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Research Report

The use of the Eurosystem's monetary policy instruments and its monetary policy implementation framework in 2020 and 2021

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EUROPEAN CENTRAL BANK
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Occasional Paper Series

Marco Corsi, Yvo Mudde (editors) **The use of the Eurosystem's
monetary policy instruments and its
monetary policy implementation
framework in 2020 and 2021**

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Abstract

The Eurosystem implements its monetary policy through a set of monetary policy instruments (MPIs) that are either part of the standard toolbox or are developed to deal with major economic and financial events with a potential adverse impact on price stability and/or the transmission of monetary policy. In the review period covered by this report (2020-2021), monetary policy action was dominated by the Eurosystem's response to the negative economic effects of the outbreak of the COVID-19 pandemic. Through its action, the Eurosystem continued to expand its balance sheet, in particular by scaling up its outright asset purchases and easing the conditions of its targeted longer-term refinancing operations (TLTROs), complemented by temporary changes in the collateral framework. The accommodative monetary policy stance was preserved by maintaining the key ECB interest rates at record-low levels, reinforced by the ECB's forward guidance on policy rates. This report provides a full overview of the Eurosystem's monetary policy implementation over the years 2020 and 2021.

JEL: D02, E43, E58, E65, G01

Keywords: monetary policy implementation, central bank counterparty framework, central bank collateral framework, central bank liquidity management, non-standard monetary policy measures

Non-technical summary

This paper provides a comprehensive overview of the use of the Eurosystem's MPIs over the period 2020 to 2021 and continues the series on this topic started in 2012.¹ The report is structured along three main themes, aimed at guiding the reader through the various MPIs that were introduced or enhanced in the review period.

First, short-term interest rates were kept at very low levels – mostly close to but below the interest rate on the deposit facility (DFR) – in an environment of very high excess liquidity, thereby preserving a very accommodative monetary policy stance. In addition, while minimum reserve requirements have continued to play a less relevant role than in the past in steering short-term rates due to the large excess liquidity, they served as reference for the two-tier system introduced in October 2019. This last instrument continued mitigating the side effects of the negative interest rate policy on the transmission of monetary policy by exempting part of banks' excess reserves from negative remuneration. Sections 2 and 3 cover these developments.

Second, liquidity provided by the Eurosystem through its credit operations more than tripled in the review period (up to €2,207 billion), in particular as a result of the attractive conditions under its TLTRO III operations, which ensured favourable bank lending conditions during the pandemic. In parallel, a temporary expansion of the collateral framework concomitant with a temporary higher risk tolerance, increased collateral availability thereby facilitating broad-based participation in these operations. As part of the swift ECB reaction to the outbreak of the COVID-19 crisis, the Eurosystem also enhanced its provision of US dollar liquidity to banks and created the Eurosystem repo facility for central banks (EUREP) to offer euro liquidity to foreign central banks. The counterparty framework was also fine-tuned, while fully preserving the Eurosystem's first layer of risk protection (the second being collateral) when conducting credit operations. Sections 4, 5 and 6 cover these developments.

Third, asset purchase programmes were conducted at an unprecedented scale to preserve favourable financing conditions, in particular following the launch of the pandemic emergency purchase programme (PEPP) in the early phase of the pandemic. Overall, a maximum envelope of €1,850 billion in purchases was foreseen under the PEPP, of which €1,581 billion had been used by the end of 2021. In addition, the asset purchase programme (APP) was scaled up in March 2020 by a total of €120 billion. In parallel, the Eurosystem continued lending part of its securities under its securities lending programmes. Section 7 describes these developments.

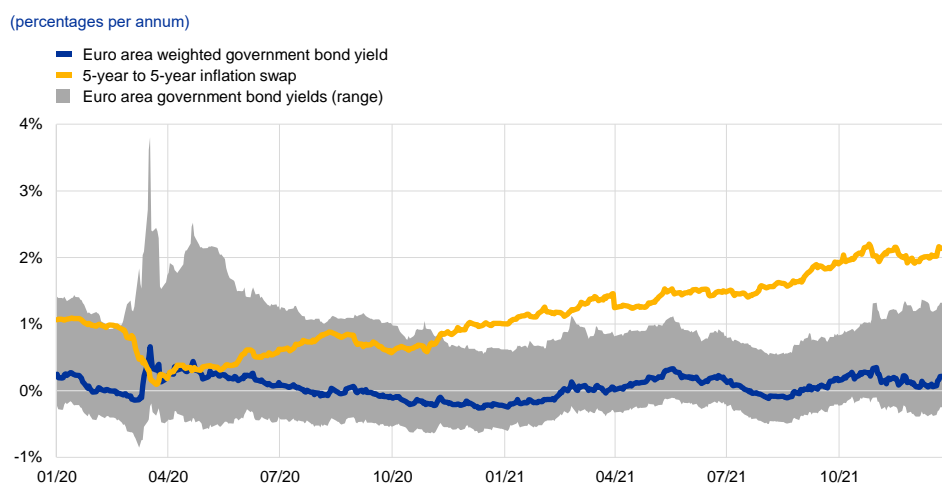
Finally, Section 8 considers the aggregate effect of the above instruments on the Eurosystem balance sheet and related liquidity conditions, as well as the effects on the distribution of excess liquidity and developments in autonomous factors, including banknotes and government deposits. Overall, in this period, monetary policy assets increased from €3.3 trillion at the end of 2019 to €6.8 trillion at the end of 2021, thereby reaching a value equating to almost 60% of the euro area gross domestic product (GDP).

¹ Eser et al. (2012); Alvarez et al. (2016); Bock et al. (2018); Sylvestre and Coutinho (2020).

1 Introduction to the Eurosystem's monetary policy instruments in 2020 and 2021

The ECB's response to the economic fallout from the outbreak of the COVID-19 pandemic dominated its monetary policy action in the period under review, namely from 1 January 2020 to 31 December 2021. In early 2020, the ECB maintained a very accommodative monetary policy stance to support the medium-term price stability objective. The outbreak of the COVID-19 pandemic and the accompanying social restrictions to limit the spread of the virus changed the economic and financial outlook drastically. The ECB faced the threat of a liquidity and credit crunch, serious risks to the monetary policy transmission mechanism, severe dislocations across market segments, and sharply decreasing market-based inflation expectations, as evident, for instance, from market-based measures (Chart 1). The ECB therefore substantially eased the monetary policy stance over the course of 2020 to counter the negative impact of the COVID-19 pandemic on the euro area economy. Following the most acute phase of the pandemic, financial and economic conditions recovered and the inflation outlook improved. Nonetheless, the ECB's policy response to the outbreak of the COVID-19 pandemic remained an important determinant for the configuration of MPIs in place throughout the review period and therefore constitutes a key element for this report.

Chart 1
Inflation expectations and government bond yields



Source: Bloomberg.

Notes: Government bonds yields (10-year maturity) are weighted by GDP, based on the 11 largest euro area countries.

1.1 Overview of monetary policy instruments

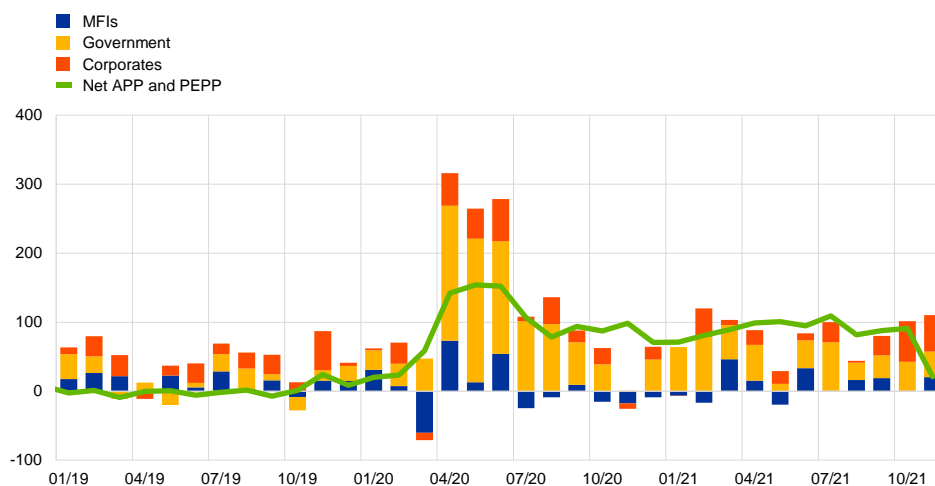
Over the review period, the Eurosystem introduced new measures and recalibrated existing instruments in an unprecedented way to counter the adverse effects of the pandemic. The Eurosystem balance sheet therefore reached record levels. This report is structured around three main themes.

First, the ECB ensured an accommodative monetary policy stance by maintaining the key ECB interest rates at record-low levels, reinforced by its forward guidance on policy rates. As a result of the large liquidity injection, excess liquidity in the euro area banking system continued maintaining the short-term money market (which are used as reference rates) trading at or around the DFR. In addition, the ECB actively used forward guidance in its communications to signal that its policy rates would remain at their present level, or lower, until the inflation outlook – including underlying inflation dynamics – were consistent with the Governing Council’s inflation aim. It also stated that policy rates would not be raised before the end of net purchases under the APP. After the conclusion of its strategy review, the ECB further clarified the conditions under which it would consider raising its interest rates. Finally, the ECB maintained its two-tier system (TTS) for reserve remuneration to mitigate the side effects of the negative interest rate policy on the transmission of monetary policy.

Chart 2

Euro area debt issuance and asset purchase programmes

(EUR billions)



Sources: ECB and ECB calculations

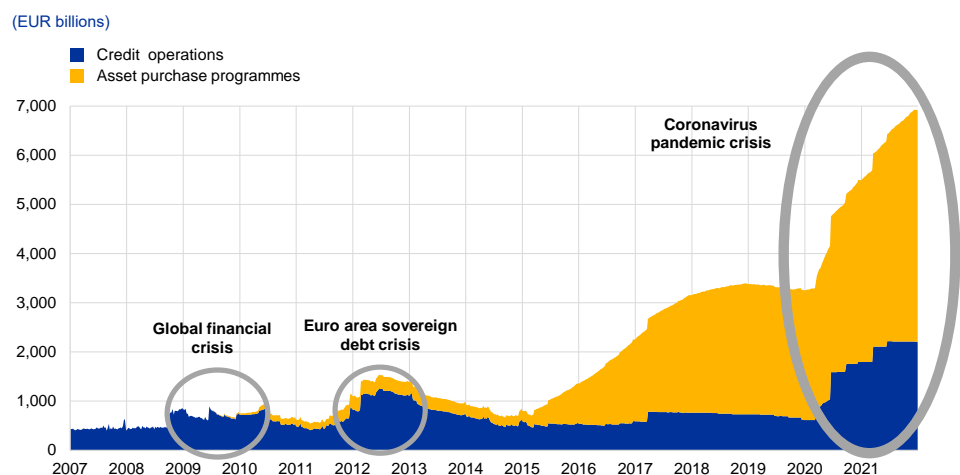
Notes: net debt issuances by issuer type, as indicated, and net volume purchased under the APP and PEPP programmes. Based on monthly data. MFI stands for monetary financial institution.

Second, Eurosystem’s credit operations ensured that bank funding conditions remained favourable and facilitated the banking sector in meeting the increased loan demand during the pandemic. The conditions of the TLTRO III programme were substantially eased by increasing banks’ borrowing allowance and decreasing the applicable borrowing rate. These amendments contributed to record (€2.2 trillion) participation in Eurosystem credit operations. Finally, an extension of

the collateral framework complemented the credit operations by increasing the collateral availability to enable bank participation in these operations.

Third, asset purchase programmes contributed to delivering the appropriate degree of monetary accommodation, stabilising financial markets and preserving favourable financing conditions. The APP – which was already in place before the pandemic – was upscaled, through duration extraction² and signalling effects, to help provide the degree of policy accommodation needed to ensure the convergence of inflation towards the aim. In addition, the PEPP was launched in the early phase of the pandemic given that the financial markets had frozen under the weight of rising uncertainty at that time. The PEPP aimed to support the monetary policy stance and transmission by ensuring the Eurosystem’s a strong market presence (Chart 2), as well as its flexibility over time, across asset classes and among jurisdictions.

Chart 3
Monetary policy operations



Sources: ECB and ECB calculations

This report provides a thorough overview of the use of the Eurosystem monetary policy implementation framework. It focuses on the 2020-2021 review period, during which outstanding monetary policy operations (MPOs) reached unprecedented levels (Chart 3). The structure of the review of MPIs will follow the main three themes set out above, thereby deviating somewhat, in terms of outline, from previous versions of the MPI report, while maintaining most of the sections covered in previous reports³. Moreover, the report provides four boxes which offer deeper insights into specific elements of relevance over the review period.

² The duration extraction channel identifies a transmission channel for non-standard monetary policy through which the central bank ‘extracts’ duration risk from the market through bond purchases while letting its balance-sheet size grow.

³ Eser et al. (2012); Alvarez et al. (2016); Bock et al. (2018); Sylvestre and Coutinho (2020).

2 Steering of short-term interest rates

In the high excess liquidity environment prevailing in the review period, money market rates were steered towards the ECB's DFR. The level of the DFR and expectations about its future levels constitute the risk-free component of euro area interest rates and yield curves and thus serve as the starting point for the monetary policy transmission mechanism.

This section outlines the main developments in money markets and their interplay with excess liquidity. Over the review period, the monetary policy implementation framework to steer short-term interest rates remained unchanged; the developments described below reflect the conduct of non-standard monetary policy measures (such as asset purchase programmes) and external developments.

2.1 Main developments in excess liquidity and money markets

During the review period, excess liquidity continued to increase and reached a record level of €4.5 trillion in 2021. At the start of the review period in 2020, the Eurosystem operated with a level of excess liquidity⁴ of €1.7 trillion. As a result of the monetary policy response to the outbreak of the pandemic, central bank reserves increased strongly. Liquidity creation amounted to €3.7 trillion and resulted in €2.8 trillion of additional excess liquidity, with the difference (€0.9 trillion) being explained by increased liquidity absorption through autonomous factors, such as banknotes and non-monetary policy deposits (e.g. government deposits) (Chart 4a).⁵ The amount in central bank reserves provided the banking sector with ample scope to meet the minimum reserve requirements (MRRs) and ensured that money market rates remained closely linked to the DFR. Sections 3 and 8 provide more information on developments with respect to MRRs and excess liquidity respectively.

Money market rates – and in particular the euro short-term rate (€STR) – remained close to the DFR. The DFR was set at -0.50% in September 2019. Money markets, and in particular the unsecured overnight rate (the €STR), traded steadily below the DFR. Over the years 2020 and 2021, the €STR decreased on average by 3 basis points to -0.57% (Chart 4b). While the €STR market is characterised by transactions between banks and institutions that do not have direct access to the deposit facility (DF) (non-banks, e.g. funds), an arbitrage mechanism explains the differential between the DFR and the €STR.⁶ Money market segments

⁴ Defined as the sum of holdings of central bank reserves in excess of reserve requirements and holdings of equivalent central bank deposits (see Section 8).

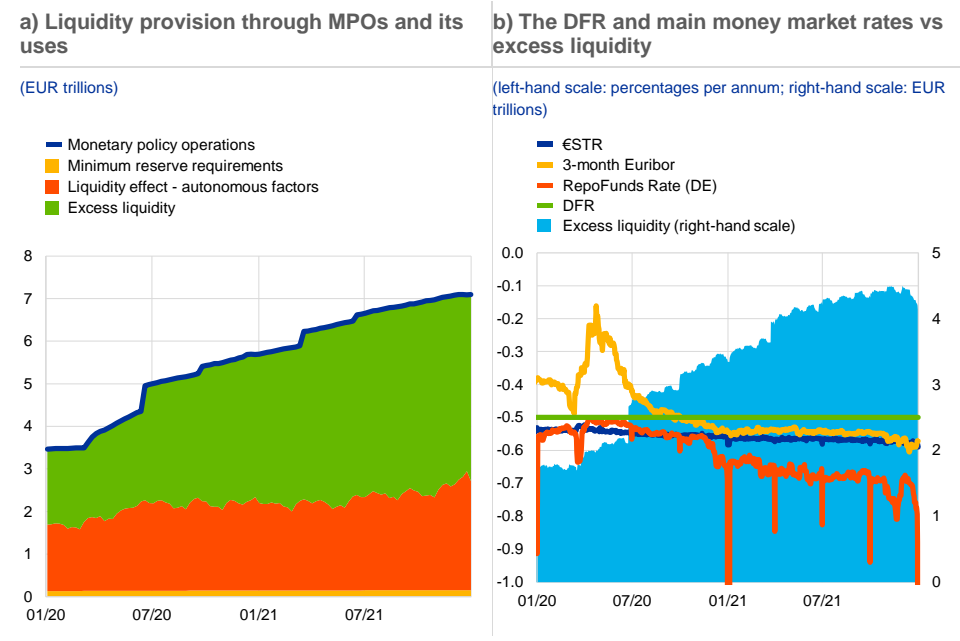
⁵ See Section 8.3 for more detailed information.

⁶ Non-bank financial institutions (NBFIs) had been increasingly holding deposits often resulting from the sale of securities to the Eurosystem. Since NBFIs do not fulfil the necessary Eurosystem eligibility criteria and thus do not have access to the Eurosystem balance sheet, they resorted to banks for liquidity storage by lending them liquidity, which banks in turn deposited with the Eurosystem by charging a spread. As a result, benchmark rates, such as €STR, declined below the DFR.

with longer tenors or secured rates naturally reflect different risk premia and market conditions. For example, the three-month euro interbank offered rate (EURIBOR) peaked during the early phase of the pandemic, while at the same time some repo rates (e.g. the German RepoFunds rate) fell to a lower level on 20 March 2020 (see Box 1). However, both rates recovered after the decisions taken by the ECB Governing Council on 24 March 2020.

