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**Working Paper**

## Overly reliant on central bank funding? Consequences of exiting TLTRO

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Florian Heider  
Jonas Schlegel

# Overly reliant on central bank funding? Consequences of exiting TLTRO

SAFE White Paper No. 101 | March 2024

**Leibniz Institute for Financial Research SAFE**  
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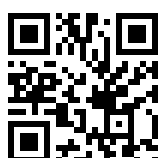
# Overly reliant on central bank funding?

Consequences of exiting TLTRO



**EGOV**  
BANKING UNION

External author:  
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# Overly reliant on central bank funding?

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## Consequences of exiting TLTRO

### **Abstract**

This study analyses potential consequences of exiting the Targeted Long-Term Refinancing Operations (TLTRO) of the European Central Bank (ECB). Thanks to its asset purchase programs, the Eurosystem still holds plenty of reserves even with a full exit from the TLTROs. This explains why voluntary and mandatory repayments of TLTRO III borrowing went smoothly. Nevertheless, the more liquidity is drained from the banking system, the more important becomes interbank market borrowing and lending, ideally between euro area member states. Right now, the usual fault lines of the euro area show up. The German banking system has plenty of reserves while there are first signs of aggregate scarcity in the Italian banking system. This does not need to be a source of concern if the interbank market can be sufficiently reactivated. Moreover, the ECB has several tools to address possible future liquidity shortages.

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## LIST OF ABBREVIATIONS

<b>DF</b>	Deposit Facility
<b>ECB</b>	European Central Bank
<b>MFI</b>	Monetary Financial Institution
<b>MRO</b>	Main refinancing operations
<b>OMO</b>	Open market operation
<b>QE</b>	Quantitative Easing
<b>LTRO</b>	Long-term refinancing operations
<b>TLTRO</b>	Targed Long-term refinancing operations
<b>ZLB</b>	Zero lower bound

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## EXECUTIVE SUMMARY

This study analyses the potential consequences of the exit from TLTRO III, which is a liquidity program introduced to support bank lending within the Euro Area. Beginning in 2019, ten TLTRO III series have been implemented, each lasting three years. Consistent with the current contractionary monetary policy stance, no additional series have been introduced, resulting in the tenth TLTRO III series being due at the end of 2024, with seven series already fully repaid. Moreover, the ECB has increased lending rates, making TLTRO III less attractive to banks. At the same time, banks have been given additional possibilities to repay voluntarily those last three TLTRO series early. As of January 2024, approximately 80% of the outstanding TLTRO III has already been repaid.

Regrettably, bank-level data is not available for this study, so we accessed and analysed central bank and aggregated banking statistics, both at the level of the entire euro area as well as at the level of individual countries. Two significant repayment periods have occurred. The first was voluntary, occurring between November and December 2022. The second took place on 28 June 2023 and was mandatory, accounting, nominally, for around 50% of all TLTRO III credit.

Analysing the two repayment periods at a national level, we observe that German banks, for instance, repaid most of their TLTRO III during the voluntary phase, while Italian banks were hesitant to use that opportunity and had to repay most of their TLTROs during the mandatory repayment in June 2023. Nevertheless, even the mandatory repayment phase did not create stress in the banking sector.

The euro area banking system still holds a considerable aggregate amount of liquidity despite the overall TLTRO III repayment of around EUR 2000 bn because of Quantitative Easing (QE). This will still be true at the end of 2024 when all TLTRO III series will be fully paid back. TLTRO III and QE are similar in that both create excess reserves located at the ECB's deposit facility. The difference lies in that TLTRO III operations always lengthen and contract the balance sheet of the banking sector. Accounting for reserves created by QE depends whether euro area banks sell their own securities or whether they act on behalf of other actors who cannot transact with the ECB directly.

At the national level, liquidity will not be abundant in all euro area countries. Holding everything else constant, Italy's banking sectors' expected reserves at the end of 2024, once all TLTRO funding is repaid, are only 2% of the banks' total assets in contrast to Germany's 10%. Although the upcoming TLTRO repayments in 2024 will be smaller than the repayments in 2023, they become significant as a percentage of outstanding liquidity, especially when the ECB's asset purchases have been halted. Additionally, future repayments will be mandatory, which increases the likelihood that some banks will be lacking sufficient amounts of reserves. Functioning interbank markets can channel resources from banks with abundant reserves to those where reserves are scarce. Ideally, this should also occur across national borders.

In the past, the interbank market was not a necessary funding tool for most banks because of the vast amount of reserves provided, so that shocks to the economy or the banking sector did not accelerate via reluctant interbank lending. This might change in the future as more and more banks will be dependent on this sort of funding again (there are signs that interbank market activity is picking up). Therefore, interbank lending needs to be monitored more closely.

Nevertheless, one should not forget that the ECB can counteract anytime and increase QE or introduce new series of TLTRO to overcome any signs of liquidity stress. Of course, this would indicate that at least some banks are indeed structurally dependent on central bank funding and cannot find adequate substitutes in private markets.

## 1. MOTIVATION

The European Central Bank (ECB) conducts the monetary policy of the euro area primarily through two related instruments. First, the setting of interest rates on its open market operations (OMOs) where commercial banks borrow reserves from the ECB against collateral. And second, by controlling the amount of reserves available to the euro area banking system.

