the implementation framework is to control short-term money market rates, which is a prerequisite for the effective transmission of monetary policy to the economy. Short-term rates must be controlled in a sufficiently stable manner so that their volatility does not affect longer term rates on the yield curve, such as Euribor rates or government bond yields. Excess volatility in short-term interest rates may increase interest rate uncertainty, which would be reflected as a general rise in risk premia. A rise in risk premia would, in turn, weaken the transmission of monetary policy and create unnecessary extra costs for the financing of the real economy.

Interest rate control must also be resilient to changes in the level of reserves. As stated above, the level of reserves needed in the banking system can increase in a crisis very strongly in a very short period of time. The implementation framework must also be able to respond to these changes without significant shifts in short-term interest rates.

Despite the considerable rise in interest rates in the past year, the natural rate of interest in the euro area is estimated to be still well below its earlier level.[13] The lower level of the natural rate and the ECB's monetary policy strategy review statement, according to which the asset purchases, negative interest rates and longer-term refinancing operations can be used on the effective lower bound for short-term interest rates, mean that in future we could more often end up in a situation in which the level of reserves will increase as a result of accommodative monetary policy. It is also possible that measures to increase the level of reserves could become necessary in an environment of positive interest rates as well, as a way of securing the transmission of monetary policy.

The more a central bank wants to contain volatility of short-term money market rates, the more market operations it must conduct and the larger its balance sheet must be. The interbank money market does not operate as efficiently as before the financial crisis, and therefore more measures are needed for containing volatility in interest rates.

Central bank actions on the markets will displace private markets. Lower trading activity may, in turn, also influence the determination of interest rates. Having a larger balance sheet may also increase the risks to the central bank. The monetary policy implementation framework must therefore strike a balance between the volatility of money market rates and the central bank's market footprint, while taking into account the need for sufficient control of interest rates. This is because maintaining price stability by means of the monetary policy stance (i.e. in normal

conditions, controlling interest rates) is the ECB's primary objective.

In estimating the appropriate size of the central bank's balance sheet, it is important to remember that the Eurosystem's balance sheet will in any case be considerably larger than in the pre-financial crisis period, due to growth in autonomous factors. In addition, the difference in excess liquidity between the corridor and floor systems is not necessarily huge relative to the balance sheet total, even though it will probably amount to several hundred billion euros. The balance sheet total is likely to be at least EUR 3,000 billion also in the foreseeable future.

Due to the increase in the balance sheet, structural operations, such as securities holdings or long-term refinancing for banks, will probably be necessary, irrespective of the implementation framework selected. The Eurosystem's operations on the financial markets will thus in any case be more extensive than in the pre-financial crisis era, irrespective of how interest rates are controlled.

In addition to interest rate control and the reduction of market footprint, the clarity and operational efficiency of the framework must also be taken into consideration. Clarity contributes to communication of the monetary policy stance to the general public and to market participants, and also facilitates the operation of market participants, particularly on the money markets. Operational efficiency, in turn, reduces the need of the central bank and of market participants for resources connected with monetary policy implementation.

Notes

1. Read more about the €STR reference rate in Jukka Lähdemäki's blog post EKP:n uusi viitekorko otti paikkansa markkinoiden ytimessä ('ECB's new reference rate has found its place at the heart of the money market'). ↑
2. A repo rate, short for repurchase agreement rate, is a secured interest rate where the market participant borrows money while providing the other market participant with securities as collateral. The securities are usually government bonds. ↑
3. If necessary, securities portfolios may also be used. ↑
4. The year is divided into eight reserve maintenance periods, each of them starting on the Wednesday following the Governing Council's monetary policy meeting. Over the maintenance period, banks must hold reserves in the account that on average amount to the minimum reserve requirement. ↑
5. The deposit facility rate was 1 percentage point lower than the main refinancing operations rate, while the marginal lending facility rate was 1 percentage point higher than the main refinancing operations rate. ↑
6. Such measures were previously referred to as 'unconventional', but in the ECB's 2021 strategy review, these measures were included in the conventional toolkit applicable when ↑

interest rates are near the lower bound.

7. To read more about the behaviour of money market interest rates in the context of excess reserves and how they have declined to below the deposit rate, see Niko Herrala's blog post Miten korkoja nostetaan? ('How to raise interest rates'). ↑
8. In the United States, there are many other participants in the money market besides banks. Therefore, an essential part of the Federal Reserve's monetary policy implementation framework, in addition to the interest paid on bank reserves, is the overnight reverse repo facility, which is also available to certain money market participants other than banks, such as money market funds. ↑
9. The Federal Reserve estimated in April 2019 that the lowest level of reserve balances in the banking system ranges between USD 650 billion and USD 900 billion. The estimate was based on a September 2018 survey of banks and calculations made based on the responses. ↑
10. The Federal Reserve provides a very detailed account of the events of autumn 2019 in the article What Happened in Money Markets in September 2019? ↑
11. The LCR requires banks to hold sufficient liquid assets to meet their net liquidity outflows during a 30-day stress period. The LCR requirement was first introduced in 2015, and it was implemented in full on 1 January 2018. ↑
12. In December 2022, 60% of the euro area banks' high quality liquid assets (HQLA) under the LCR regulation were central bank reserves. ↑
13. For a more detailed analysis of the natural rate of interest and its outlook, see e.g. Olli Rehn's speech Whither r*? The outlook for the natural rate of interest under short-run inflationary pressures and structural shifts. ↑

Keywords

ECB, monetary policy implementation