Chart 4

Developments in excess liquidity and money market interest rates



Source: ECB, European Money Market Institute, Bloomberg
 Note: the German RepoFunds rate reached -2.25% at the end of 2020 and -4.65% at the end of 2021 due to repo market dynamics.

Box 1

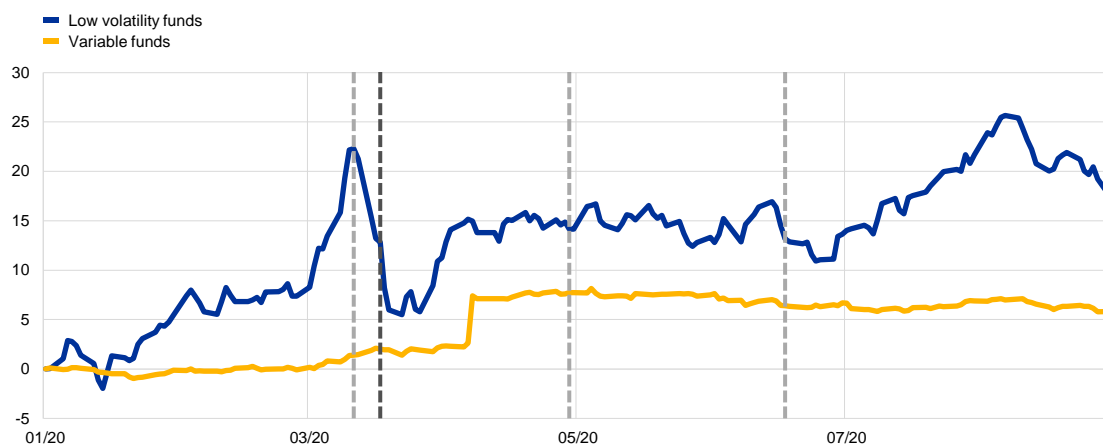
The interaction between developments in money markets and money market funds and the ECB's response during the COVID-19 crisis

This box focuses on the tensions in euro area money markets during the early stages of the pandemic and the interplay with money market funds (MMFs). As a result of increased market volatility and economic uncertainty, MMFs experienced significant outflows on the outbreak of COVID-19 in March 2020 (Chart A). Prior to the COVID-19 stress, these funds held around 70% of short-term (mostly private) debt issued in the euro area, and therefore play a vital role in money markets. The stress placed on MMFs had implications for monetary policy transmission given its impact on EURIBOR – an important reference rate for the euro area – and on banks' liquidity management.

Chart A

Cumulative daily flows in the assets under management of European MMFs

(EUR billions)



Source: iMoneyNet.

Notes: iMoneyNet includes daily data on multiple characteristics of individual MMFs. While the database covers almost the entire US, for the euro area it covers only Ireland and Luxembourg (and not France). Consequently, the results may differ slightly from those of other sources. Euro government funds are excluded, as these are negligible. Black (grey) vertical bars show policy actions relating to asset purchases (refinancing operations). Remarkably, euro low volatility funds experienced relatively large inflows at the beginning of the crisis in March 2020. This happened on the back of margin-related inflows owing to the fact that the ECB surprised markets by keeping the DFR unchanged whereas the markets had fully priced in a rate cut. While this first led to MMF inflows, resulting from gains on derivatives positions (through overnight index swaps (OISs)), margin calls also triggered a sharp reversal. Last observation: end of January 2021.

MMFs came under pressure as economic stress and regulatory side effects increased outflows

The early phase of the pandemic was accompanied by an increased preference for liquidity on the part of investors, banks and other parties. MMFs experienced substantial redemptions, driven by the standstill in the global economy that significantly harmed traditional corporate cash flows. Moreover, the uncertainty in financial markets led to growing liquidity needs (e.g. among pension funds) to meet margin calls on derivatives exposures.⁷ Finally, investors in MMFs redeemed cash for precautionary reasons given that they were uncertain about the speed at which they would be able to monetise assets. MMFs were challenged to meet these withdrawals given that securities selling had to take place in illiquid markets or the funds had to draw down their weekly liquid asset buffers.

While triggered by the COVID-19 shock, MMF outflows seem to have been amplified by regulatory liquidity restrictions. Liquidity restrictions/redemption tools at fund level were introduced as part of the MMF reforms introduced after the financial crisis to increase the soundness of that sector. Funds of the type most common in Europe (low volatility net asset value funds) are required to keep their weekly liquid assets above 30% of their net asset value (NAV) and the deviation of the mark-to-market value NAV within 20 basis points.⁸ In times of stress, MMFs have to sell assets to be able to meet daily redemptions, while simultaneously complying with these liquidity restrictions. The threat posed by the need to meet these restrictions may trigger procyclical investment behaviour,

⁷ See ECB (2020a).

⁸ Regulation (EU) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds (OJ L 169, 30.6.2017, p. 8). This Money Market Funds Regulation entered into force in 2019.

leading to pre-emptive runs before the liquidity restrictions kick in. In March 2020, MMF outflows were, indeed, more severe among funds with a lower percentage of liquid assets on their books.⁹

Why was the stress among MMFs relevant for the ECB?

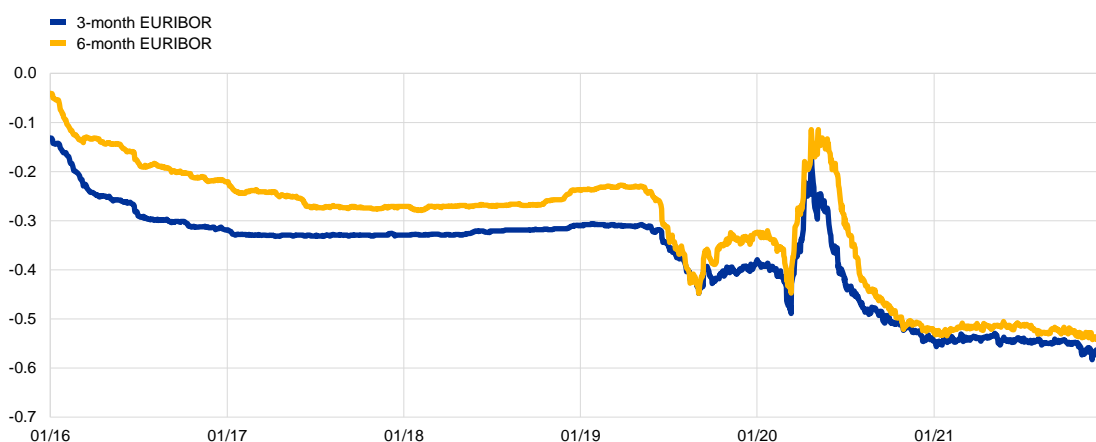
The MMF sector holds a substantial amount of short-term marketable debt (e.g. commercial paper (CP)). While the majority of European banks have a large depositor base and, as a result, short-term debt only makes up a small portion of their total funding mix,¹⁰ CP plays an important role in the liquidity management for banks given that it is often used to manage the liquidity coverage ratio (LCR)¹¹.

More importantly, stress in the CP market due to MMF liquidity strains had adverse consequences on the transmission of monetary policy to the real economy. Following the benchmark reform of risk-free rates in the euro area, rates on CP issued by banks are included in the EURIBOR calculation. EURIBOR serves as an important benchmark for contracts worth some €180 trillion, including over €1 trillion of retail mortgages.¹² Hence, the malfunctioning of CP markets that followed the pronounced outflows from the MMF sector resulted in large spikes in bank CP rates, automatically feeding into EURIBOR. As a result, EURIBOR rates rose to levels last seen in 2016, despite the unprecedented monetary accommodation set by the Eurosystem (Chart B).

Chart B

EURIBOR rates

(percentages per annum)



Source: European Money Market Institute.

The monetary policy response

The Eurosystem took extensive measures to limit the negative effects of the COVID-19 crisis on the economy and price stability. The impact on CP markets was alleviated by the purchase of non-

⁹ See ECB (2021a), Hudepohl et al. (2021), and ESMA (2021). The ESMA reported that no funds breached the +/- 20 basis points collar in March, although a few funds were close to the threshold (e.g. one fund had an 18 basis points deviation).

¹⁰ In fact, CP covers less than 3% of total funding needs and is thus only a minor source of bank funding. Overarchingly, the share of deposit financing in total liabilities for the European banking sector in general is more than ten times as large as the share of short-term marketable debt.

¹¹ An important regulatory ratio which measures whether banks are capable of managing outflows over a 30-day period.

¹² See "Euro money market reference rate", [European Money Market Institute website](#).

financial CP with a minimum residual maturity of 28 days¹³ and the broader acceptance of uncovered bank bonds (the risk concentration limit having been increased from 2.5% to 10%). Furthermore, the favourable conditions attaching to lending operations (additional long-term refinancing operations (LTROs), pandemic emergency long-term financing operations (PELTRO) and TLTROs) eased banks liquidity conditions and decreased their need to rely on market funding. While these policy responses only supported MMFs indirectly, they helped to stabilise the money markets effectively and money market rates such as EURIBOR started declining again towards record-low levels. From a policy perspective and with a view to potential future such episodes, while the extensive monetary policy measures taken by the Eurosystem helped to relieve stress in money markets, adjusting regulation may prove particularly effective in enhancing the resilience of MMFs in a more structural way.¹⁴

¹³ Instead of the minimum residual maturity of six months that applies to other marketable debt instruments with an initial maturity of at least 367 days covered by the corporate sector purchase programme (CSPP).

¹⁴ ECB (2022); FSB (2021).

3 Minimum reserve requirements and the two-tier system

MRRs have traditionally absorbed a relatively stable amount of liquidity given an unchanged reserve ratio and only moderate growth in the relevant balance-sheet items.

The Eurosystem's minimum reserve system traditionally served the purpose of enlarging the structural liquidity deficit of the euro area banking system in order to help steer short-term interest rates. Although this purpose has become less relevant in recent years due to the large liquidity surplus, MRRs remain a standard monetary policy implementation tool with euro area credit institutions being required to hold a certain amount of funds as minimum reserves in their current accounts at their respective national central banks (NCBs). In addition, the MRR has served as a reference since October 2019 for the TTS, as explained below. The MRR is calculated on the basis of the respective credit institution's balance sheet prior to the start of a maintenance period, and every credit institution must ensure that it holds the required level of reserves, on average, over the relevant maintenance period. The reserve requirement for each credit institution is calculated by multiplying specific short-term liabilities by the reserve ratio, currently at 1% since January 2012. The funds held to meet the MRR are remunerated at the main refinancing operations (MRO) rate, that is to say, there are no costs for banks.

However, minimum reserves increased in absolute terms over the review period due to the more pronounced increase in deposits on credit institution balance sheets.

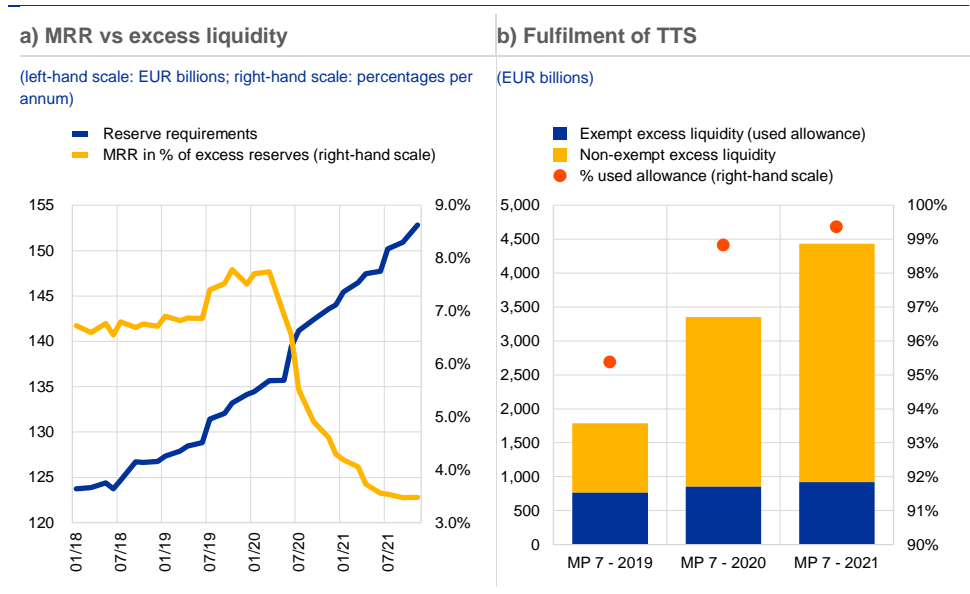
MRRs gradually rose from €134.5 billion in January 2020 to €154.2 billion in December 2021 (Chart 5a), an increase of 14.7% compared with 8.4% in the period from January 2018 to December 2019. This increase was driven by the growth of credit institution liabilities subject to reserve requirements. While reserve requirements grew in absolute terms, their share of total excess liquidity provided to the banking system almost halved, from around 7.5% at the end of 2019 to 3.4% in November 2021. This relative decline reflects the significant increase in excess liquidity caused by the various pandemic-related measures (see Section 8), and was most pronounced following the settlement of TLTRO III.4 on 24 June 2020.

The TTS addressed the side effects of the negative interest rate policy on the transmission of monetary policy by exempting a portion of banks' excess reserves from negative remuneration.

Frictions in the pass-through of negative rates to banks' funding costs when deposit rates are floored at zero (this is particularly relevant for most of the retail deposits) may negatively affect bank profits and thereby impair bank-based transmission of monetary policy. The TTS aims to mitigate such impairments by exempting portions of credit institutions' excess reserves from negative remuneration at the DFR. The exempt tier was set in relation to a credit institution's MRR; the multiplier is the same for all credit institutions and has remained unchanged at 6 during the review period.

Credit institutions made intensive use of the TTS and had nearly made full use of it by the end of the review period. Most credit institutions in the euro area made full use of their TTS allowance following its introduction, when 95.4% of the exempt tier was used. In the review period, this increased to 99.4% as credit institutions became more familiar with the system and optimised their reserve management. The magnitude of use of the exempt tier mechanically followed the increase in MRR, thereby rising from €804.8 billion in November 2019 to €925.4 billion in December 2021 (Chart 5b).

Chart 5
Developments in MRR and TTS



Source: ECB and ECB calculations.
Note: based on maintenance period averages.

4 Credit operations

Credit operations¹⁵ are one of the cornerstones of the Eurosystem's monetary policy framework.

The European banking sector plays an essential role in the transmission of the ECB's monetary policy. Through its credit operations, the ECB is able to directly affect banks' funding conditions, thereby preserving or stimulating bank lending conditions. From the start of 2020, recourse to Eurosystem funding significantly increased, moving from €627 billion to €2,207 billion, reversing the downward trend seen in previous years (Chart 6).

This chapter distinguishes three main classes of credit operations:

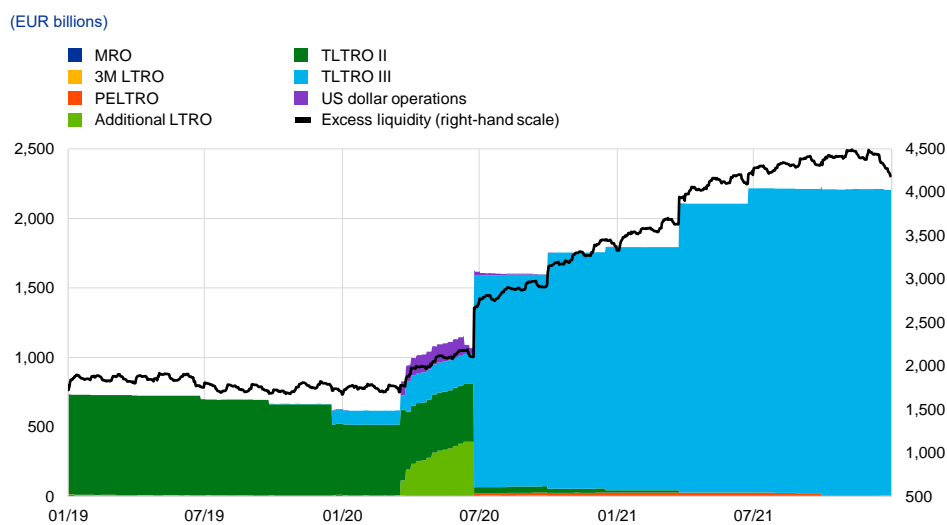
- **The TLTRO III** programme provides banks with longer-term funding at attractive conditions conditional on banks meeting a bank-specific pre-determined lending benchmark. The operations are aimed at preserving favourable borrowing conditions and are specifically designed to stimulate bank lending to the real economy. During the review period, the ongoing series of TLTRO III operations was adjusted in order to preserve bank lending amid the outbreak of the COVID-19 pandemic.
- **PELTROs, LTROs and MROs** provide banks with funding at less attractive terms compared with TLTRO III operations. While at the onset of the pandemic the ECB's response included the launch of PELTROs and additional LTROs at relatively favourable pricing, three-month LTROs and MROs continued to be offered under their customary conditions and played a role in providing liquidity to smaller and/or specialised banks. In addition, the marginal lending facility (MLF) remained available as a liquidity backstop.
- **US dollar operations** provide euro area banks with short-term US dollar liquidity. With deteriorating liquidity in the US dollar funding market after the outbreak of the pandemic, the conditions of the US dollar tenders offered by the Eurosystem were temporarily eased.

All credit operations with banks are conducted on the basis of the Eurosystem counterparty (see Section 5) and collateral frameworks (see Section 6). This chapter also contains a subchapter elaborating on the foreign exchange arrangements between central banks, which offer non-euro area banks the possibility of obtaining euro outside the euro area.