Since the financial crisis, there have been many innovations and additions to this basic framework. The most notable one is the ECB's purchase of various securities (quantitative easing, QE), mostly of government bonds, from euro area banks (where these banks may conduct the sale on behalf of other actors who have no direct access to the ECB). The overall effect of the modifications to OMOs and the introduction of QE has been a considerable increase in the size of the balance sheet of the Eurosystem.<sup>1</sup>

However, the conduct of monetary policy is undergoing yet another significant shift. The once aggressive expansion of the ECB's balance sheet has stopped, giving way to a phase of rising interest rates in order to combat the extraordinary level of inflation that appeared as soon as economies emerged from the Covid pandemic. This pivot has sparked intense discussions around the future trajectory of the ECB's monetary policy, particularly concerning the unwinding of its balance sheet — a conversation that inevitably turns to the significant holdings accumulated through Targeted Longer-Term Refinancing Operations (TLTROs).

TLTRO III, a form of OMOs, together with Quantitative Easing (QE), now constitute the majority of how the ECB injects reserves into the banking system of the euro area. While exit from QE is likely to be slow – the ECB has not signalled any intention of actively selling securities back to the market – exit from TLTRO III has been swift, considerable, and without negative consequence for the transmission of monetary policy.

It is, however, not entirely clear what the swift exit from TLTRO III signals for the broader debate on the appropriate size of the ECB's balance sheet (see also Schnabel, 2023). At least two questions emerge. First, does it matter whether reserves were supplied via the TLTRO or via QE? Conceptually, the mechanism is different. With QE, the central bank has more control over the volume of reserves as it can decide how much to buy or sell, while with TLTROs, it is the banks that decide on how much to borrow. Relatedly, the undoing of the supply of reserves is different. While a TLTRO is repaid as any loan, QE-supplied reserves either expire (when the underlying bond expires) or must be actively bought back from banks by selling the bond back. Second, will a future exit from an extensive supply of reserves be as benign as the current one (caused mainly by the repayment of TLTRO III)?

This note can only scratch at the surface of these fundamental issues of how to engineer the reversal of the expansive monetary policy since the financial crisis. However, our scratching reveals the usual fault lines in the euro area, i.e., a structural difference between Euro member states with high amounts of reserves like e.g., the German banking system, and member states with low levels of reserves like e.g., the Italian banking system.

---

<sup>1</sup> In what follows, we use Eurosystem and ECB synonymously when there should be no confusion.

## 2. THE ECB'S TARGETED LONGER-TERM REFINANCING OPERATIONS

The ECB's motivation for introducing Targeted Longer-Term Refinancing Operations (TLTROs) in mid-2014 was to improve the transmission mechanism of monetary policy within the Euro Area.

In mid-2014, official policy rates had become so low that there was little room to stimulate the economy through further interest rate cuts. The ECB's interest rate for its main refinancing operations (MRO), i.e., the rate at which banks borrow reserves, reached the zero lower bound (ZLB). The ECB's interest rate for its deposit facility (DF), i.e., the rate at which borrowed reserves are remunerated, even became negative.

At the same time, there was a considerable loss of economic activity in the euro area and a deflationary pressure started to build up. The euro area economy was suffering from the shocks of the financial crisis in 2009 and, importantly, the sovereign debt crisis in 2012.

A particular shortcoming in the euro area was the absence of quantitative easing. The ECB did not engage in large scale purchases of government bonds until early 2015. Prior to that, there was considerable disagreement on whether such purchases were legally possible in the euro area.

The fall-out from the crises and the absence of a powerful monetary tool to stimulate the economy created the fear of further economic fragmentation in the euro area. Previously, the strongest tool in the ECB's arsenal were the longer-term refinancing operations (LTROs). Especially the 3-year operations at the height of the sovereign debt crisis helped to calm the situation.

But the effectiveness of standard lending operations by the ECB is limited. To fully stop the sovereign debt crisis, it took Mario Draghi's "whatever it takes" speech to convince markets that it is futile to speculate on a break-up of the euro area.

Moreover, standard lending operations are ill-suited to stimulate the economy. They provide banks with liquidity, which is essential in a crisis, but they do not stipulate how banks use the liquidity. LTROs had not necessarily led to more lending but instead, to more investment into sovereign bonds (see for example Achary and Steffen, 2015, and Crosignani et al., 2020).

To address these shortcomings, the ECB introduced the so-called Targeted LTROs. They provide attractive financing conditions for credit institutions to stimulate lending to the real economy. To ensure that banks focus on lending, both the volume TLTRO credit as well as its financing conditions depend on the volume of bank lending to the real economy.

In this paper, we do not assess whether the TLTROs succeeded in expanding bank credit to the real economy – there is evidence that it did (Barbiero et al., 2022) – but instead, we focus on the exit from the current, still active, program, TLTRO III. Of particular interest is whether there are still abundant reserves in the banking system after the exit and whether banks are able to replace TLTRO-supplied reserves.

### 2.1. TLTRO III

Three series of TLTROs have been introduced. TLTRO I (introduced in 2014) and TLTRO II (introduced in 2016) have been either fully paid back or rolled over into TLTRO III. TLTRO III was introduced in March 2019 and implemented via ten operations, the last in December 2021, each with a maturity of three years and the possibility of early repayment after one year.

Together with the ECB's asset purchase programs, TLTRO III is responsible for a large supply of reserves to euro area banks. The main reason for the prominence of TLTRO III is its expansion in spring 2020 as a response to the onset of the Covid pandemic. The expansion lifted several restrictions on how much banks could borrow (overall and per operation) and, importantly, on what interest rate banks had to pay. Previously, the interest rate was linked to the rate on the ECB's deposit facility rate, which stood at minus 50 basis points at that time. The new pricing of the TLTROs removed another 50 basis points so that banks could obtain reserves for a little as minus 1%.

These new TLTRO conditions were very attractive. The TLTRO operation in June 2020 (TLTRO-III 4) was the largest single injection of reserves by the ECB (Altavilla et al., 2023). The overall volume of lending provided by TLTRO III to the euro area banking sector reached its high at the end of 2021 with a total of EUR 2.200 bn. A full review of the TLTROs is well beyond this paper (for a review, see for example Barbiero et al, 2021).<sup>2</sup> This paper focuses solely on TLTRO III and specifically on the effects of its repayment.

## 2.2. Exiting TLTRO III

In late 2021, the ECB had started with a process of monetary policy normalization. The first step was to stop the purchase of new assets. The second step, in mid-2022, was then to increase policy rates. In view of further rate increases and hence, a tightening of the monetary policy stance, the ECB announced on 27.10.2022 that TLTRO III will be recalibrated to increase the speed of the monetary policy normalization process.<sup>3</sup>

From 23.11.2022 onwards, TLTRO III operations were indexed to the key ECB interest rates. Before, banks which lend more than their benchmark were given beneficial lending conditions, namely 50 basis points below the deposit facility. To some extent simplified, the ECB closed a risk-free and profitable carry trade strategy, where banks could borrow money for 50 bp below the deposit facility and lend it back to the ECB at the deposit facility. Additionally, the ECB announced three early repayment dates with the first date on 23.11.2022.

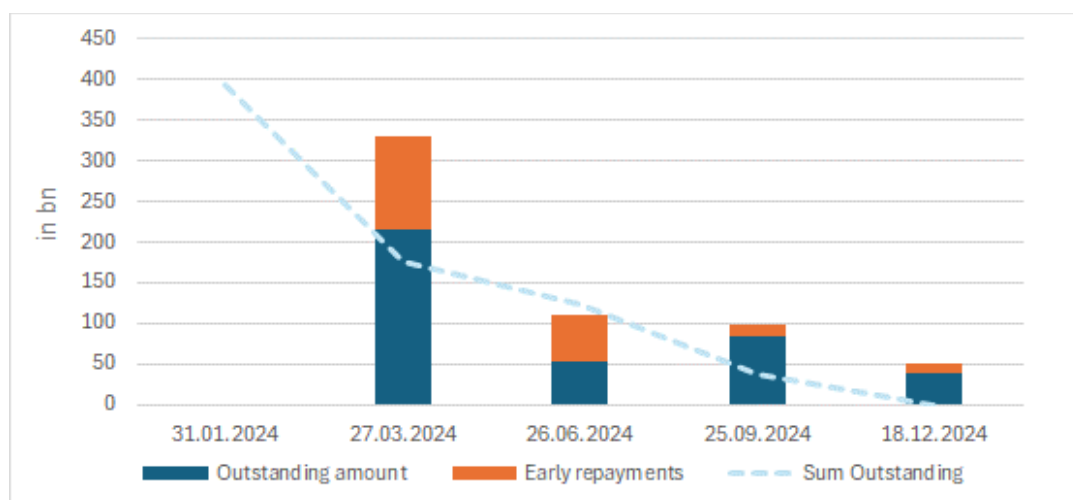
As of January 2024, the outstanding volume in TLTRO III is at EUR 400 bn (Figure 1). By now, around 80% of lending TLTRO has already been paid back by banks. The next reduction will occur on 27.03.2024 with a size of EUR 215 bn. This means that by spring 2024, less than 10 percent of the maximum volume reached during Covid will be outstanding. At the end of 2024, all TLTRO III will be fully paid back.

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<sup>2</sup> Official information about TLTROs can be found on the ECB's website:  
<https://www.ecb.europa.eu/mopo/implement/omo/tltro/html/index.en.html>

<sup>3</sup> See: [ECB recalibrates targeted lending operations to help restore price stability over the medium term \(europa.eu\)](#).

**Figure 1:** Outstanding TLTRO III (series 7.-10.) as of January 2024



Source: ECB (<https://www.ecb.europa.eu/mopo/implement/omo/html/index.en.html>), author's calculation

Note: Figure 1 presents the four final TLTRO III series 7.-10 as of January 2024, separated by early repayments (already paid back) and the still outstanding amount. Note that the Sum Outstanding assumes no further early repayments.

In the next section, we take a closer look at the repayment of TLTRO III loans. The repayment of almost all of the EUR 2200 bn from the TLTRO III accounts entirely for the reduction of the size of the ECBs balance-sheet since it reached more than EUR 8500 bn at the end of 2021. At the end of January 2024, the consolidated statement of the Eurosystem stated a size of balance-sheet of about EUR 6800 bn. So far, there has been no active reduction of the ECB's balance-sheet via a reversal of quantitative easing, so-called quantitative tightening (QT).