¹⁵ Under Article 2(31) of Guideline (EU) 2015/510 of the European Central Bank of 19 December 2014 on the implementation of the Eurosystem monetary policy framework (ECB/2014/60) (henceforth: the General Documentation (GD)), Eurosystem credit operations means liquidity-providing reverse transactions (i.e. liquidity-providing Eurosystem MPOs, excluding foreign exchange swaps for monetary policy purposes and outright purchases) and intraday credit.

Chart 6

Participation in Eurosystem credit operations with eligible counterparties



4.1 TLTROs

The TLTRO III series was launched in September 2019. Through this targeted programme the ECB provided banks with the opportunity to obtain three-year funding up to a maximum amount. This borrowing allowance depended on the size of the banks' outstanding portfolio of loans to non-financial corporations (NFCs) and households, excluding loans for house purchases. Banks received a discount on their borrowing rate conditional on their lending performance.

With market stress rising following the outbreak of the pandemic, the ECB enhanced the conditions of the TLTRO III programme to support bank lending. This easing of the TLTRO III conditions was one of the key responses to the pandemic. By April 2020, the ECB had introduced a special interest rate period, running from June 2020 to June 2021, during which the interest rate on TLTRO III operations was reduced to 50 basis points below the average interest rate prevailing in the Eurosystem's MRO rate over the same period. Moreover, for counterparties whose eligible net lending reached the lending performance threshold, the interest rate over the period from June 2020 to June 2021 would be 50 basis points below the average DFR prevailing over the same period. Finally, the ECB raised the maximum total amount that counterparties were allowed to borrow under TLTRO III. In December 2020, in response to the economic fallout from the resurgence of the pandemic in the euro area, the terms and conditions of the TLTRO III programme were prolonged further (Table 1).

Table 1**Main TLTRO III parameters before and after the outbreak of the COVID-19 pandemic**

	TLTRO III (pre-pandemic)	TLTRO III (until end 2021)	
Operations	7 quarterly operations from September 2019 to March 2021	10 quarterly operations from September 2019 to December 2021	
Maturity	3 years		
Eligible loans	Loans to euro area NFCs and households, excluding loans for house purchases		
Borrowing allowance	30% of the eligible loans	55% of the eligible loans	
Interest rate	Between the MRO rate and DFR (average over the life of the operations)	Between the MRO rate and DFR (average over the life of the operations)	
		From June 2020 to June 2021 (special interest rate period)	Between the MRO rate - 50 bps and DFR -50 bps (average between June 2020 and June 2021)
		From June 2021 to June 2022 (additional special interest rate period)	Between MRO rate -50 bps and DFR -50 bps (average between June 2020 and June 2021)
Benchmark net lending (BNL)	Based on eligible net lending in the 12-month period to 31 March 2019		
	Positive eligible net lending: BNL = 0		
	Negative eligible net lending: BNL = eligible net lending in that period		
Lending performance thresholds	From 1 April 2019 to 31 March 2021: threshold of at least 2.5% relative to benchmark outstanding amount ¹⁶	From 1 April 2019 to 31 March 2021	Threshold of at least 1.15% relative to the benchmark outstanding amount
		From 1 March 2020 to 31 March 2021 (special reference period)	Threshold of at least 0% relative to the BNL
		From 1 October 2020 to 31 December 2021 (additional special reference period)	Threshold of at least 0% relative to the BNL
Voluntary repayment options	Two years from settlement for each operation, at a quarterly frequency	One year from settlement for each operation, starting in September 2021, except for the last three operations with the early repayment option available from June 2022, at a quarterly frequency	

Source: ECB.

Note: pre-pandemic parameters refer to the TLTRO III conditions from February 2020, and end-2021 parameters indicates the TLTRO III conditions since March 2021, after the last enhancement of the TLTRO III parameters in December 2020.

Participation in TLTRO III reached record levels compared with the TLTRO I and II series allotted between 2014 and 2017. The very favourable conditions of the TLTRO III programme incentivised broad-based participation across euro area banks. Participation per country was less concentrated compared with past series. While under TLTRO II banks from Italy and Spain borrowed overall more than half of the total outstanding amount, under TLTRO III their share declined to 37% over the life of the operations. On the other hand, banks in France and Germany showed the opposite behaviour, increasing their overall share from 28% under TLTRO II to 41% under TLTRO III. Most of the participation took place following enhancement of the borrowing conditions, namely under TLTRO III.4 in June 2020 and under TLTRO III.7 in March 2021 (Chart 7). The June 2020 TLTRO III operation, which marked the beginning of the special interest rate period, saw the highest take-up, with 742 banks participating for a total of €1,308 billion. In September 2021, Eurosystem outstanding credit operations reached a new all-time high (€2,230 billion), doubling the peak

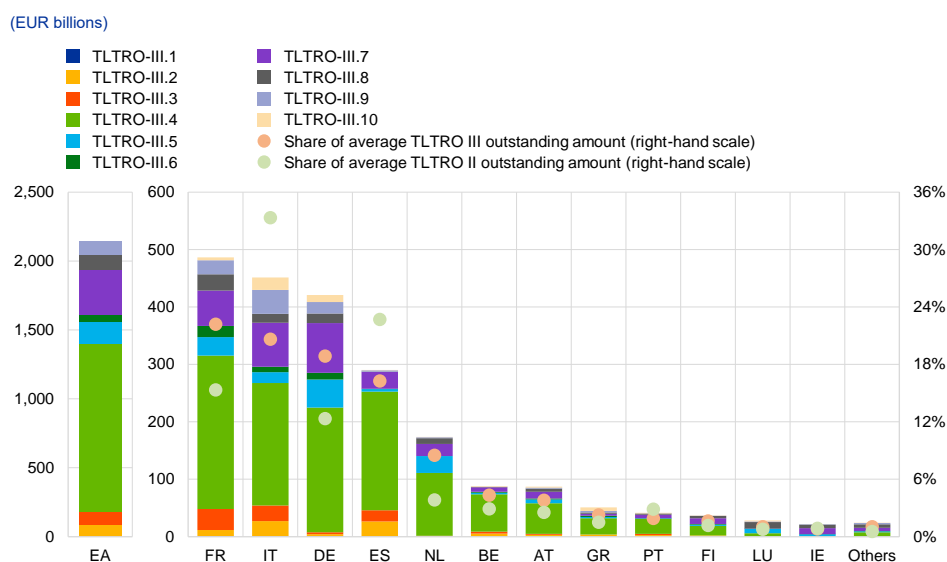
¹⁶ The benchmark outstanding amount is equal to the eligible stock of credit on 31 March 2019 plus the BNL.

reached with the three-year LTROs programme in 2012. During the review period, TLTROs represented, on average, more than 95% of the total outstanding refinancing operations.

Banks have repaid €139 billion on the early repayment options dates for TLTRO III in 2021. In the early repayment round in September 2021, 137 participants repaid a total of €79 billion, while in December 2021 a total of 72 participants repaid €60 billion. The net reduction in TLTRO usage of these banks was, however, much lower (€35 billion) given that a large share of the funds was repaid to be rolled over into the ninth or tenth TLTRO III series (with a longer remaining maturity).

Chart 7

TLTRO III outstanding amounts and share of average TLTRO II and III outstanding amounts

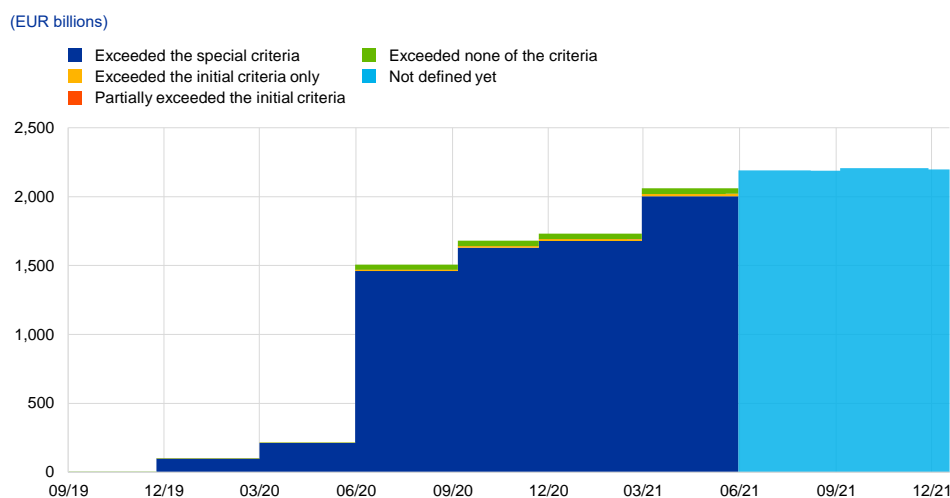


Source: ECB.

Note: The chart shows the outstanding amounts after the last TLTRO III operation. The share of average TLTRO II and TLTRO III outstanding amounts considers the entire period under analysis.

Almost 92% of the participating banks met the special criteria (i.e. exceeded the benchmark net lending in the special reference period) and benefited from the most favourable interest rate applicable until June 2021. Around 3% of banks did not exceed the special criteria but exceeded the initial criteria (i.e. exceeded the net lending benchmark for the second reference period), and therefore paid the DFR on their TLTRO III operations (Chart 8).¹⁷ Banks that did not reach their net lending benchmarks in any of the aforementioned reference periods – in total, 5% of banks – obtained the less favourable interest rate, i.e. the MRO rate until June 2020 and after June 2021, and the MRO rate minus 50 basis points during the period between June 2020 and June 2021. Banks' lending performance over the additional special interest rate period was communicated in June 2022.

¹⁷ Note that 20% of these banks only partially exceeded the initial criteria i.e. the lending growth was positive but lower than 1.15%. In these cases, the interest rate applied was between the average MRO rate and the average DFR over the life of the operations.

Chart 8**TLTRO III outstanding amounts by lending performance category**

Source: ECB.

4.2 PELTROs, LTROs, MROs and the MLF

The ECB launched additional LTROs and PELTROs as temporary liquidity backstops following the outbreak of the COVID-19 crisis. The additional LTROs were designed to bridge liquidity needs until settlement of the fourth TLTRO III operation in June 2020 – which was the first chance for banks to participate under the eased TLTRO III conditions. The operations were offered at the DFR and, compared with TLTRO III, without conditions, thereby allowing banks to swiftly participate and build (precautionary) liquidity buffers. The volume of operations peaked at around €390 billion in June 2020. The additional LTROs were complemented by PELTROs, introduced in April 2020, to ensure sufficient liquidity provision for banks that did not, or could not, participate in the TLTRO III series, given their business models and the related availability and type of loan portfolios. These operations were provided at an interest rate 25 basis points below the MRO rate and had a maturity ranging from 8 to 16 months. Four additional PELTROs were allotted in 2021. Outstanding PELTROs peaked at around €28 billion in July 2021.

Regular liquidity-providing refinancing operations continued to represent only a small fraction of total Eurosystem lending. The regular refinancing operations, i.e. the three-month LTROs and MROs, are currently only used by a small number of banks. The operations have a maturity of three months and one week respectively, and are both conducted under a full allotment procedure: MROs are conducted at an interest rate at the MRO rate (which was maintained at 0% during the review period); LTRO operations are conducted at the average MRO rate. The large amount of excess liquidity in the system and the availability of more favourable TLTROs and PELTROs reduced banks' demand for MROs and three-month LTROs. The average outstanding amounts in MROs and three-month LTROs during the period under review were around €0.6 billion and €1.2 billion respectively. Average recourse to these operations decreased by around €7 billion in 2020-21 compared with the

previous two years. From a country perspective, participation in regular MROs and three-month LTROs was concentrated in Germany and Italy (around 75% of the average volume over the review period).¹⁸

Recourse to the MLF was occasional and due to unexpected payments or technical failures. The MLF allows eligible counterparties to obtain overnight liquidity at an interest rate above the MRO rate. The facility is designed to cover specific liquidity shortfalls caused either by market developments or by technical issues affecting the settlement of counterparties' payments at a time of the day when the counterparty is not able to find alternative funding on the market. Over the review period the MLF rate remained constant at 0.25%, while recourse remained limited, averaging just €12 million per day, which represents a significant reduction in comparison with the daily average of €71 million in the previous review period. There was, indeed, no participation in the MLF for almost two-thirds of the days in the review period, while usage of the facility exceeded €100 million on only 12 days. With more reserves available, counterparties increasingly used these to fund their payments, thereby reducing their use of intraday credit.¹⁹ In turn, lower intraday credit meant that the likelihood of the automatic MLF being used at the end-of-day decreased²⁰. Occasional spikes above €100 million were mostly related to unexpected payment outflows occurring late in the day and technical failures impeding the correct settlement of upcoming inflows.

4.3 US dollar credit operations

US dollar tenders proved to be an important stabilising tool after the outbreak of the pandemic, easing US dollar funding strains. Amid high volatility and risk aversion, US dollar funding conditions for euro area banks deteriorated significantly following the outbreak of the pandemic.²¹ In response, the ECB and other major central banks announced coordinated action to enhance the provision of US dollar liquidity to banks outside the United States through the standing swap line (Section 4.4), and by lowering the rate to the OIS rate + 25 basis points²² and reintroducing a

¹⁸ Smaller participation was recorded in Austria, France and Greece (around 6%, 4% and 2% respectively of the average volume over the review period), while it was negligible or null in other jurisdictions.

¹⁹ Intraday credit is credit provided during the day free-of-charge and against eligible collateral (see point (26) of Article 2 of Guideline of the European Central Bank of 5 December 2012 on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET2)(ECB/2012/27). If a Eurosystem eligible counterparty does not repay the intraday credit by the end of the TARGET2 business day, its recourse is automatically converted into MLF and the MLF rate is applied.

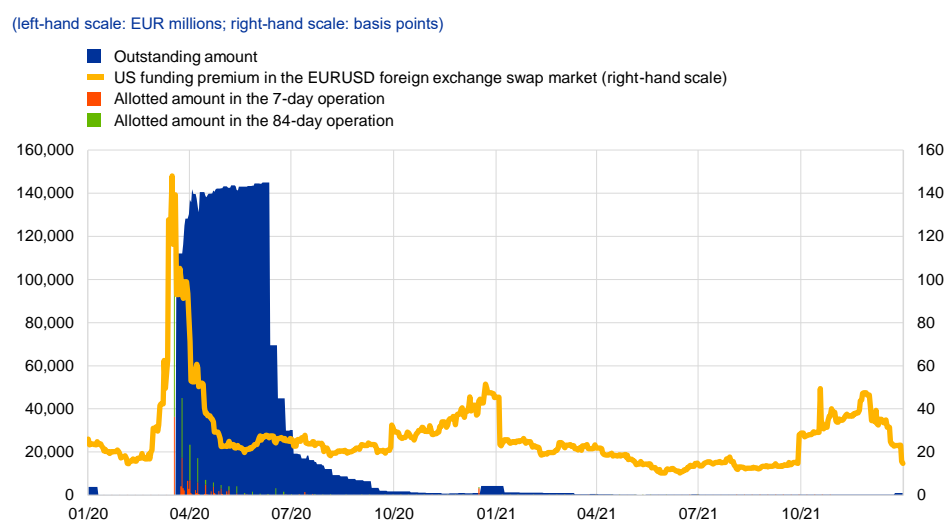
²⁰ See ECB (2021b).

²¹ For instance, the 3-month US funding premium in the EUR/USD foreign exchange swap market peaked at roughly 140 basis points on 19 March 2020, surging from a daily average of 20 basis points during January and February 2020 (Chart 9).

²² In October 2008, when the fixed-rate full allotment tender procedures were introduced, the pricing of US dollar operations was changed from the rate charged in the Federal Reserve's Term Auction Facility (TAF) to a fixed rate of 100 basis points above the corresponding OIS rate. In November 2011, the price was further reduced to OIS + 50 basis points, which remained in place until 15 March 2020, when the Federal Reserve, the ECB, the Bank of Japan, the Bank of England, the Swiss National Bank and the Bank of Canada introduced a new pricing.

weekly tender with a maturity of 84 days in addition to the existing 7-day operation.²³ Shortly thereafter, the frequency of the 7-day tender was increased from weekly to daily.²⁴ These measures not only improved market sentiment by offering an effective backstop, but also allowed banks to meet their funding needs immediately, easing stress in US funding markets.²⁵ On 18 March 2020, the Eurosystem allotted USD 76 billion to 44 bidders under the 84-day operation and USD 36 billion to 22 bidders under the 7-day operation. The total allotment of USD 112 billion on 18 March was the highest in a single day since 2008. Usage of the facilities remained high during the rest of March and April 2020, with the outstanding amount of US dollars borrowed from the Eurosystem reaching an 11-year high of USD 145 billion in June 2020 (Chart 9).

Chart 9
USD funding conditions and usage of the Eurosystem USD facilities



Source: ECB and Bloomberg.

As US dollar funding conditions gradually normalised, recourse to US dollar tenders dropped, in line with the backstop function of the facility. Starting in the second half of April 2020, US funding conditions progressively improved, leading to a decline in usage of the US dollar facility, which quickly lost its economic appeal. Consequently, usage of US dollar swap lines dropped significantly over time. On 21 April 2020 the Eurosystem saw no bids for the first time since the onset of the pandemic, with nil-bid operations becoming increasingly frequent thereafter. In June 2020 the average allotment per operation was USD 250 million, against over USD 600 million in May and roughly USD 10 billion between mid-March and mid-April. The average take-up per operation remained low for the rest of 2020 and in 2021, standing at USD 136 million between September 2020 and December 2021 as US

²³ Enhancement of the swap line facilities was announced by the Federal Reserve, the ECB, the Bank of Japan, the Bank of England, the Swiss National Bank and the Bank of Canada on 15 March 2020. For more details, see the corresponding [press release](#). The 84-day US dollar operation was reactivated for the first time since 2014.

²⁴ For more details, see the corresponding [press release](#).

²⁵ ECB (2020c).

dollar financing conditions broadly continued to be favourable.²⁶ Following the improvement in US dollar funding conditions in offshore markets and the corresponding drop in the use of the US dollar facility, the frequency of the 7-day operation was gradually reduced from daily to three times a week from July 2020 and from three times a week to weekly from September 2020, while the weekly 84-day operation was discontinued from July 2021.

4.4 The Eurosystem repo facility for central banks (EUREP) and other repo agreements and foreign exchange swaps with foreign central banks

Foreign-exchange (FX) swap and repo lines are arrangements between central banks that are used to provide domestic banks with funding in foreign currencies. These operations have a backstop function aimed at preventing or easing cross-currency frictions. The swap line between the ECB and the Federal Reserve is, for example, used by the ECB to lend to US dollars to euro area banks with US dollar credit operations. Similarly, several FX swap and repo agreements²⁷, including the Eurosystem repo facility for central banks (EUREP), were established to increase euro availability to central banks outside the euro area.

These two types of arrangement are designed to help domestic banks, through the related credit operations offered by their respective central banks, to satisfy their foreign currency needs during periods of market stress, supporting the restoration of orderly market conditions. In normal times, there is little systematic use of these arrangements given that market pricing would be more favourable. However, if funding conditions become dysfunctional, as was the case at the onset of the COVID-19 pandemic, participation in the swap and repo lines becomes more attractive and helps banks to satisfy their structural and immediate funding needs, supporting the restoration of orderly market conditions. The mere existence of precautionary liquidity arrangements has a calming effect on investors, helping to maintain orderly market functioning.

The extension of the network of liquidity arrangements with other central banks also ensured access to foreign liquidity during the pandemic period. Following the outbreak of COVID-19, liquidity demand for precautionary and cash management purposes surged globally, while heightened risk aversion hindered the circulation of liquidity on a cross-border basis. Central banks around the world reacted by reactivating and extending their network of swap and repo lines. In particular, alongside the outstanding agreements, the Eurosystem swiftly reactivated

²⁶ Occasional spikes in participation in the US dollar facility were observed at quarter-ends and especially at year-ends, when, given tax considerations and regulatory requirements, banks are typically reluctant to expand their balance sheet for intermediation activities, leading to tighter US dollar funding conditions. However, during the review period, usage of the US dollar facility at quarter-ends remained in line with the seasonal trend and, overall, was limited to a few counterparties.

²⁷ From the Eurosystem perspective, swap line agreements allow the ECB to borrow foreign currency from a foreign central bank against euro, with the promise to repay the borrowed currency plus a pre-agreed interest rate on a specified future date. Under a repo line, a foreign central bank can borrow euro from the ECB for a specific period at a pre-agreed interest rate in exchange for eligible assets denominated in euro that are mobilised as collateral.

its swap line agreement with the Danish National Bank and set up temporary precautionary swap line agreements with the Croatian National Bank and the Bulgarian National Bank. In addition, the Eurosystem established temporary bilateral repo lines with several other non-euro area central banks, namely the National Bank of Romania, the Bank of Albania, the National Bank of North Macedonia, the National Bank of Serbia, the Central Bank of the Republic of San Marino and the Hungarian National Bank (Table 2). Finally, to complement the set of liquidity agreements arranged with non-euro area counterparties, the ECB introduced the Eurosystem repo facility for central banks (EUREP) in June 2020 as a precautionary backstop to address pandemic-related euro liquidity needs outside the euro area. Like other temporary pandemic-related measures, EUREP is a temporary facility and will be available until January 2023.²⁸

Table 2
Overview of operational liquidity lines

Non-euro area counterpart	Type of arrangement	Reciprocal
Българска народна банка (Bulgarian National Bank)	Swap line	No
Danmarks Nationalbank	Swap line	No
Hrvatska narodna banka	Swap line	No
Sveriges Riksbank	Swap line	No
Bank of Canada	Swap line	Yes
People's Bank of China	Swap line	Yes
Bank of Japan	Swap line	Yes
Swiss National Bank	Swap line	Yes
Bank of England	Swap line	Yes
Federal Reserve System	Swap line	Yes
Magyar Nemzeti Bank	Repo line	No
Banca Națională a României	Repo line	No
Bank of Albania	Repo line	No
National Bank of North Macedonia	Repo line	No
Central Bank of the Republic of San Marino	Repo line	No
National Bank of Serbia	Repo line	No

Source: ECB.

Note: The table does not include repo lines established with non-euro area central banks under EUREP, for which the ECB does not disclose its counterparties.

²⁸ In view of the highly uncertain environment caused by the Russian invasion of Ukraine and the risk of regional spillovers that could adversely affect euro area financial markets, on 10 March 2022 the Governing Council decided to extend the EUREP facility until 15 January 2023.

5 Counterparty framework

The Eurosystem counterparty framework sets the eligibility criteria that euro area credit institutions must comply with in order to be granted access to MPOs.²⁹ The framework is designed to ensure that a broad range of counterparties may participate in Eurosystem MPOs, while protecting the Eurosystem from the risk of a counterparty defaulting. Over the review period the Eurosystem counterparty framework was amended to: 1) introduce a more direct mapping of failures to meet minimum regulatory requirements to restrictions in counterparty access to Eurosystem MPOs, i.e. some automaticity in the application of discretionary measures, and 2) be aligned with the treatment of the leverage ratio requirement under the Capital Requirements Regulation (CRR)³⁰, which is relevant for assessing financial soundness as required under the GD.

5.1 Eligibility criteria and discretionary measures

Eligibility criteria for participation in Eurosystem MPOs remained largely unaltered in the review period. To qualify as an eligible counterparty, a credit institution needs to³¹:

1. be subject to Eurosystem's minimum reserve requirements;
2. be supervised by competent authorities;
3. be financially sound; and
4. fulfil the operational requirements of the local NCB for participation in MPOs.³²

The first requirement grants euro area credit institutions access to MPOs. The second and third requirements provide the Eurosystem with a first layer of risk protection. Financial soundness requires assessment by the Eurosystem, which may take into account prudential information on capital, leverage and liquidity ratios.³³

In 2021 the Eurosystem enhanced the efficiency and consistency of application of the counterparty framework. The Eurosystem may suspend, limit, or even exclude, an individual counterparty's access to MPOs if that counterparty is

²⁹ Monetary policy eligible counterparties (MPECs) are defined as counterparties having access to either liquidity-providing operations and/or liquidity-absorbing operations and/or to standing facilities. Counterparties for outright purchases are not MPECs. MPECs are a subset of euro area credit institutions subject to minimum reserve requirements, the number of such institutions having decreased from 4,462 to 4,308 during the review period.

³⁰ Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (OJ L 176, 27.6.2013, p. 1).

³¹ Article 55 of the General Documentation.

³² Access to Eurosystem MPOs is granted by the relevant NCB to counterparties that fulfil the eligibility criteria set in line with the decentralised monetary policy implementation in the euro area.

³³ Article 55a of the General Documentation.

in breach of the eligibility criteria.³⁴ Until 2021 the Eurosystem determined which of the three above-mentioned actions was warranted by assessing the specific case concerned.³⁵ On 1 January 2021 the Eurosystem adopted a more rule-based approach to this process aimed at enhancing its internal efficiency and ensuring consistent application of the framework across counterparties. Specifically, when own funds requirements are breached, the Eurosystem limits the counterparty's access to MPOs, on the grounds of prudence, to the level prevailing when that non-compliance is notified to the Eurosystem. If compliance with own funds requirements has not been restored at the latest within 20 weeks from the identification of the non-compliance, the counterparty's access to MPO is suspended. Similarly, if the required information related to own funds requirements is incomplete or not available, the Eurosystem may limit a counterparty's access to MPOs 14 weeks after the reference date, and may suspend the counterparty after 20 weeks.³⁶ Over the review period, 17 banks were the subject of Eurosystem discretionary measures, namely three limitations and 14 suspensions.³⁷

The counterparty framework rules relevant for assessing financial soundness were amended in line with the relevant EU prudential regulation. To ensure consistency with the regulatory framework, the Eurosystem adopted the relevant definitions under the CRR. Consequently, on 28 June 2021, when the regulatory requirement making the leverage ratio binding came into force³⁸, the Eurosystem aligned treatment of the leverage ratio requirement in the Eurosystem counterparty framework with that of the existing Pillar 1 own funds requirements.³⁹ Since then, fulfilment of the leverage ratio requirement has been monitored on a regular basis as is the case with capital ratios. Accordingly, breaches and incomplete reporting of the leverage ratio trigger the discretionary measures explained above.

5.2 Counterparties' developments

Over the review period the number of monetary policy eligible counterparties (MPECs) continued to decrease, mainly on the back of consolidation of the EU banking sector. By the end of 2021, 1,869 credit institutions classified as MPECs (out of the 4,308 credit institutions in the euro area at the end of the reference period). The change in the number of MPECs was mainly driven by corporate events that to some extent reshaped the EU banking system, with a net overall decrease in MPECs of 148 over the review period (Chart 10a). The net decrease was mainly due

³⁴ Article 158 of the General Documentation.

³⁵ If a counterparty is suspended or excluded from access to MPOs, it must repay the outstanding credit operations (including accrued interest) in full, by a date decided by the Eurosystem. Under a limitation, the counterparty does not have to repay its outstanding credit operations (but may not increase its borrowed amount). The Eurosystem may revoke a limitation or suspension, but exclusions are expected to be permanent.

³⁶ Where this occurs, just as before 2021, the Eurosystem may limit access to MPOs once the reporting breach is detected and until either (1) the counterparty reports the relevant information, or (2) the counterparty is suspended.

³⁷ Of these banks, 5 counterparties re-gained access to MPOs during the review period.

³⁸ The binding leverage ratio requirement is usually 3%, unless adjusted in accordance with Article 429a(7) of Regulation (EU) No 876/2019 (CRR2).

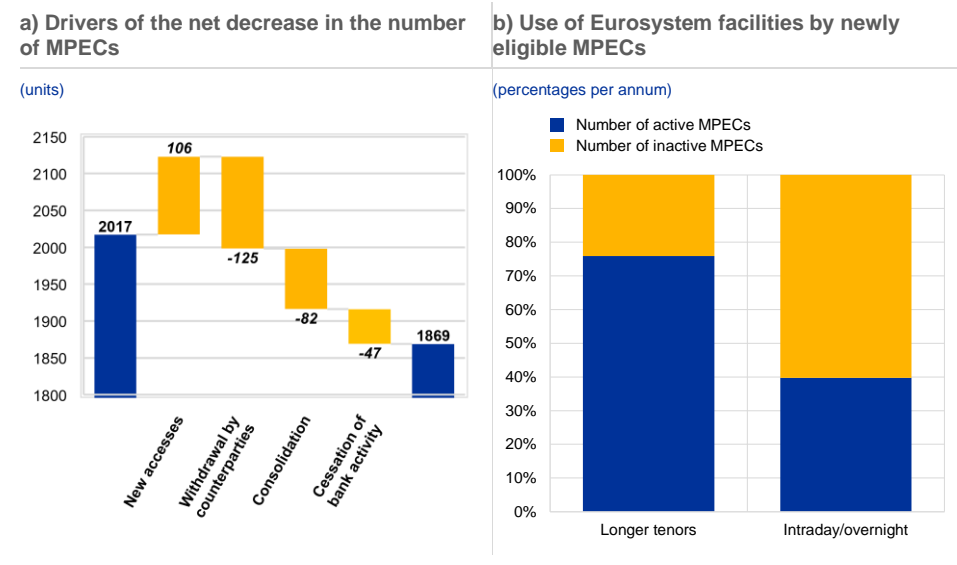
³⁹ Common Equity Tier 1 capital ratio (4.5%), Tier 1 capital ratio (6%), total capital ratio (8%).

to the voluntary withdrawal by the counterparties concerned from their status as Eurosystem eligible counterparties, followed, in order of relevance, by consolidation activities, cessation of activity due to the withdrawal of banking licences, liquidations and closures (typically of foreign branches). At the same time, some new banks were established across the euro area, thereby partially offsetting the decrease.

The majority of new MPECs participated in at least one credit operation, while access requests for intraday credit and the MLF were mainly precautionary.

When applying for access to Eurosystem credit operations, credit institutions may also request access to Eurosystem MPOs, including the standing facilities and intraday credit, depending on their business needs. In the period under review more than 70% of new eligible counterparties, amounting in total to 63 new MPECs, participated in one or more credit operations soon after having become eligible, while the remainder mainly requested access on precautionary grounds. Just 40% had recourse to intraday credit or overnight credit through the MLF (Chart 10b). This suggests that the intention to participate in longer tenor operations, such as TLTRO III operations, may have been the main driver for new access requests over the review period.

Chart 10
Developments in MPECs



Source: ECB
Notes: the left panel: 'New MPEC accesses' identify either new banks or banks that have requested access as an eligible counterparty to any Eurosystem facility in the review period. 'Withdrawal by counterparties' identifies banks that voluntarily withdrew from Eurosystem facilities. 'Consolidation' identifies the net figure for merger and acquisition activity in terms of legal entities having access to Eurosystem facilities. 'Cessation of bank activity' identifies banking licence withdrawals, and bank closures or liquidation. The right panel: 'active MPECs' identifies newly eligible MPECs that made use of the facility at least once in the period under review; 'inactive MPECs' identifies newly eligible MPECs that made no use of the facility in the period under review. 'Longer tenors' refers to MROs, LTROs and TLTROs. 'Intraday/overnight' identifies use of intraday credit and/or marginal lending facilities by the end of the day.

6 Collateral framework

The Eurosystem collateral framework regulates the collateralisation of Eurosystem credit operations and provides a second layer of protection against counterparty default⁴⁰. In the period under review, the temporary collateral easing measures in response to the pandemic were the major innovation. In addition, the Eurosystem extended collateral eligibility to sustainability-linked bonds, made the necessary adaptations following Brexit and introduced adjustments to increase transparency and reduce the overall complexity of the Eurosystem collateral framework.⁴¹

6.1 Changes to the collateral framework

Collateral rules were temporarily broadened in response to the emergency created by the COVID-19 pandemic. The Eurosystem introduced temporary collateral easing measures in April 2020⁴², these being further extended in December 2020 until June 2022. The measures included an increase in the types of credit claims that were eligible as collateral (including loans benefiting from the guarantee schemes adopted in euro area Member States in response to the pandemic), the maintenance of eligibility – under some conditions – for assets that fulfilled credit quality requirements at the onset of the pandemic, a reduction in collateral valuation haircuts by a fixed factor of 20%, and a waiver of the minimum rating requirement for marketable debt securities issued by the Hellenic Republic. These measures were introduced to facilitate the availability of eligible collateral for Eurosystem counterparties to be able to participate in liquidity-providing operations, such as the TLTRO III series, and to facilitate an increase in bank funding against loans to corporates and households. ECB estimates suggest that collateral easing measures have contributed to approx. 23% of the total increase in the value after haircuts of mobilised collateral since the start of the pandemic and account for 10% of the currently mobilised collateral (Chart 11)⁴³. The increase in collateral value due to these collateral easing measures was predominantly driven by the expansion of additional credit claim frameworks (€162 billion) and by the temporary haircut reduction (€113 billion). In March 2022 the ECB announced the gradual phase-out of the pandemic collateral easing measures in three stages between July 2022 and March 2024⁴⁴.

⁴⁰ For further information on how the collateral framework has been developed over the years, see Bindseil et al. (2017).

⁴¹ See Guideline (EU) 2020/1690 of the European Central Bank of 25 September 2020 amending Guideline (EU) 2015/510 on the implementation of the Eurosystem monetary policy framework (ECB/2020/45).

⁴² For further details, see the ECB press releases of [7 April 2020](#) and [22 April 2020](#).

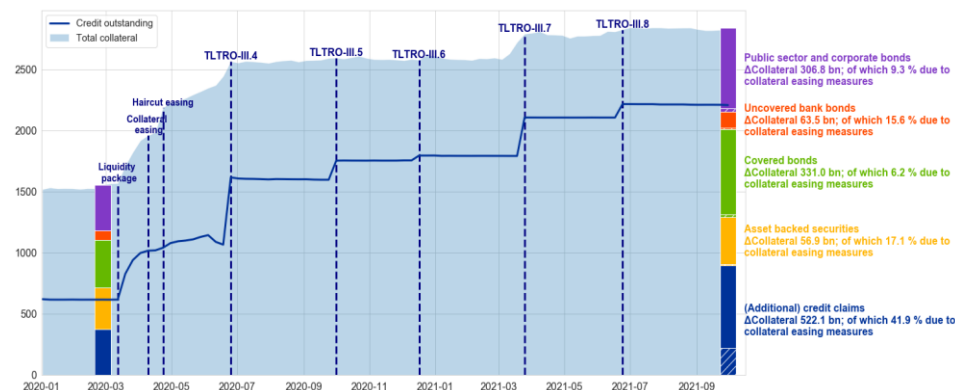
⁴³ The analysis covers the period between 27 February 2020 and 30 September 2021.

⁴⁴ For further details, see the ECB press release of [24 March 2022](#).

Chart 11

Impact of temporary collateral easing measures on mobilised collateral value

(EUR billions)



Source: ECB, Eurosystem and ECB calculations.

Notes: The bar chart shows the mobilisation of Eurosystem-eligible collateral by asset category, and the values are after valuation and haircuts. The first observation shows the composition of collateral before the outbreak of the pandemic, on 27 February 2020. The cross-shaded areas in the bars on the right-hand side show the total collateral value due to the collateral easing measures for the respective asset category on 30 September 2021.

The expansion of the additional credit claim (ACC) frameworks significantly increased the availability of non-marketable assets as collateral. The revised framework has allowed NCBs to additionally accept loans to small and medium-sized enterprises or self-employed individuals as collateral provided that they are covered by COVID-19-related government and other public sector guarantee schemes.⁴⁵ In addition, several other measures were implemented to broaden the availability and ease the mobilisation of ACCs.⁴⁶ Box 2 reviews the principles behind acceptance of government/public sector guaranteed loans into the ACC framework.