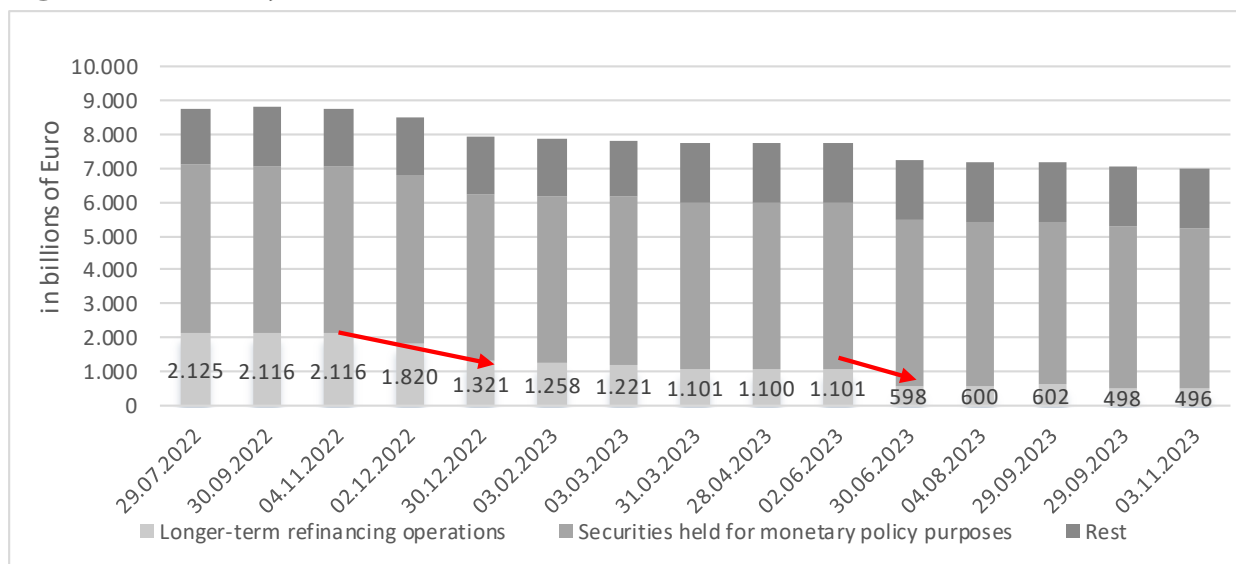
### 3. ANALYSIS OF EXITING TLTRO III

In this section, we exploit the difference between the voluntary repayment of TLTRO III in November and December 2022, and the mandatory repayment in June 2023. We first consider the balance sheet of the entire Eurosystem. We then examine differences in central bank balance sheet across euro area member states. Finally, we link the balance sheets of national central banks and of their respective banking sector, with a focus on the German and Italian banking system.

#### 3.1. Central bank balance sheets

As around 80% of TLTRO III has already been paid back, the analysis starts by looking back at the consolidated balance sheets of the Eurosystem over time. Figure 2 presents longer-term refinancing operations, which is an aggregate of all targeted longer-term refinancing operations (TLTRO) and non-targeted longer-term refinancing operations (LTRO). Nevertheless, we will interpret this figure as TLTRO III as TLTRO I and TLTRO II have been fully repaid and LTROs are in comparison to TLTRO III neglectable in size for our time period. For instance, as of January 2024, the current outstanding amount of other LTROs is around EUR 4bn, while the outstanding amount of TLTRO III is around EUR 400 bn, which means that 99% of LTROs are TLTRO III.

**Figure 2:** The Eurosystem balance sheet: Assets



Source: ECB's Disaggregated financial statement of the Eurosystem statistic, author's calculations

Note: Figure 2 presents the asset side of the Eurosystem balance sheet. Longer-term refinancing operations (LTROs), which almost exclusively contain TLTRO III, are presented at the bottom. Securities held for monetary policy purposes (QE) are presented in the middle and all other asset items like for instance gold are presented as "Rest" on the top. The three items together add up to the Eurosystem's total assets. Figures are expressed in billions of Euros.

Figure 2 shows that there have been two major repayment periods. The first happened between November and December 2022 (Repayment: €795 bn). The second occurred on 28.06.2023 (Repayment: €503 bn). While both paybacks have been substantial, they differ in their implementation. The first was mainly driven by voluntary repayments. The increase in the interest rates up to the key ECB interest rates eliminated the carry-trade profit opportunity for banks and hence, some banks voluntarily decided to replay early.



This was different in June 2023, when the fourth TLTRO III series (Corona series of €1308<sup>4</sup> bn; approximately 50% of all aggregated TLTRO III series) was due. Here, all banks, independent of profit opportunities and liquidity needs, had to repay their TLTRO III funding. The difference between voluntary and mandatory payback is crucial for the analysis and the outlook as the upcoming payback periods in 2024 will be mandatory and not voluntary.

**Figure 3:** Voluntary TLTRO III repayments (Nov.-Dec. 2022) by country

	Outstanding amount TLTRO 04.11.2022	Outstanding amount TLTRO 30.12.2022	Absolut change	% change
<b>Belgium</b>	86.0	48.9	-37	-43%
<b>Germany</b>	399.3	235.9	-163	-41%
<b>Estonia</b>	1.8	0.2	-2	-92%
<b>Ireland</b>	21.5	0.2	-21	-99%
<b>Greece</b>	50.7	35.4	-15	-30%
<b>Spain</b>	289.7	133.9	-156	-54%
<b>France</b>	459.2	326.4	-133	-29%
<b>Italy</b>	431.0	355.7	-75	-17%
<b>Cyprus</b>	6.2	5.2	-1	-16%
<b>Latvia</b>	0.6	0.5	0	-9%
<b>Lithuania</b>	1.6	1.6	0	0%
<b>Luxembourg</b>	25.8	8.1	-18	-69%
<b>Malta</b>	0.7	0.1	-1	-80%
<b>Netherlands</b>	172.4	61.9	-110	-64%
<b>Austria</b>	85.2	54.0	-31	-37%
<b>Portugal</b>	40.8	16.0	-25	-61%
<b>Slovenia</b>	1.4	0.8	-1	-44%
<b>Slovakia</b>	10.2	6.5	-4	-37%
<b>Finland</b>	32.1	30.1	-2	-6%

Source: ECB's Disaggregated financial statement of the Eurosystem statistic, author's calculations

Note: Figure 3 presents early TLTRO III repayments which happened between November and December 2022. The data source only provides LTROs, but given that 99% of LTROs are TLTROs, we use them interchangeable. The first column presents the outstanding TLTROs on 04.11.2022. The second column presents the outstanding amount of TLTROs on 30.12.2022. The third column presents the absolute change between the outstanding amount before and after the voluntary repayments, while the fourth column presents the percentage change between the outstanding amount before and after the voluntary repayments. Figures are expressed in billions of Euros.