The eligibility ‘freeze’ shielded collateral from potential downgrades that could have reduced the availability of marketable assets. At the outbreak of the pandemic, a sudden shortage in collateral availability due to a wave of potential downgrades could have depressed banks’ lending activity and exacerbated the crisis in a procyclical manner. To pre-empt this, on 7 April 2020 the Eurosystem temporarily froze the eligibility of marketable assets that fulfilled minimum credit quality requirements, provided that the asset ratings remained above credit quality step 5⁴⁷ and all other eligibility requirements were fulfilled. Assets that fell below the minimum credit quality requirements were subject to haircuts based on their actual

⁴⁵ The ACC framework was introduced in 2012 and regulates credit claims that do not fulfil all the eligibility criteria applicable under the general collateral framework. Until the 2020 extension, ACCs included pools of loans to households as well as pools of similar kinds of loans, consisting of, for instance, corporate loans, small and medium-sized enterprise (SME) loans, consumer loans or mortgages (consumer loans and mortgages are loans to households; individual ACCs include only loans to corporates/SMEs). ACCs could also be of lower credit quality than the generally accepted credit claims or be denominated in currencies other than the euro.

⁴⁶ The measures included: 1) expansion of the scope of acceptable credit assessment systems. For example, several NCBs with an in-house credit assessment system (ICAS) decided to complement their existing ICASs with more resource-efficient statistical ICAS (see Box 1 in Auria et al. (2021)) and other NCB-specific credit assessment approaches, or by easing acceptance of banks’ own credit assessments from internal rating-based systems that were approved by supervisors; 2) a reduction in ACC loan level reporting requirements. In addition, it should be noted that some NCBs created new ACC frameworks or expanded their existing ACC frameworks to features were already acceptable before the pandemic.

⁴⁷ Equivalent to a rating of BB. For ABS the threshold of credit quality step 4 (BB+) applied.

ratings. Additionally, under the temporary changes introduced in response to the pandemic, NCBs were permitted to accept as collateral marketable debt securities issued by the Hellenic Republic, for which the minimum rating requirement was temporarily waived.

The Eurosystem further supported the provision of credit by increasing its risk tolerance by lowering the haircuts applied, by increasing the concentration limit for unsecured bank bonds, and by lowering the minimum size threshold for domestic credit claims. First, valuation haircuts were temporarily reduced by a fixed factor of 20% across all eligible marketable and non-marketable collateral asset categories, thereby tolerating more risk on the Eurosystem's balance sheet in response to the COVID-19 pandemic crisis⁴⁸. Second, the concentration limit for unsecured bank bonds was increased from 2.5% to 10%, enabling counterparties to hold a larger share of such assets in their collateral pools. Third, the Eurosystem lowered the minimum size threshold for domestic credit claims⁴⁹ from €25,000 to €0 to facilitate the mobilisation as collateral of loans to small corporate entities.

As part of the regular collateral framework development, the Eurosystem began accepting sustainability-linked bonds (SLBs). From 1 January 2021, SLBs started to be accepted as collateral for Eurosystem credit operations, as well as for outright purchases for monetary policy purposes, provided that they complied with all the other eligibility criteria. Specifically, such bonds were deemed to be eligible as collateral if they had coupon structures linked to certain sustainability performance targets relating to one or more of the environmental objectives set out in the EU Taxonomy Regulation and/or to one or more of the United Nations Sustainable Development Goals relating to climate change or environmental degradation. This decision further broadened the universe of Eurosystem-eligible marketable assets and signalled the Eurosystem's support for innovation in the area of sustainable finance.

From 1 January 2021, after the end of the Brexit transition period, certain marketable and non-marketable assets became ineligible. There are various references to the EU, EEA and non-EEA G10 assets in the GD and the temporary frameworks which resulted in the ineligibility of some assets. However, certain other

⁴⁸ The temporary haircut reduction by 20% complemented the Governing Council decision at the same time to adjust the haircuts applied to non-marketable assets as part of the regular review of its risk control framework.

⁴⁹ The minimum size threshold for domestic credit claims is non-uniform between NCBs, that can decide on a higher minimum amount for their jurisdiction.

assets linked to the United Kingdom remained eligible following the change of United Kingdom's status to a non-EEA G10 country on 1 January 2021⁵⁰.

6.2 Eligibility and mobilisation of collateral

Most of the increase in eligible marketable assets during the review period was due to government securities on the back of significant issuances. Between the first quarter of 2020 and the fourth quarter of 2021 eligible marketable assets increased from €14,296.3 to €16,352.6 billion, around 76% of which was attributable to government securities (Chart 12a). These developments were mainly attributable to the fiscal response to the COVID-19 crisis in terms of government issuances. The remaining increase was due to corporate bonds, covered bonds and other marketable assets⁵¹. On the other hand, eligible unsecured bank bonds and asset-backed securities decreased by approximately €85 billion on aggregate.

⁵⁰ Since 1 January 2021, the following assets have no longer been eligible as a direct consequence of the United Kingdom having left the EU and the EEA: (i) unsecured debt instruments issued by credit institutions or investment firms, or by their closely-linked entities, that are established in the United Kingdom (Article 81a of the "General framework"); (ii) asset-backed securities whose issuer or originator is established in the United Kingdom (Article 74 of the "General framework"); (iii) asset-backed securities in which the acquisition of the cash-flow-generating assets by the special purpose vehicle (SPV) is governed by UK law (Article 75 of the "General framework"); (iv) asset-backed securities in which clawback rules are governed by UK law (Article 76 of the "General framework"); (v) assets denominated in pounds sterling, yen or US dollars whose issuer is established in the United Kingdom (Article 7 of the "Temporary framework"); (vi) assets with guarantees governed by UK law or where the guarantor is established in the United Kingdom, unless the guarantee is not needed to establish the credit quality requirements for the specific debt instrument (Articles 114(4) and 70 of the "General framework"); (vii) credit claims for which the facility agent is a credit institution located in the United Kingdom (Article 104(4) of the "General framework"); (viii) debt instruments listed on the London Stock Exchange other than those admitted to trading on at least one acceptable market as defined by Article 68(1) of the "General framework" and meeting all the other eligibility criteria. Based on the United Kingdom's status as a non-EEA G10 country, euro-denominated debt instruments issued by entities established in the United Kingdom, but which do not fall into the categories listed above, continue to be accepted as eligible collateral (in line with Article 70 of the "General framework").

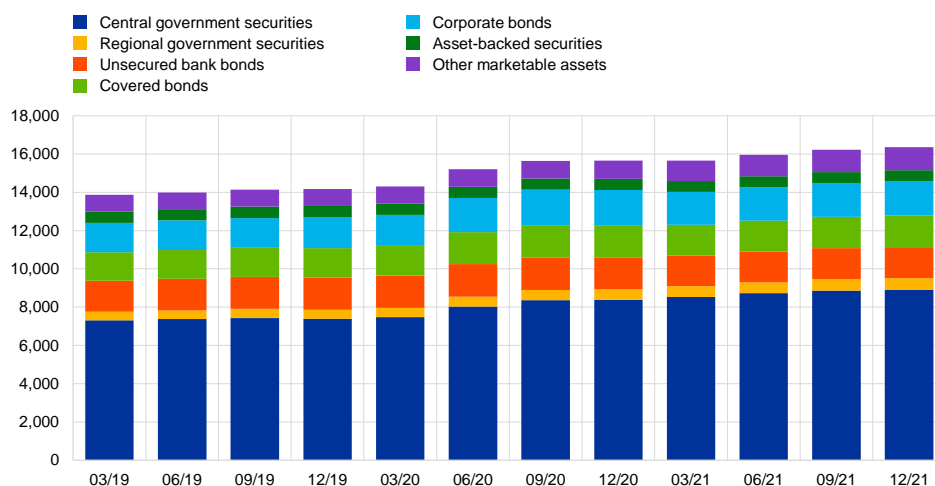
⁵¹ Other marketable assets include debt issued by supranational issuers and agencies.

Chart 12

Eligible marketable assets and use of collateral

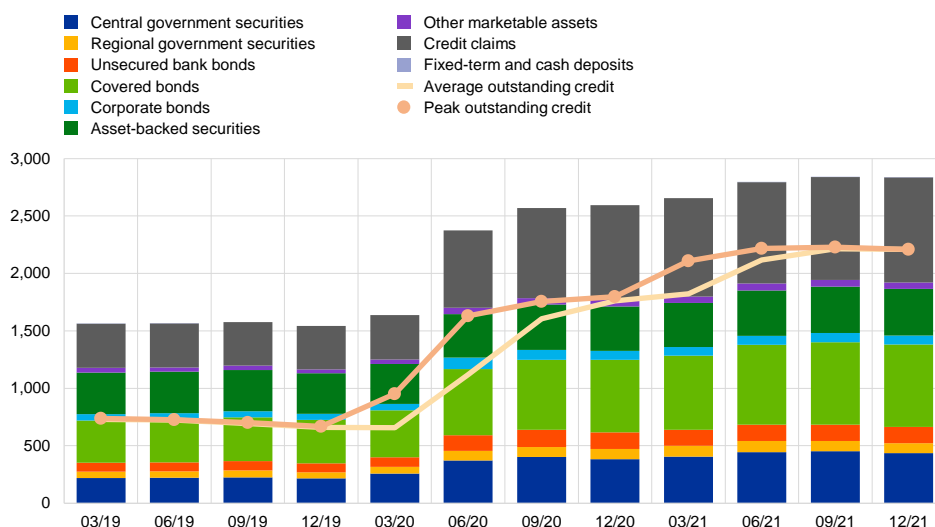
a) Eligible marketable assets

(EUR billions)



b) Use of collateral and outstanding credit

(EUR billions)



Source: ECB and ECB calculations.

Non-marketable assets represented the bulk of the increase in mobilised collateral over the review period.

Following the collateral easing measures introduced in 2020, mobilised collateral increased considerably, from €1,636.1 billion in the first quarter of 2020 to €2,838.8 billion at the end of 2021 (Chart 12b). Credit claims (including additional credit claims) accounted for the largest share of the increase during the review period (around 44%), mostly on the back of the expansion of the ACC framework. Overall, mobilised credit claims more than doubled in amount, from €384.9 billion in the first quarter of 2020 to €914.9 billion at the end of 2021. For marketable assets, the largest increases in amounts mobilised were recorded for covered bonds (around 26% of the overall increase), followed by government securities (around 17% of the overall increase). Unsecured bank bonds,

asset-backed securities, corporate bonds and other marketable assets were used to a lesser extent and accounted for 13% of the overall increase.

Box 2

Acceptance of loans guaranteed by public guarantee schemes within the ACC framework

At the outbreak of the COVID-19 pandemic, the European Commission adopted the State aid temporary framework to support the economy and address the liquidity shortage faced, in particular, by non-financial corporates. As one of its measures, this temporary framework enabled EU Member States to provide public guarantees on loans to ensure that banks kept providing credit to their business customers. Most EU Member States therefore launched public guarantee schemes. Through those schemes, EU Member States committed to cover a large portion of the associated credit risk (up to 100%) and potential losses, the remainder being covered by credit institutions.

Following this development and as part of its response to the outbreak of the pandemic, the Eurosystem decided to accept as collateral within its ACC framework loans guaranteed by public guarantee schemes. This collateral was subject to additional risk control measures given that the features of such guarantee schemes do not comply with the Eurosystem's ordinary requirements for guarantees. This new feature of the Eurosystem ACC framework was aimed at facilitating banks' recourse to central bank liquidity (e.g. TLTRO III series) against loans to corporates and small businesses in response to the liquidity shock experienced by both the banking sector and the real economy. Without such guarantees, those loans would have been subject to higher risk-related haircuts or, particularly in the case of newly originated loans, would have been ineligible under the Eurosystem collateral framework because they did not provide sufficient protection and because of the potentially higher default probability of the underlying debtors under the economic circumstances that existed at that time. The provision of public guarantees on loans served as a credit-enhancing tool that made it possible for NCBs to temporarily accept the underlying assets as collateral. Those loans could therefore be used as collateral together with the credit claims accepted under the permanent framework and those (individual and pools) accepted as ACC collateral under the temporary framework.

ACCs are a tool at NCBs' disposal for increasing collateral availability by allowing banks to transform otherwise ineligible credit claims with low opportunity cost into central bank liquidity, especially at times of significant liquidity shortages. The large volume of loans on banks' balance sheets allows them to generate ample amounts of collateral – after application of appropriately calibrated haircuts – which can be used to borrow with the Eurosystem. In parallel, in terms of refinancing, banks can still mobilise more liquid assets with a higher opportunity cost, such as government bonds, as Eurosystem collateral or, alternatively, use such assets to refinance on the repo market, depending on the situation of the individual bank and on possible pockets of collateral scarcity on the repo market. As a by-product, by transforming illiquid assets into central bank reserves (i.e. high-quality liquid assets (HQLAs)), the increased level of HQLAs facilitates the fulfilment of counterparties' LCRs.

Whether or not to adopt and/or expand an ACC framework and its final specification are a matter of national discretion, meaning that NCBs can adapt the rules governing the eligibility and use of ACCs to their specific national requirements to meet specific collateral needs in their respective jurisdictions. This national discretion proved to be particularly relevant in this case given the heterogeneity in the legal implementation of the public guarantee schemes across jurisdictions. At

the same time, Governing Council oversight ensured a common minimum risk control framework across the euro area.

The acceptance of ACCs covered by public guarantees required significant resources across the Eurosystem. NCBs willing to expand their ACC framework conducted a risk management, legal and operational assessment of their jurisdiction's public guarantee scheme in order to appropriately adjust their risk control frameworks, and adapted their internal collateral management systems to accept the new type of credit claims as collateral. Overall, out of the 17 NCBs that have approved ACC frameworks in place, 11 adapted their eligibility requirements and risk control framework to account for the features of their national public guarantee schemes. Although recourse to ACCs differed substantially across NCBs' counterparties, by the end of 2021 multiple counterparties mobilised credit claims benefiting from public guarantee schemes, representing some 22% of the total Eurosystem ACC collateral.

7 Asset purchase programmes

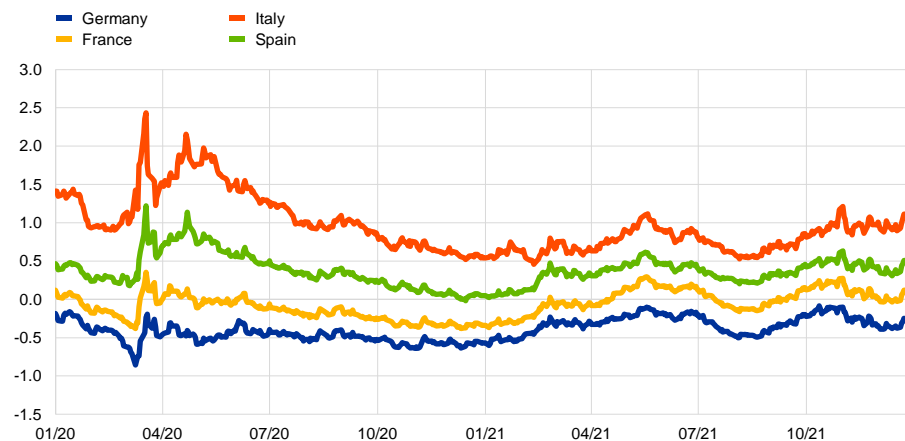
Asset purchases are generally an important tool to support the monetary policy transmission mechanism and to provide the degree of policy accommodation needed to ensure price stability. Several asset purchase programmes were introduced over the past decade to complement the regular MPOs of the Eurosystem. The ongoing APP has been conducted since 2014 and aims to enhance the accommodative stance of monetary policy in an environment where interest rates are at or close to their effective lower bound. In addition, the PEPP was launched to counter the serious risks to the monetary policy transmission mechanism and to the outlook for euro area price stability posed by the COVID-19 outbreak (Chart 13). The PEPP therefore had a dual role. First, the asset purchases under the PEPP delivered the monetary accommodation required to ensure that medium-term price stability continued to be preserved by supporting the economic recovery from the pandemic crisis. Second, the flexible nature of the PEPP across time, asset classes and jurisdictions was designed to fulfil a market stabilisation role in an efficient manner. This section covers the main developments in the implementation of the APP and PEPP over the reference period.

7.1 Pandemic emergency purchase programme

The Eurosystem's PEPP was one of the key responses to the outbreak of the pandemic. The programme was announced on 18 March 2020, and initially consisted of an envelope of purchases amounting to €750 billion. After two increases – €600 billion on 4 June 2020 and €500 billion on 10 December 2020 – the envelope amounts to a total of €1,850 billion. Net purchases under the programme ended in March 2022. The maturing principal payments from securities purchased under the PEPP will be reinvested until at least the end of 2024.

Chart 13**10-year government bond yields of selected countries**

(percentages per annum)

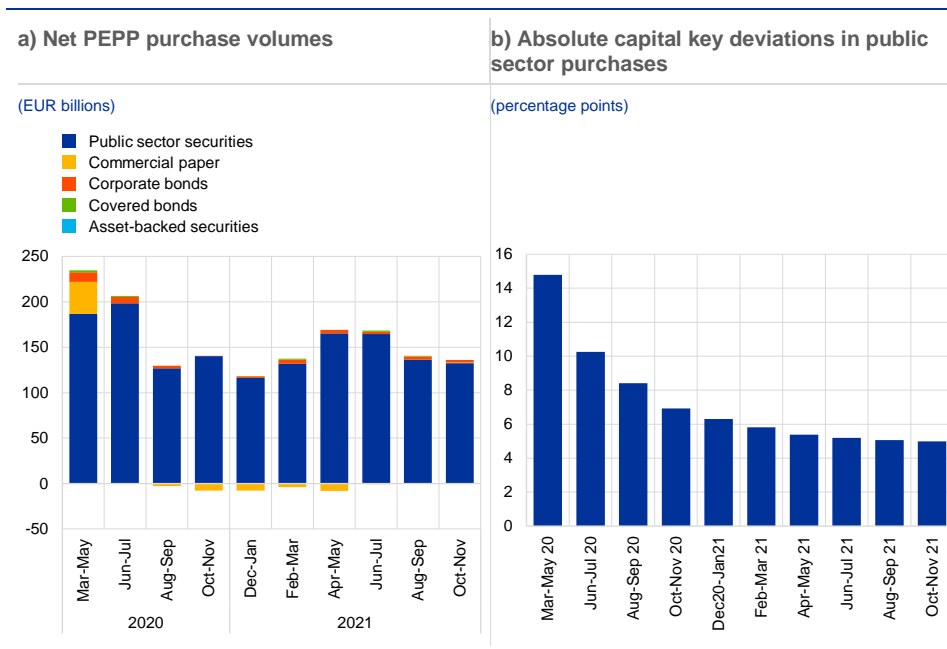


Source: ECB.