We can see substantial differences in TLTRO holdings at the country level in figure 3. German banks paid back the most TLTROs in absolute terms during the early repayment period, although it had already less TLTROs than Italian and French banks before. Italian banks on the contrary paid back only EUR 75bn, respectively 17% (vs. German banks: 41%). In percentage terms, Irish and Estonian banks paid back the most.

<sup>4</sup> The difference between the TLTRO III series 4 of €1308 bn and its repayment amount of €503 bn is due to the voluntary early repayments in November and December 2022.

**Figure 4:** Mandatory TLTRO III repayments (28.06.2023) by country

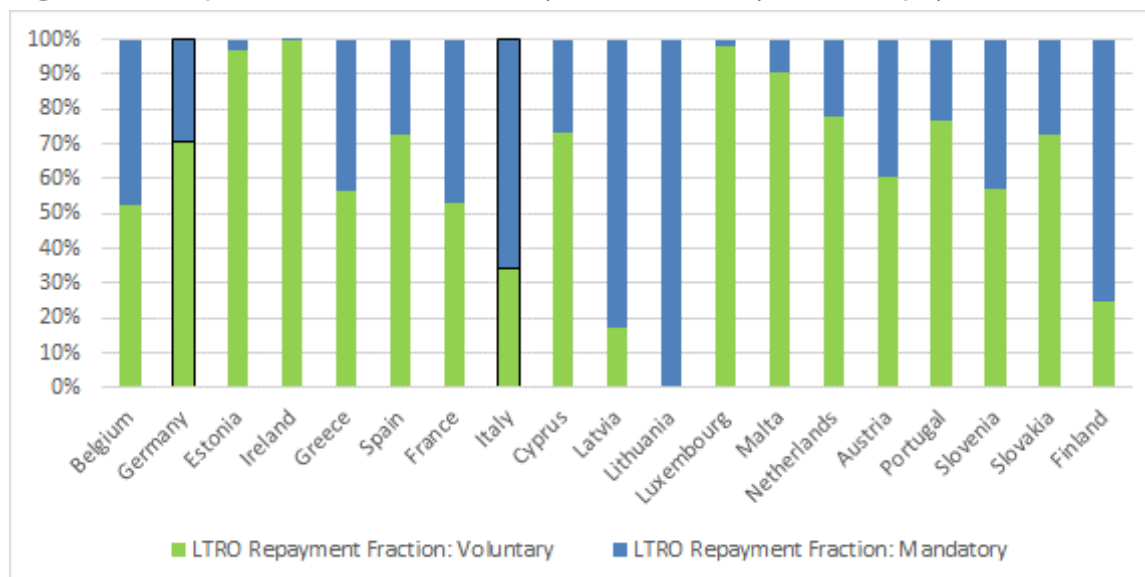
	Outstanding amount TLTRO 02.06.2023	Outstanding amount TLTRO 30.06.2023	Absolut change	% change
Belgium	46.9	13.0	-33.9	-72%
Germany	198.9	131.1	-67.8	-34%
Estonia	0.1	0.1	-0.1	-50%
Ireland	0.2	0.2	-0.1	-30%
Greece	28.3	16.6	-11.7	-41%
Spain	96.2	37.3	-58.9	-61%
France	263.1	146.4	-116.7	-44%
Italy	317.9	172.6	-145.3	-46%
Cyprus	5.0	4.6	-0.4	-7%
Latvia	0.3	0.1	-0.3	-73%
Lithuania	1.6	1.5	-0.1	-9%
Luxembourg	6.2	5.8	-0.4	-6%
Malta	0.1	0.1	-0.1	-48%
Netherlands	56.3	25.0	-31.4	-56%
Austria	46.3	26.0	-20.2	-44%
Portugal	12.8	5.2	-7.6	-59%
Slovenia	0.6	0.1	-0.5	-80%
Slovakia	6.3	4.9	-1.4	-22%
Finland	13.6	7.5	-6.1	-44%

Source: ECB's Disaggregated financial statement of the Eurosystem statistic, author's calculations

Note: Figure 4 presents the compulsory repayments of the TLTRO III Corona series on 28.06.2023 in EUR billion. The data source only provides LTROs, but given that 99% of LTROs are TLTROs, we use them interchangeable. The first column presents the outstanding TLTROs on 02.06.2023. The second column presents the outstanding amount of TLTROs on 30.06.2023. The third column presents the absolute change between the outstanding amount before and after the mandatory repayments, while the fourth column presents the percentage change between the outstanding amount before and after the mandatory repayments. Figures are expressed in billions of Euros. Figures in the % change column are different to interpret for countries which have already paid back LTROs substantially in Nov. and Dec. 2022 against those which have not.

Figure 4 presents a country breakdown of the second major TLTRO payback period. In contrast to the voluntary period between November and December 2022 (see Figure 3), the compulsory payback date in June 2023 (Figure 4) shows a different picture. Italian banks paid by back the most in absolute terms. While Italy's banks only paid back EUR 75 bn in Nov. and Dec. 2022 (Figure 3), they had to pay back EUR 145 bn on 28.06.2023 (Figure 4).

**Figure 5:** Comparison between voluntary and mandatory TLTRO repayments



Source: ECB’s Disaggregated financial statement of the Eurosystem statistic, author’s calculations

Note: Figure 5 presents a comparison between voluntary (Nov.-Dec. 2022) and mandatory (28.6.2023) LTROs repayments based on absolute changes presented in Figure 3 and 4. The data source only provides LTROs, but given that 99% of LTROs are TLTROs, we use them interchangeable. The fractions are calculated as the absolute repayment over the combined repayments of both events.

We have seen that German banks repaid the most during the voluntary phase (Figure 3), while during the compulsory payback in June 2023, Italian banks clearly stand out (Figure 4). Figure 5 visualises the differences by presenting the voluntary and mandatory repayments amounts by country as a percentage fraction. Based on both repayments’ periods, German banks paid back 70% of their repayments voluntarily, while Italian banks paid back only 34% voluntarily. To better understand the difference between mandatory and voluntary repayments and its effects on banks, we will now look more closely at these two countries and their respective banking system.

### 3.2. A quick primer on the accounting of central bank operations with the banking sector in the euro area

In the following, we want to examine what was the effect of TLTRO repayment within a country with a particular focus on the country’s banking system. For this, it will be useful to review how central bank operations by the ECB are accounted for on the ECB’s and the banking sector’s aggregate balance sheet.<sup>5</sup>

The TLTRO follows the ECB’s standard accounting for open market operations (OMOs). When a commercial bank borrows from the ECB, the reserves the commercial bank receives are a liability for the commercial bank: “Deposits from the Eurosystem”. The corresponding asset on the balance sheet of the ECB is a “Lending to euro area credit institutions (related to monetary policy operations)”. The commercial banks deposit the reserves at the ECB’s deposit facility – there is no choice, this is the only place reserves can be held –, which creates a liability at the ECB “Liabilities to euro area credit

<sup>5</sup> Of course, one would like to carry out the analysis at the level of individual banks. However, the borrowing of individual banks from the ECB or bank-level information about asset sales (QE) is not available to central-bank outsiders.

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institutions (related to monetary policy operations)". The corresponding asset for commercial banks is "Loans to the Eurosystem". Both the ECB's and the banking sector's balance sheet increase.

The accounting of asset purchases (QE) is different. Take first the simpler case when a commercial bank in the euro area sells a security to the ECB. That security then shows up as the following asset at the ECB: "Securities held for monetary policy purposes". In return the commercial bank obtains reserves, which shows up as "Loans to the Eurosystem" because they are in fact deposited at the ECB's deposit facility. The corresponding liability at the ECB is again "Liabilities to euro area credit institutions (related to monetary policy operations)". Now only the balance sheet of the ECB increases while the commercial bank has swapped its security for reserves.

Finally, if a euro area commercial bank sells a security to the ECB on behalf of a third party, then again, the balance sheet of the commercial bank increases. Because a third party sold the security to the commercial bank, the bank has created a new liability to pay the third party: the deposit to a non-euro area resident or a non-MFI (monetary financial institution) in the euro area.

In summary, without the involvement of third parties without access to the ECB, QE does lead to an extension of bank balance sheet. In contrast, a TLTRO will always increase the balance sheet of participating commercial banks. Conversely, exiting a TLTRO then always leads to a balance sheet reduction unless banks are able to replace the TLTRO-liquidity from other sources. A commercial bank repays its TLTROs with its reserves which leads to a reduction of the bank's balance sheet size. Figure 6 illustrates this. Bank A (first row) has borrowed reserves via a TLTRO. Bank A then repays the TLTRO (second row) and its balance sheet shrinks. Bank A then has insufficient reserves/liquidity given the amount of loans it holds (loans create liquidity risk — payments occur — against which banks hold liquidity). Bank B in contrast has generated reserves/liquidity via a larger inflow of deposits.<sup>6</sup>

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<sup>6</sup> This is a shortening of the logic because reserves can only come from the central bank. One fully scenario for bank B is that it had bonds in addition to loans, in line with its larger amount of deposits, and that bank B has sold the bond to the central bank for reserves. For simplicity, we have not shown this intermediary step for why a bank with more deposits has the same amount of reserves without borrowing from the central bank.

**Figure 6:** Exiting TLTRO: Stylized bank’s balance sheets



If a bank wants to avoid a reduction in reserves when repaying the TLTRO, it can do so by borrowing reserves from other banks via the interbank market (see Figure 6, third row). The “reserve poor” bank A receives reserves from a “reserverich” bank B via an interbank loan which then sits on the liability side of bank A and the asset side of bank B. In this scenario, the total amount of reserves has been reduced via the TLTROs repayments, but banks’ balance sheets size remains the same.

In conclusion, TLTROs do not necessarily result in a balance sheet size reduction as the interbank market is able to reverse this effect. Nevertheless, for this to happen, there needs to be demand (the “reserve poor” bank wants to avoid a balance sheet reduction) and supply (the “reserve rich” bank needs to be willing to lend reserves).