The design of the PEPP entailed flexibility of purchases over time, asset categories and jurisdictions, allowing the programme to be effective as a market stabiliser. While the benchmark allocation for purchases of public sector securities was based on the Eurosystem capital key of the NCBs, the actual purchases could be conducted in a flexible manner, likewise over time and across asset classes, on the basis of market conditions (Chart 14). This design feature ensured that the PEPP could fulfil a market stabilisation role. Moreover, in addition to the asset categories eligible under the existing APP, a waiver of the eligibility requirements was granted for securities issued by the Greek Government. Finally, the eligibility of non-financial CP under the CSPP was expanded to include securities with a remaining maturity of at least 28 days. These securities could be purchased under both the CSPP and the PEPP. The residual maturity of public sector securities eligible for purchase under the PEPP range from 70 days up to a maximum of 30 years and 364 days.

PEPP holdings amounted to €1.581 trillion by the end of 2021, reflecting the flexible nature of the PEPP. The overall purchase volumes peaked in the first few months of the programme, with monthly volumes exceeding €100 billion a month in April, May and June 2020. The majority of PEPP holdings were securities issued by public sector entities, totalling €1,531 billion and representing over 97% of the total volume. While deviations from the capital key have decreased to five percentage points, they amounted to more than 14 percentage points in the March to May 2020 period, illustrating the flexibility of the tool. Moreover, a substantial amount of (corporate) CP was bought in the first three months of the PEPP, amounting to €35.4 billion. Due to the substantially lower purchases in subsequent months and the short maturities of those securities, the outstanding holdings of CP in the PEPP declined to below €4 billion at the end of 2021. At the end of that same year, PEPP holdings in covered bonds and corporate bonds (excluding CP) accounted for €6 billion and €40 billion respectively. See Box 3 for the role of the PEPP in the stabilisation and reduction of volatility in the European government bond market.

Chart 14
PEPP flexibility



Source: ECB and ECB calculations.

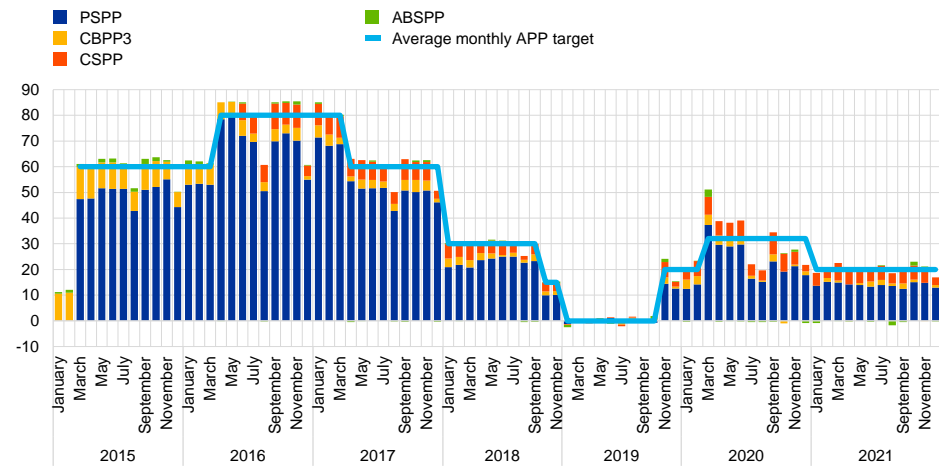
7.2 Asset purchase programme

The APP continued to support broad-based monetary accommodation during the review period. At the start of 2020, net purchases under the APP amounted to €20 billion per month. These monthly amounts were complemented by an additional envelope of €120 billion on 12 March 2020 to “support favourable financing conditions for the real economy in times of heightened uncertainty”. The additional envelope was used until the end of 2020. The APP consists of the public sector purchase programme (PSPP) and the three smaller private sector programmes, covering corporate bonds (the CSPP), covered bonds (the covered bond purchase programme series 3 (CBPP3)) and asset-backed securities (the asset-backed securities purchase programme (ABSPP)). There were no material changes in the design of the APP in the review period. The actual monthly profile of net purchases often diverged somewhat from the average purchase pace set by the Governing Council, reflecting seasonal fluctuations in market liquidity. Holdings at amortised cost under the APP increased from €2.58 trillion in December 2019 to €3.12 trillion in December 2021 (Chart 15).

Chart 15
APP purchases

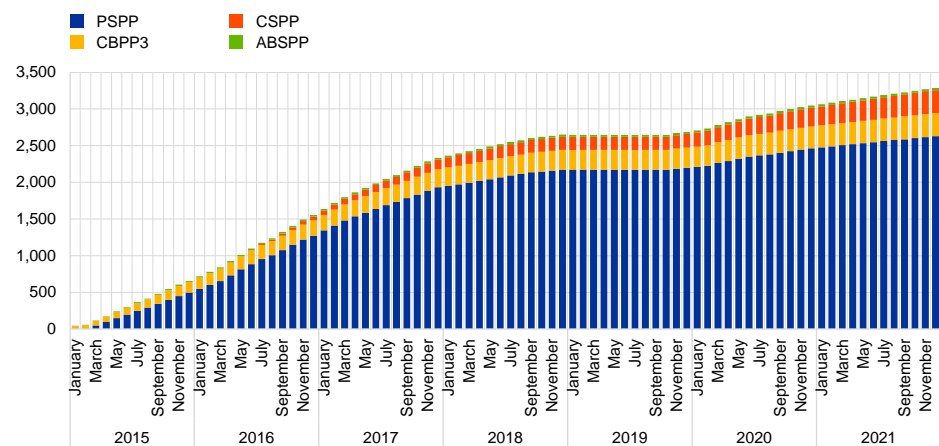
a) Monthly purchases

(EUR billions)



b) Cumulative purchases

(EUR billions)



Source: ECB. Note: holdings at amortised cost. For Chart a, the additional envelope of €120 billion decided by the Governing Council on 12 March 2020 has been linearised for illustration purposes, although it was implemented in full in accordance with the established principles but with additional flexibility.

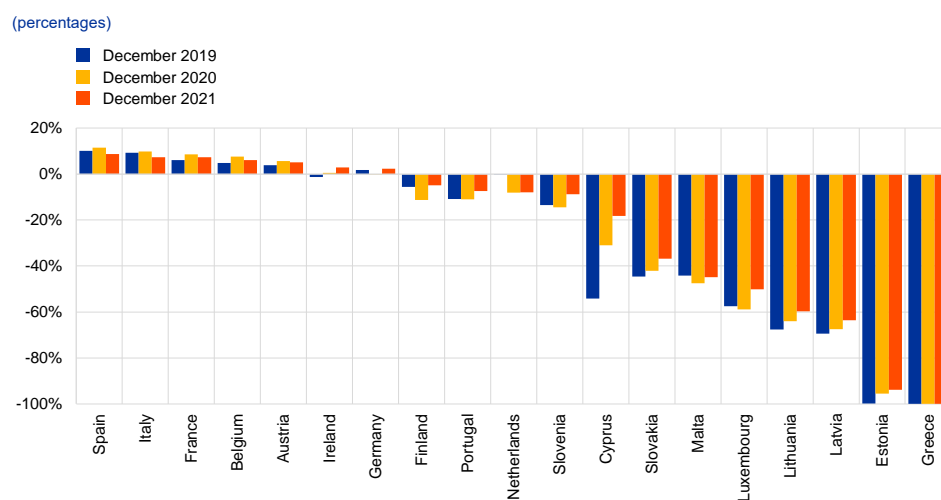
Public sector purchase programme

The PSPP was announced in January 2015. Under the PSPP purchases are limited to the secondary market. The allocation of purchases across eligible jurisdictions is guided, on a stock basis, by the respective NCBs' subscription to the ECB's capital key, as amended over time. A new capital key came into effect on 1 February 2020⁵². Cumulative net PSPP purchases increased by €405 billion during the period under review and amounted to €2,603 billion at the end of the fourth quarter of 2021. Since December 2018 the bonds issued by governments and recognised agencies have made up around 90% of the total Eurosystem portfolio,

⁵² See the corresponding ECB [press release](#).

while securities issued by international organisations (and also, under the Next Generation EU (NGEU) investment and reform programme – see Box 4) and multilateral development banks account for around 10%. The portfolio allocation of purchases across jurisdictions continues to be adjusted with a view to bringing the share of the PSPP portfolio into closer alignment with the ECB capital key, subject to issue and issuer limits, the principle of market neutrality, and other programme constraints. Chart 16 shows the end-of-year relative deviations from the jurisdictions' shares as determined by the Eurosystem capital key. Large deviations for Greece and relatively small jurisdictions reflect the ineligibility of Greece and limited availability of securities, respectively. Declining deviations from the capital key over 2021 in most jurisdictions highlight the commitment to reduce such deviations whenever the conditions permitted.

Chart 16
PSPP relative capital key deviations



Source: ECB.
Note: holdings at amortised cost.

Private sector purchase programmes (CSPP, CBPP3 and ABSPP)

The private sector programmes are conducted on the basis of benchmarks that are broadly in line with market capitalisation. These asset purchase programmes are built on the eligibility criteria of the collateral framework for the specific asset categories concerned. The respective benchmarks reflect all eligible outstanding assets on a proportional basis. In day-to-day implementation of the programmes, bond purchases are responsive to the availability and liquidity of individual bonds. Purchases under the private programmes are generally conducted in both the primary and the secondary markets, but only on the secondary market for public sector entities under the CSPP. Table 3 provides an overview of the main settings for the private sector programmes.

Table 3

Implementation of private sector programmes

	Start of the purchases	Implemented by	Holdings at end 2019	Holdings at end 2021	Redemptions over 2020-2021	Share of primary market purchases at end 2021
CSPP	Jun 2016	Six NCBs, ECB coordination	€185 billion	€310 billion	€35.3 billion	22.9%
CBPP3	Oct 2014	Twelve NCBs and the ECB	€264 billion	€299 billion	€63.4 billion	36.2%
ABSPP	Nov 2014	Six NCBs, ECB coordination	€28 billion	€29 billion	€20.5 billion	65.4%

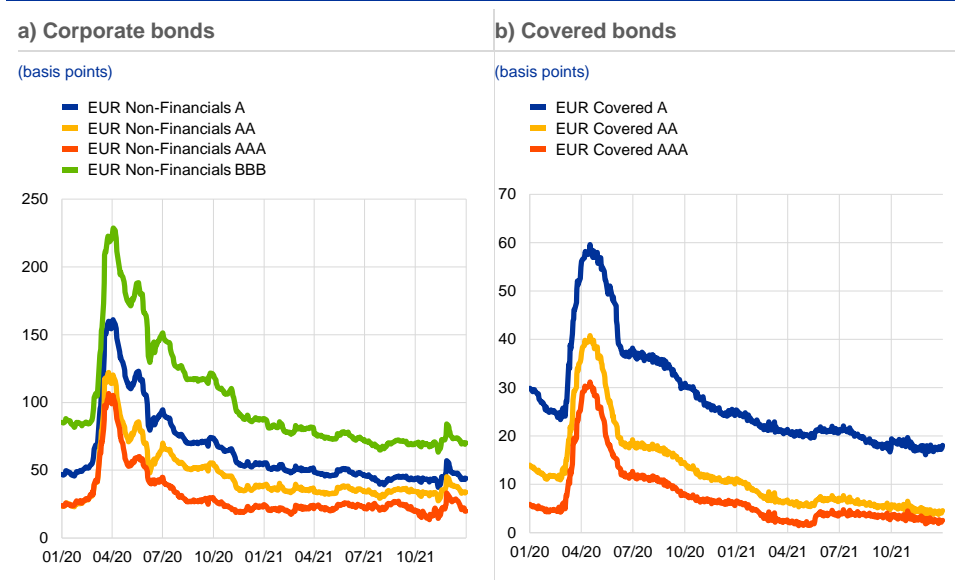
Source: ECB.

Private sector holdings increased by €161 billion over the review period. The greatest contribution to the increase came from the CSPP, under which holdings increased by €125 billion. Overall, holdings under the private sector programmes are increasingly being reduced by redemptions. Redemptions in 2020 and 2021 amounted to €119.2 billion, lowering the net impact of gross purchases.

Asset swap spreads for non-financial corporate bonds were very volatile in 2020. They peaked in March-April 2020, and kept declining during the rest of the review period. Strong Eurosystem presence was one of the drivers of the decrease in volatility (Chart 17). The spreads progressively tightened after the additional monetary policy measures related to the pandemic started to take effect. Spread levels remained relatively stable in 2021.

Chart 17

Asset swap spreads per rating class



Source: IHS Markit iBoxx indices.

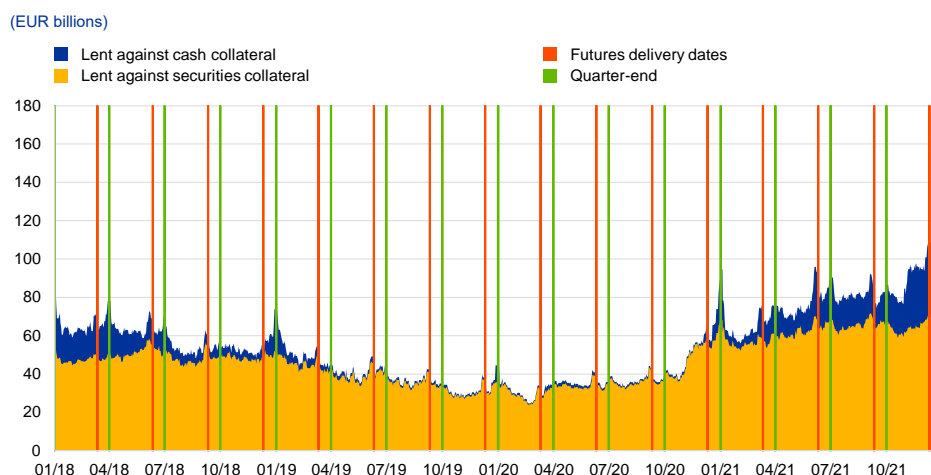
7.3 Securities lending programmes

The Eurosystem offers securities lending programmes to support bond and repo market liquidity without unduly curtailing normal repo market activity. As a side effect of the purchase programmes, the decline in the free float of securities in financial markets could potentially have negative effects on market functioning. In order to prevent or alleviate such side effects, the Eurosystem offers the majority of its asset holdings for securities lending (PEPP, PSPP, CSPP and CBPP1, 2 and 3, as well as the Securities Markets Programme (SMP)). In addition to securities, counterparties are also allowed to place cash as collateral in PSPP and public sector PEPP securities lending facilities. This cash collateral variant of securities lending is subject to an overall limit, which was increased from €75 billion to €150 billion in November 2021 to reflect, inter alia, the increase in the stock of acquired assets over time and also to serve the purpose of a backstop.

The PSPP and public sector PEPP securities lending on-loan balance was increasing during the period under review. In 2020 the average monthly on-loan balance in the Eurosystem was €39.2 billion, of which €1.8 billion was borrowed against cash collateral. This increased to an average monthly on-loan balance of €80.7 billion in 2021, of which €17.7 billion was borrowed against cash collateral. The peaks in usage of the Eurosystem facilities occurred at quarter-ends and ahead of futures delivery dates (Chart 18).

Chart 18

PSPP and public sector PEPP securities lending



Source: ECB.

Note: On-loan balance of securities, lent by the Eurosystem.

Box 3

The role of the PEPP in the stabilisation and reduction of volatility in the European government bond market

In times of acute stress, falling asset prices and higher credit risk reduce the capacity of financial intermediaries to bear risk when duration supply (e.g. through government issuances) increases. In those situations, asset purchases help stabilise the markets when conducted in large volumes and

in a flexible manner. Large purchase volumes mitigate temporary supply and demand imbalances, while flexibility makes it possible to target specific asset segments, thereby addressing market segmentation. Overall, PEPP contributed to a reduction in yield spreads, which was more significant in size compared with the PSPP⁵³. At the same time, PEPP contributed to a reduction in the volatility. Lower volatility reduces the risk faced by market operators and thus facilitates portfolio rebalancing towards riskier assets. As a result, compressed volatility supports the smooth transmission of the monetary policy stimulus generated by purchase programmes. Flexibility plays an important role also in reducing volatility in the market, since purchases can be distributed over time to when they are most needed⁵⁴.

This box provides insights into changes in indicators of the functioning of markets, such as market volatility and correlations between government bond yields.