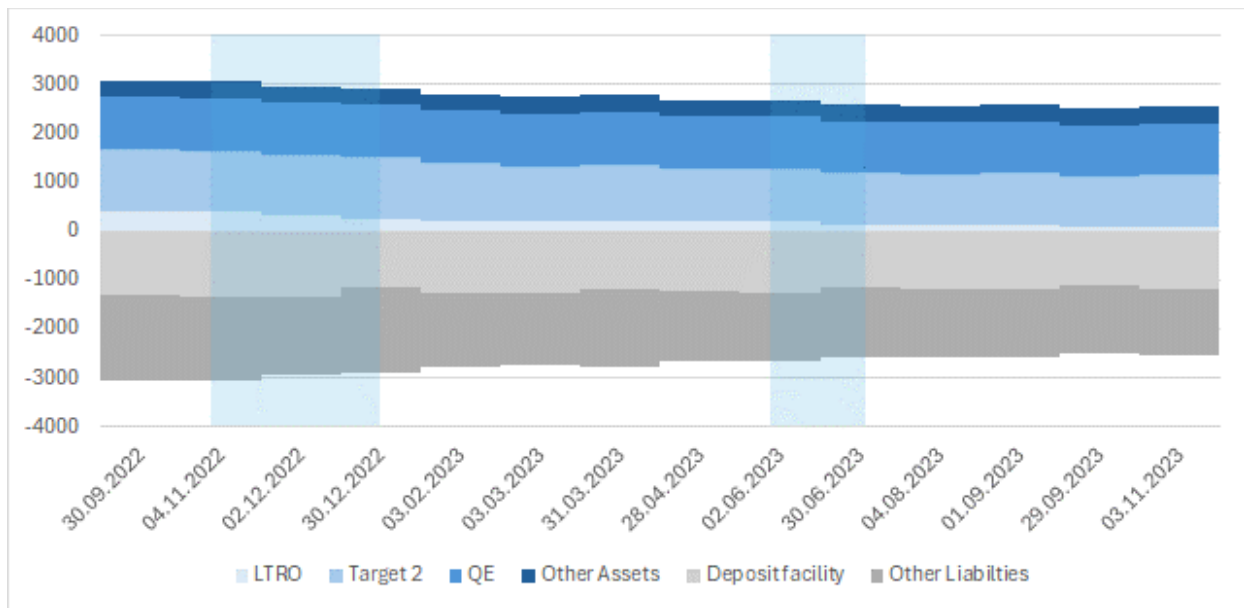
In the following, we will trace the assets and liabilities created by TLTRO III operations, as well as QE, on the balance sheets of the Bundesbank and of the Banca d’Italia and the balance sheets of the respective national banking sectors. We do so for the recent period that covers both the voluntary as well as the mandatory TLTRO repayment.

### 3.3. Germany’s banking system

Germany's central bank total balance sheet has fallen steadily without sudden drops during the voluntary repayment period in November/December 2022 and the mandatory repayment period in June 2023. The reason for this is that TLTROs are small in Germany in comparison to the overall balance sheet size. Moreover, there is little imbalance in the amount repaid in the two periods, in both cases German banks repaid about 40 percent of the then outstanding TLTRO amount. Moreover, German’s

Target 2 position (an asset)<sup>7</sup> has been reduced consistently. The reduction in central bank assets is mirrored by reductions in the deposit facility, in liabilities to other euro area residents and in liabilities to other non-euro area residents denominated in euro (both part of “Other Liabilities”).

**Figure 7:** Germany’s central bank balance sheet



Source: ECB’s Disaggregated financial statement of the Eurosystem statistic, author’s calculations

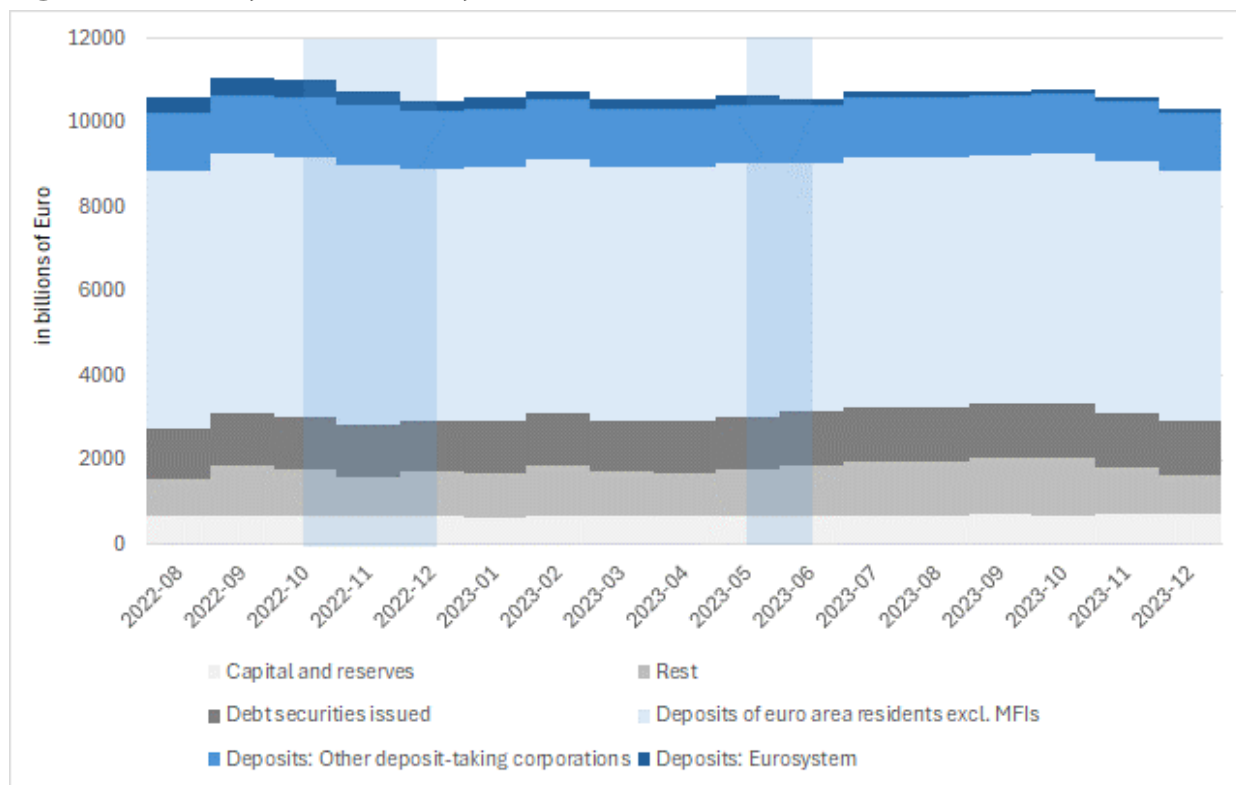
Note: Figure 7 presents Germany’s central bank balance sheet and its subcategories. On the asset side (positive figures) LTROs, Target 2, QE and other assets are presented in ascending order. On the liability side (negative figures), deposit facility and other liabilities are presented in descending order. Figures are presented in billions of Euros.