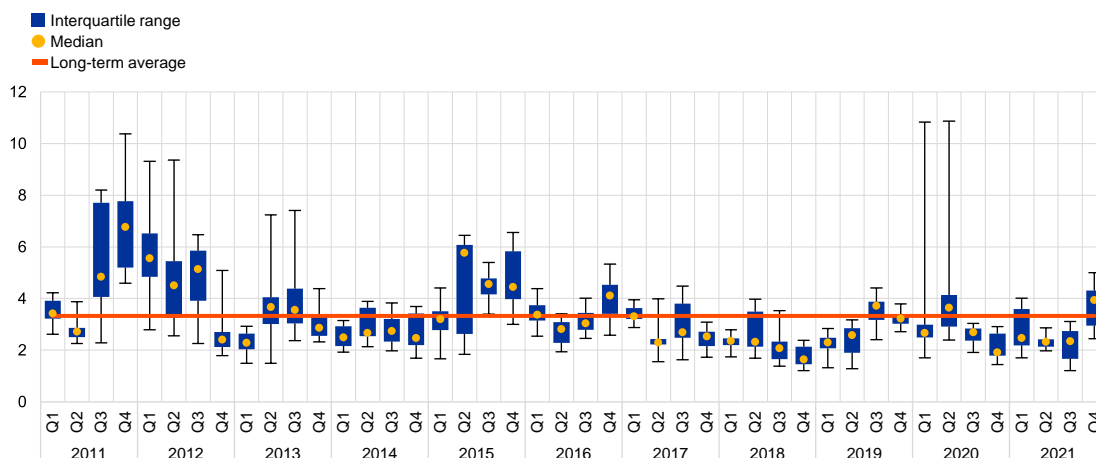
After the sharp increase in volatility in the aftermath of the pandemic outbreak, a normalisation phase followed. Chart A (panel a) shows the volatility of the euro area 10-year GDP-weighted yield since 2011. In 2020-2021 volatility levels of European government bonds' yields progressively stabilised around multi-year lows. Volatility fluctuated within a narrow range during implementation of the PEPP, after historic peaks ahead of the start of the programme.

Chart A

Bond yield volatility and correlations

a) Volatility of the euro area 10-year GDP-weighted yield, by quarter – euro area

(standard deviation of daily changes in yield, basis points)

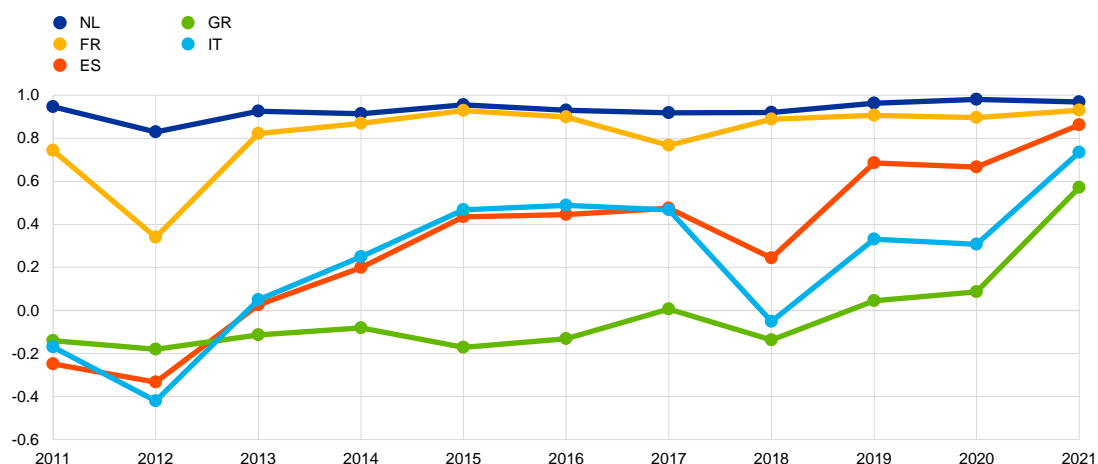


⁵³ ECB (2021).

⁵⁴ The Eurosystem conducted purchases under the PEPP in a flexible manner, allowing fluctuations in the distribution of purchase flows over time, across asset classes and among jurisdictions.

b) Correlation between the 10-year German bond yield and 10-year government yields for selected countries, by year

(correlation coefficient)



Source: ECB Statistical Data Warehouse (SDW), ECB calculations, Bloomberg.

In addition to the general reduction in volatility, a gradual alignment of government yield volatility among euro area countries can also be observed. Chart A (panel b) shows the correlation between the 10-year German bond yield and the 10-year government yields for selected countries since 2011. Compared to the 2011/2012 crisis episode, the developments in the correlation coefficients, which strongly tend toward 1, show lower signs of market segmentation and an easing in conditions across all the European bond markets during the pandemic crisis. This trend is particularly evident for Greece, whose government bonds are eligible for the PEPP but not for the APP.

Such developments point towards an improvement in market functioning in the wake of a general decrease in uncertainty after the most acute phase of the pandemic. Alongside the PEPP, the fiscal response also contributed to the lower uncertainty (see also Box 4).

Two recent studies on the flexibility embedded in PEPP complemented previous literature⁵⁵ claiming that asset purchases tend to be more effective in times of stressed market conditions, given that they improve risk sentiment and support better market functioning. A first study⁵⁶ uses policy counterfactuals⁵⁷ to show that, had the Eurosystem implemented the asset purchases under the PEPP and the additional APP envelope at a constant-pace (i.e. as under the pre-COVID-19 APP), in March and April 2020, the overall impact of these two measures on long-term government bond yields (estimated at around 60 basis points) would have been lower by about 15 basis points. These results appear to show that promptly adjusting the pace of asset purchases in the event of unforeseen market volatility can play a quantitatively-significant role in stabilising financing conditions, especially in times of heightened market stress, and thereby preserve the smooth transmission of monetary policy to the real economy.

A second study⁵⁸ focuses on the intraday impact of asset purchases. Using confidential high-frequency data on the asset purchases carried out by Banca d'Italia in the first half of 2020, it is

⁵⁵ For example, Cúrdia and Woodford (2011); Vayanos and Vila (2020).

⁵⁶ Bernardini and Conti (2021).

⁵⁷ The authors use weekly data and set-up a Structural Bayesian Vector Autoregressive model, which allows to capture the dynamic feedbacks between central bank asset purchases and market rates, and then estimate policy counterfactuals.

⁵⁸ Bernardini and De Nicola (2020).

estimated that, at the peak of the pandemic crisis, an outright purchase of long-term government bonds reduced the corresponding yields by around ten basis points per billion euro, compared with around 2 to 5 basis points per billion euro in quieter periods. These results suggest that a targeted distribution of asset purchases over the course of the day can enhance the overall effectiveness of an asset purchase programme. In particular, stepping-up the pace of purchases at times when selling pressures prevail helps to neutralise upward pressures on yields.

Box 4

The NGEU programme and its implications for monetary policy implementation

Presentation of the NGEU funding programme

The European Commission launched the NGEU programme to support economic recovery from the pandemic. The NGEU package consists of €750 billion in grants and loans to be distributed from the EU to its Member States. This temporary instrument complements the EU budget and is focused on a green and digital recovery. A coordinated policy response at European level was essential to avoid uneven recovery and economic fragmentation within the European Union. This box elaborates on the implications of NGEU for the financial markets and for monetary policy implementation.

The implications of the NGEU programme for financial markets

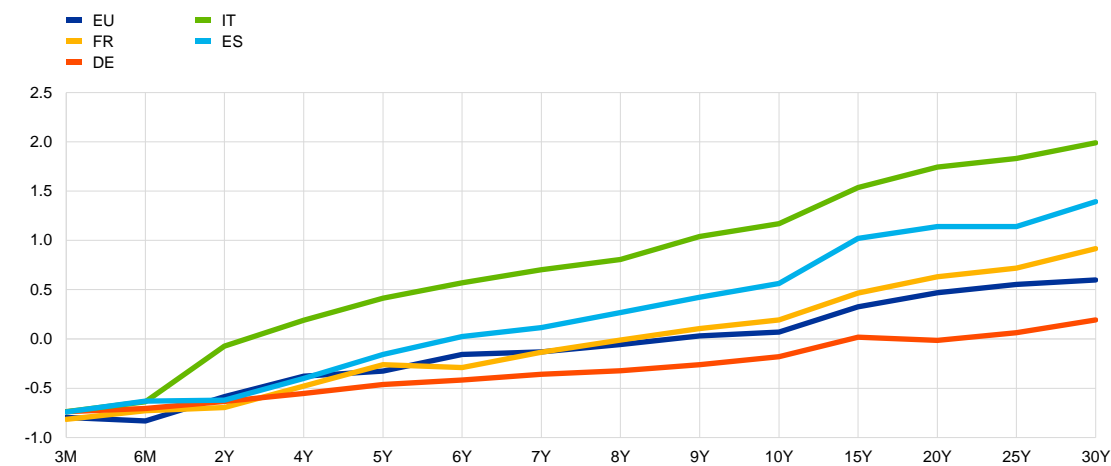
The issuance needs of the NGEU programme significantly increase EU issuance activity, not only compared with its own regular issuances but also vis-à-vis EU sovereigns, making the EU one of the largest issuers in the euro area in the coming years. To fund the NGEU programme, the European Commission will raise up to around €800 billion on financial markets by 2026, equivalent to borrowing volumes of roughly €150 billion per year. Borrowing will be repaid by 2058. In 2021, the Commission already issued €71 billion in bonds and €22 billion in bills to start funding the recovery packages for the European Union's Member States. These securities were issued using a diversified funding strategy, as explained below.

NGEU issuance is expected to result in a deep and liquid EU bond market, ensuring a truly liquid, risk-free euro interest rate curve (Chart A). The NGEU funding strategies include long and short-term funding. Long-term funding (EU bonds with maturities from 3 to 30 years) is aimed at building a liquid benchmark yield curve. Short-term funding (EU bills with three-month and six-month maturities) helps to manage financing needs and liquidity risk by granting access to the money market and attracting new types of investors. As part of the long-term funding strategy, the European Commission is seeking to raise 30% of the programme using green bonds (about €250 billion), therefore becoming the world's largest green bond issuer by 2026. To this end, the Commission has developed the NGEU Green Bond Framework based on International Capital Market Association (ICMA) criteria and partially following the European taxonomy, the latter currently under discussion by the Commission.

Chart A

EU benchmark yield curve against selected euro area countries

(percentages per annum)



Source: Bloomberg

Notes: yield curves at 31 December 2021.

From June 2021 to the end of 2021, the Commission undertook eight NGEU bond issuances on the five-year to 30-year benchmark yields for a total amount of €71 billion. These issuances received strong interest from investors. Order books were largely oversubscribed, by up to 13.8 times for the 30-year benchmark yield. In issuing its first NGEU green bond, the Commission conducted the largest transaction ever on the green bond market. This issuance was met with strong investor interest, with the final book over 11 times oversubscribed for a final issued volume of €12 billion. Market participants explained the strong demand by a still narrow green bond universe with many green funds actively searching for green securities.

Implications for monetary policy

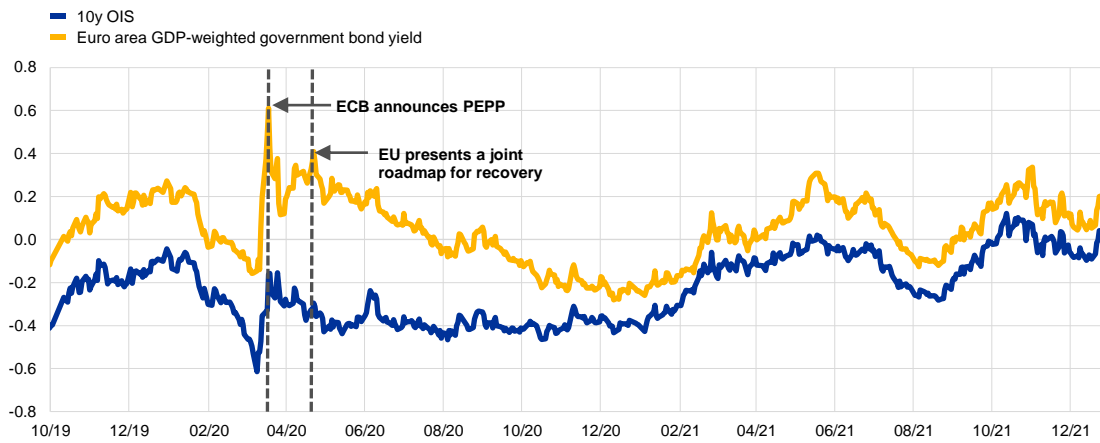
The NGEU programme is expected to contribute positively to the implementation of monetary policy by the ECB. First, by easing the funding needs of individual Member States, the NGEU package is expected to assist in containing the rise of economic divergences among Member States. It is therefore expected to ease any latent fragmentation in the euro area and to complement the PEPP/APP programmes in ensuring the smooth transmission of monetary policy (Chart, panel a). Second, the NGEU programme sent a signal of increased EU cohesion and solidarity, contributing to reducing risk premia across the euro area. Third, NGEU bonds typically serve as collateral for Eurosystem operations and are purchasable under outright asset purchase programmes. Given the large size of issuances anticipated, the NGEU programme will therefore increase the universe of Eurosystem eligible bonds in the supranational space. In 2021 the NGEU programme represented more than 40% of issuances in the supranational Eurosystem eligible space, which increased from €105 billion in 2020 to €165 billion in 2021 on the back of NGEU issuances (Chart B, panel b).

Chart B

Impact of NGEU on markets and EU issuance activity

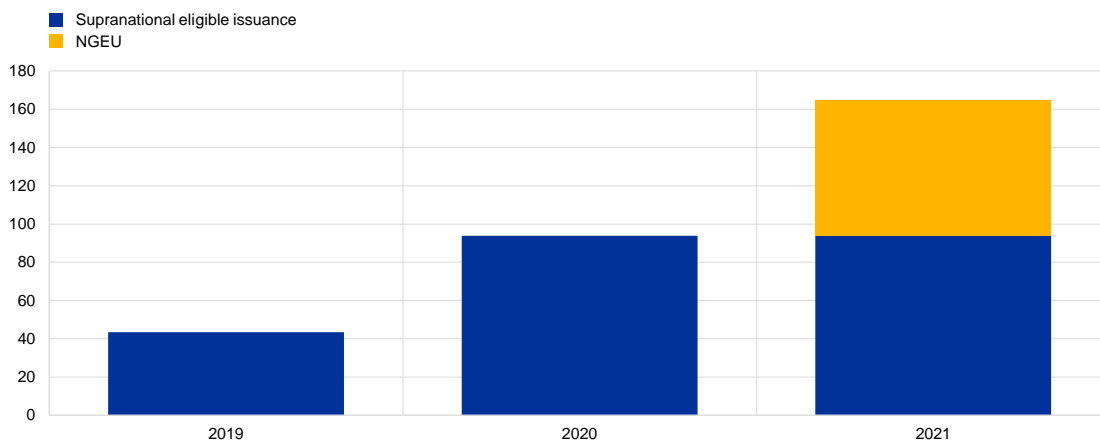
a) Euro area GDP-weighted sovereign bond yields and OIS rates

(percentages per annum)



b) Issuance of Eurosystem eligible supranational assets

(EUR billions)



Source: Bloomberg, ECB, ECB calculations.

Note: Panel b includes all supranational issuance in a given year eligible for Eurosystem operations from the end of the respective year.

8 Impact of the Eurosystem monetary policy implementation on its balance sheet and liquidity conditions

The operations described in Sections 4 and 7 expanded the Eurosystem balance sheet to an unprecedented level. As a result, both their share as a percentage of the total balance sheet and as a percentage of GDP rose. The expansion in assets was mirrored by a mechanical increase in liabilities, mostly in the form of bank reserves (excess liquidity). While the level of excess liquidity more than doubled over the review period, its distribution across the Eurosystem changed somewhat. Autonomous factors⁵⁹ had an increasing absorption effect, in particular, due to the fiscal response to the pandemic crisis (and the related increase in government deposits), and as a result of the increase in demand for banknotes and of higher deposits inflows from non-euro area residents.

8.1 Impact of Eurosystem monetary policy implementation on its balance sheet

The monetary policy response to the COVID-19 crisis translated into accelerated growth of the Eurosystem balance sheet. Since the global financial crisis, MPIs have contributed to a substantial increase in the Eurosystem balance-sheet size. Over the review period, the monetary policy response to the outbreak of COVID-19 contributed to the fastest-growth period in the history of the Eurosystem balance sheet (Chart 19). This was mainly due to the implementation of the PEPP programme and to the high demand for the TLTRO III series. By the end of 2021, the Eurosystem balance sheet had reached a historic high of €8.4 trillion, an increase of €3.8 trillion since 31 December 2019.

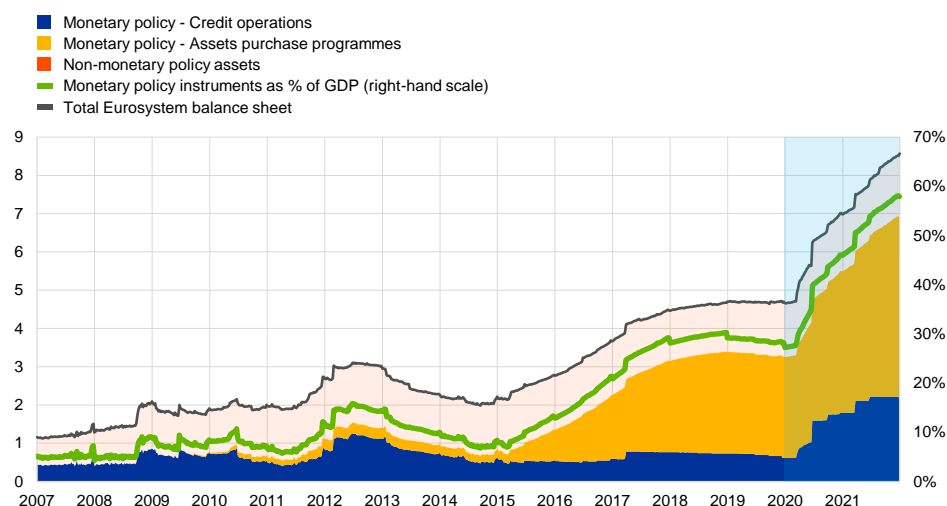
⁵⁹ Autonomous factors are central bank balance-sheet assets and liabilities that affect the amount of excess liquidity available to the banking system but that are not under the direct control of the central bank. In this report we focus on the balance sheet from a monetary policy perspective, therefore all balance-sheet items that are not relevant from this perspective would fall under autonomous factors.

Chart 19

MPIs in the Eurosystem balance sheet

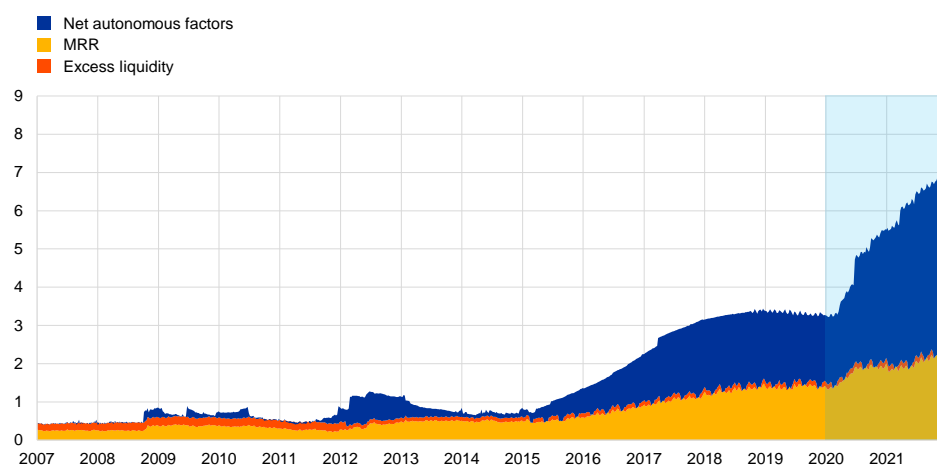
a) MPIs (assets) in the Eurosystem balance sheet

(left-hand scale: EUR trillions; right-hand scale: percentages)



b) Eurosystem liabilities: how liquidity is used

(EUR trillions)



Source: ECB

Notes: the charts deviate from a pure (accounting) balance-sheet perspective and focus on the key elements relevant from a monetary policy perspective. As a result, the total Eurosystem balance sheet in terms of assets (accounting balance sheet) is higher than the sum of the liabilities items shown in Panel a because it includes (asset) autonomous factors. However, when all autonomous factors (both assets and liabilities) are aggregated and netted out, they result in a net liquidity absorption (liability), which is the relevant figure from a monetary policy perspective. Credit operations here include MROs, LTROs, TLTROs and MLFs; outright purchases include CBPP1-2, SMP, APP, PEPP operations. MPIs include lending operations and outright purchases.

The share of monetary policy assets increased, both as a percentage of GDP and as a percentage of the Eurosystem balance sheet.

The increase in the balance sheet was predominantly driven by the expansion of monetary policy assets, increasing from €3.3 trillion at the end of 2019 to €6.8 trillion at the end of 2021, thereby reaching a value equating to almost 60% of GDP (Chart 19a). Within monetary policy assets, 55% of the increase was due to asset purchase programmes, while 45% to credit operations. Given the comparatively lower level of outstanding credit operations at the end of 2019, this translated into a more significant increase in credit operations as a share of the Eurosystem balance sheet (Table 4).

The significant monetary policy interventions were mirrored by a mechanical increase in Eurosystem liabilities, primarily as excess liquidity. High TLTRO III take-up and asset purchase programmes resulted in a comparable⁶⁰ increase in central bank overnight deposits, thereby increasing excess liquidity in the banking system from €1.7 trillion at the end of 2019 to €4 trillion by the end of 2021. Considering the Eurosystem balance sheet from a liquidity perspective (Chart 19b), the residual increase in liabilities was due to autonomous factors, absorbing liquidity on the net (see Section 8.3) – and MRRs, which have marginally increased with the higher deposit base (see Section 3). Overall, in terms of the (accounting) balance sheet, the relative share of central bank reserves increased from 39% to 50% as a percentage of the Eurosystem balance sheet (Table 4).

Table 4
Composition of the accounting Eurosystem balance sheet at the end of 2019 and of 2021

ASSETS	Q4 2019	Q4 2021
Securities held for monetary policy purposes	56%	55%
Lending to euro area credit institutions ^(a)	13%	26%
Non-monetary policy assets ^(b)	31%	19%

LIABILITIES	Q4 2019	Q4 2021
Banknotes	28%	18%
Central bank reserves ^(c)	39%	50%
Non-monetary policy deposits	13%	17%
Capital & reserves and other	20%	15%

Source: ECB.

Notes: (a) includes refinancing operations and the MLF; (b) includes foreign currencies, gold, euro-denominated own fund portfolios, emergency liquidity assistance (ELA) and other assets; (c) includes current account assets (both required and excess reserves) and the DF.

8.2 Excess liquidity and its distribution

Excess liquidity results from the holding of central bank reserves either in banks' current accounts or at the DF. Eurosystem eligible counterparties have two options for depositing their reserves overnight. They can leave them on their current accounts with their respective NCB in excess of their MRR or move them overnight to the DF. In the current negative-interest-rate environment, both accrue the same remuneration, which remained at -0.50% over the review period. Only reserves held in current accounts may benefit from the TTS (see Section 3). Credit institutions and/or eligible counterparties tended to keep their excess liquidity in current accounts. Some counterparties nevertheless transferred their reserves to the DF, mainly for internal reasons such as accounting processes relating to the remuneration of accounts or for liquidity management considerations. Current accounts increased from €2,288 billion in 2020 to €3,535 billion in 2021, while

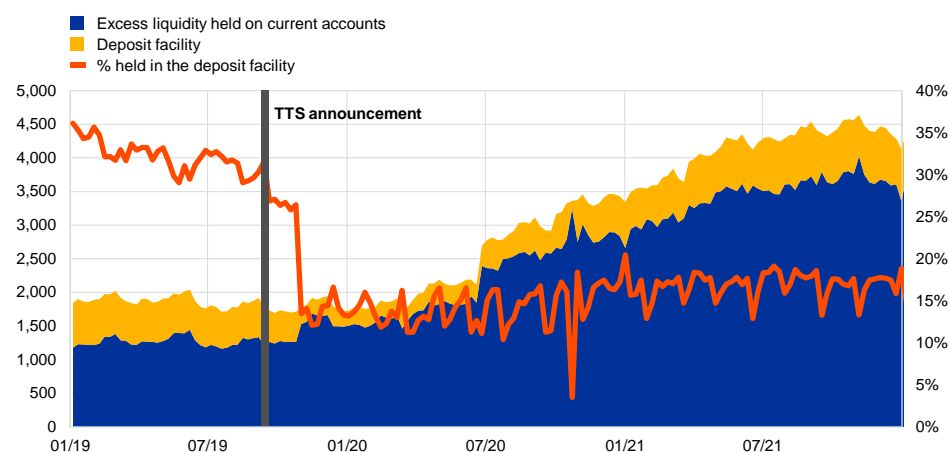
⁶⁰ Monetary policy operations do not typically translate one-to-one into central bank overnight deposits given that some liquidity flows into the balance sheet of the central bank as autonomous factors.

recourse to the DF increased from €372 billion in 2020 to €690 billion in 2021 (all based on daily averages, Chart 20). However, the percentage of excess liquidity held in the DF decreased significantly after the announcement of the two-tier system, as it only considers the excess reserves to fulfil the exempted tier. By the end of 2021, the DF was used by only about 60 banks in the Eurosystem.

Chart 20

Excess liquidity and its balance sheet components

(left-hand scale: EUR billions; right-hand scale: percentages)



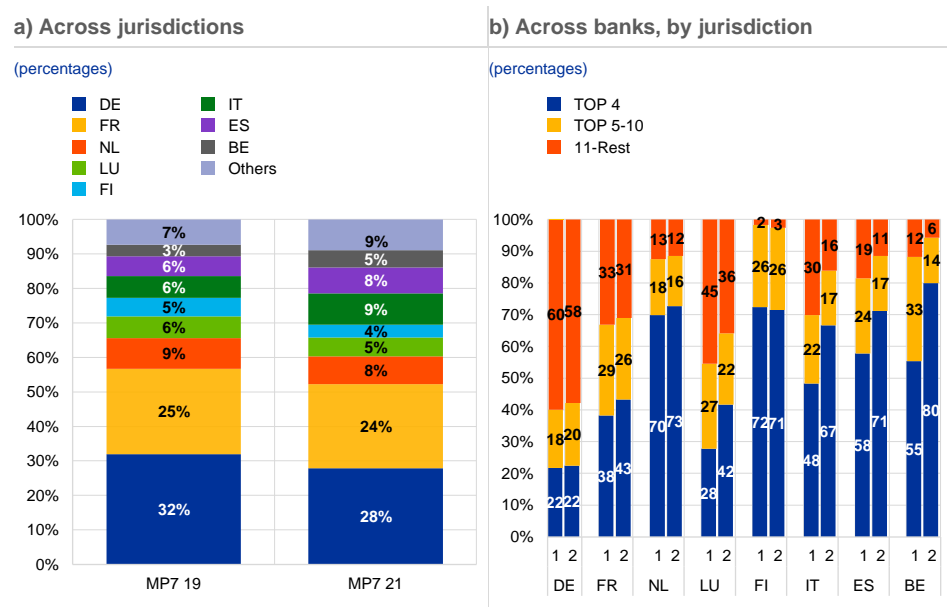
Source: ECB

Over the review period, there were some changes to the distribution of excess liquidity over jurisdictions and banks. Although the largest share of excess liquidity in the euro area was still held in banks located in Germany, France, the Netherlands, Finland, and Luxembourg, their share decreased from 77% to 69% over the review period (Chart 21a). Banks located in Italy and, more marginally, in Spain, Ireland, Greece, Austria, and Portugal increased their excess liquidity holdings. This was mainly attributable to banks' broad participation in the TLTRO III series (and the subsequent deposit of their overnight liquidity with the Eurosystem) in combination with the TTS. Some redistribution had previously occurred as a result of the trading of reserves due to the introduction of the TTS in late 2019 (see Section 3). Overall, the concentration of excess liquidity among the top four holders in each jurisdiction increased, except for Germany, France and Finland⁶¹ (Chart 21b).

⁶¹ Ignoring decreases in countries where the share of the top 4 was already above 80% in 2019.

Chart 21

Distribution of excess liquidity over selected maintenance periods



Source: ECB

Notes: MP stands for maintenance period. Panel a shows jurisdictions with excess liquidity of at least 5% of the Eurosystem excess liquidity in either MP7 2019 or MP7 2021. In Panel b, '1' stands for MP 7 2019 and '2' for MP 7 2021. It should be noted that the concentration within every jurisdiction is also a function of the local banking system structure. For example, the number of banks in Germany and Italy is higher than in Spain, France and the Netherlands.

8.3 Developments in autonomous factors

Autonomous factors are relevant for monetary policy implementation since they affect the amount of excess liquidity. Autonomous factors are central bank balance-sheet assets and liabilities that affect the amount of excess liquidity available to the banking system but that are not under the direct control of the central bank. In the euro area, NCBs forecast and analyse developments in autonomous factors as part of their daily liquidity management activities. In addition, the Eurosystem regulates its non-monetary policy activities through the Agreement on Net Financial Assets (ANFA) and the Guideline on domestic assets and liabilities management⁶². The former sets out the rules and limits for holdings of financial assets that are related to the national tasks of NCBs⁶³, while the latter ensures that NCBs' non-monetary policy activities do not hinder monetary policy implementation and sets the appropriate remuneration to disincentivise excessive non-monetary policy deposits being held with NCBs.

The combination of monetary and fiscal stimulus in response to the pandemic crisis had a significant effect on banknotes, government deposits, and

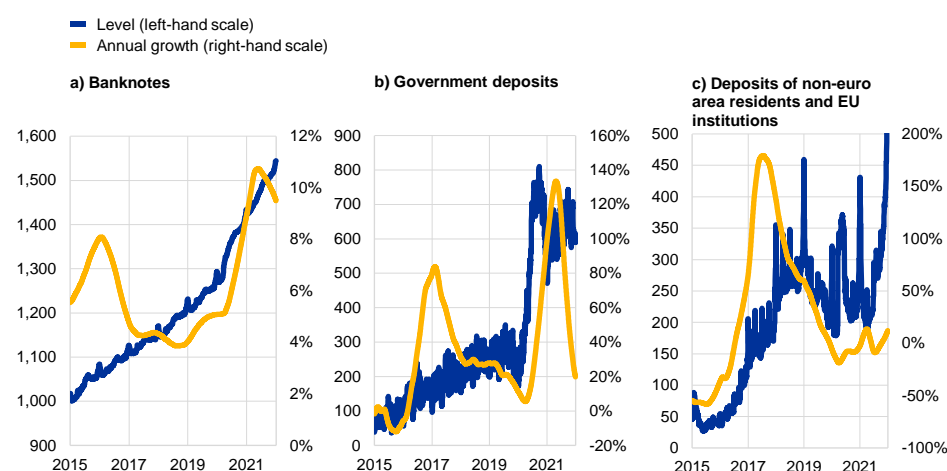
⁶² [Guideline \(EU\) 2019/671 of the European Central Bank of 9 April 2019 on domestic asset and liability management operations by the national central banks](#) (recast) (ECB/2019/7), (OJ L 113, 29.4.2019, p. 11).

⁶³ Such NCB financial assets may relate, for example, to counterpart items for their capital and accounting reserves or other specific liabilities, their foreign reserves and employee pension funds or may be held for general investment purposes.

deposits of non-euro area residents. These three autonomous factors are the main liquidity-absorbing factors on the Eurosystem balance sheet and accounted for an overall increase in liquidity absorption over the review period of around €755 billion, of which €220 billion in banknotes, €450 billion in government deposits and €85 billion in deposits of non-euro area residents. Chart 22 summarises how these three factors developed over the review period.

Chart 22
Main liquidity-absorbing autonomous factors

(left-hand scale: EUR billions; right-hand scale: percentages per annum)



Source: ECB

Banknotes in circulation accelerated over the review period, mostly for precautionary purposes. After some years of strong growth in euro banknotes in circulation (around 5% in 2017-2019, i.e. significantly above GDP growth), the net issue of banknotes accelerated in the review period, reaching growth rates of up to 10%. The value of outstanding euro banknotes increased by €220 billion, equivalent to an average annual growth rate of 9.5% (Chart 22a). Recent payment surveys indicate that the share of cash transactions in the euro area underwent a significant decline, which gained further momentum due to the COVID-19 pandemic⁶⁴. In addition, euro banknote cumulated net shipments abroad (cumulated euro banknotes leaving the euro area minus euro banknotes coming in from outside the euro area) suggest that demand from outside the euro area did not contribute to the high demand, largely due to the greatly reduced air traffic. It follows from these two circumstances that the increase in banknotes in circulation during the study period was mainly attributable to store-of-value (hoarding) or precautionary approaches⁶⁵. However, banknotes have also been used increasingly to avoid negative remuneration on central bank (e.g. vault cash) and commercial bank accounts given that excess liquidity increased strongly.

Government deposits rose substantially as a result of the fiscal response to the COVID-19 crisis. Deposits by Treasuries and other public authorities

⁶⁴ ECB (2021c).

⁶⁵ These developments are not new. The 2007-2008 financial crisis showed similar dynamics.

(hereinafter, 'government') held with NCBs have historically represented the more volatile and hard-to-predict autonomous factor given that they are affected by any financial operation conducted by governments, such as debt issuance and redemptions, collection of taxes and payments of pensions, as well as their liquidity preferences. These operations are generally country-specific, depending on governments' investment frameworks and institutional arrangements with the respective NCB. In this regard, different NCBs in the euro area have different fiscal agent roles and responsibilities in conducting cash management activities on behalf of the government in their respective jurisdictions, and different frameworks for managing short-term investments. In the review period, government deposits increased sharply, reaching peak levels above €750 billion, more than doubling in size compared with previous years (Chart 22b). The main reason for the significant growth was the fiscal response to the economic fallout caused by the COVID-19 outbreak. In general, Treasuries in euro area countries provisioned their balances through debt issuances to cover expenditures of uncertain amounts in the short term. It is expected that these higher levels of government deposits will gradually be reduced at a pace proportional to economic recovery in the euro area. Given the volatility of government deposits and their weight in autonomous factors, the Eurosystem has historically set limitations on their remuneration to provide incentives for governments to place their deposits in the market⁶⁶. From January 2022, the €STR became the applicable ceiling for the remuneration of government deposits under the prevailing negative-interest-rate environment, substituting for the discontinued euro overnight index average (EONIA).

Deposits of non-euro area residents and EU institutions increased overall more marginally compared with previous periods but with a stronger increase towards year-ends. These deposits are primarily part of the Eurosystem reserve management services (ERMS) that NCBs offer to foreign central banks, international organisations, and foreign governments. Money market rates trading below the DFR have made the fixed-rate and safe conditions offered on these accounts relatively attractive, especially on end-of-period reporting dates when market rates turn particularly volatile and alternative investment opportunities with credit institutions are limited (Chart 22c). Over the review period, three additional events were noteworthy. First, the peak observed between March and June 2020 was due to euro lending to the Federal Reserve in exchange for borrowing US dollars amid the US dollar swap operations that were enhanced in March 2020 to support the smooth functioning of US dollar funding markets in the euro area⁶⁷. Second, the higher deposits observed in 2021 were mostly linked to the provision of funds for the NGEU recovery programme. Finally, year-end money market pressure in 2021 started earlier than in previous years, indicating the increased unwillingness of banks to take in deposits over year-end because of regulations, bank levies, and other balance-sheet concerns.

⁶⁶ Art. 4 of Guideline ECB/2019/7.

⁶⁷ This temporal increase was registered in the ECB balance sheet.

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