How does the smooth reduction of the Bundesbank’s balance sheet compare to the balance sheet of the German banking sector? Recall that a repayment of TLTROs should shorten the balance sheet of banks. On the liability side, there should be fewer deposits by the Eurosystem. Indeed, there is a reduction in deposits to the Eurosystem to almost zero (Figure 8).

Interestingly, while the balance sheet of the German banking sector shrinks during the voluntary TLTRO III repayments of EUR 163 bn between Nov. and Dec. 2022, it does not shrink during the mandatory repayment of EUR 68 bn on 28.06.2023. In the voluntary repayment phase, banks did not substitute the loss of liquidity with other sources, i.e., these reserves were truly in excess of banks’ needs, or at least the small repricing, which made TLTRO reserves more expensive, made it too costly to hold them.

<sup>7</sup> Target 2 is a net position. Therefore, it appears on the asset side of Germany’s central bank balance sheet and on the liability side of Italy’s central bank balance sheet. For more information about the role of Target 2 positions on the Eurosystem balance sheet, see [What are TARGET2 balances](#) and Whelan et al. (2014).

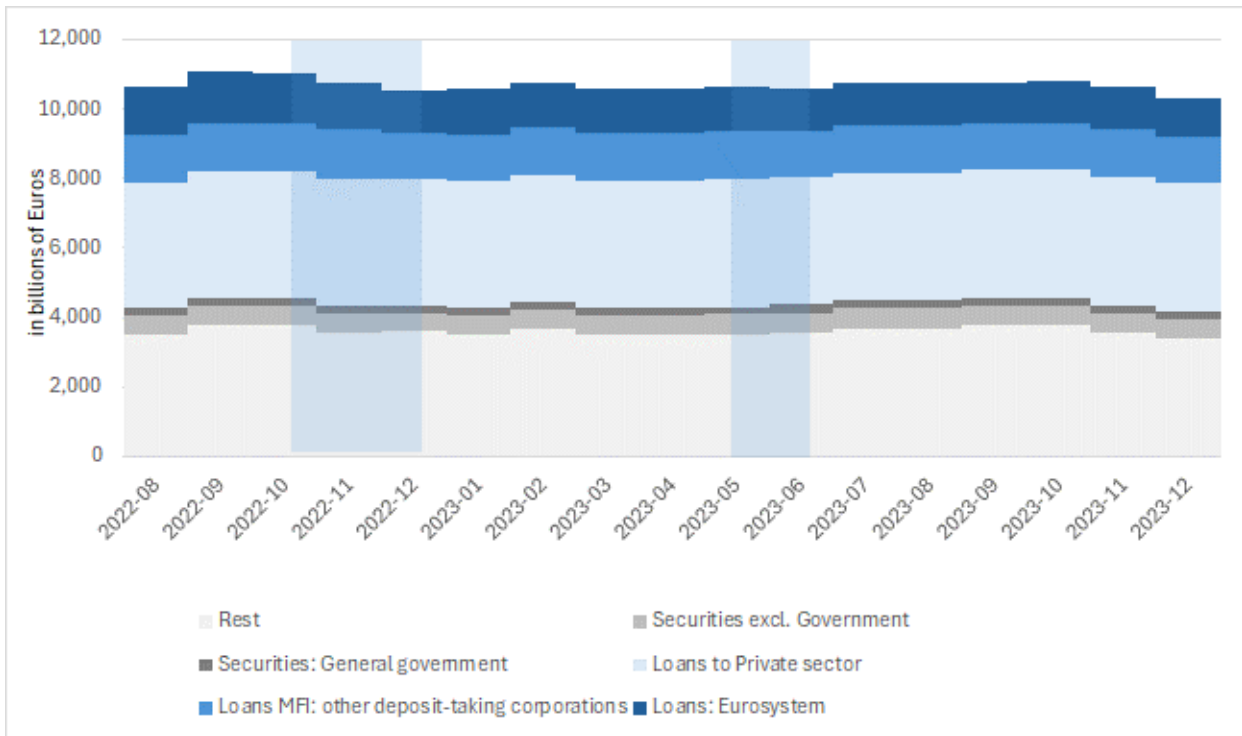
**Figure 8:** Germany's banks liability structure



Source: ECB's aggregated balance sheet of MFIs (excluding the Eurosystem) statistic, author's calculations

Note: Figure 8 presents the liability side of Germany's banking sector. The subcategories Capital and reserves, rest, debt securities issued, deposits of euro area residents excl. MFIs, deposits of other deposit-taking corporations and deposits of the Eurosystem are presented in an ascending order. Figures are presented in billions of Euros.

How do the changes on the liability side of the German banking sector relate to changes on the asset side? During the voluntary repayment phase, when the balance sheet of German banks shrank, the main reduction is in the loans to the Eurosystem, which captures the amount of reserves at the deposit facility of the Bundesbank. However, the overall reduction in assets was small because German banks increased their loans to both banks and non-banks in the months following the voluntary TLTRO repayment (Figure 9).

**Figure 9:** Germany's banks asset structure

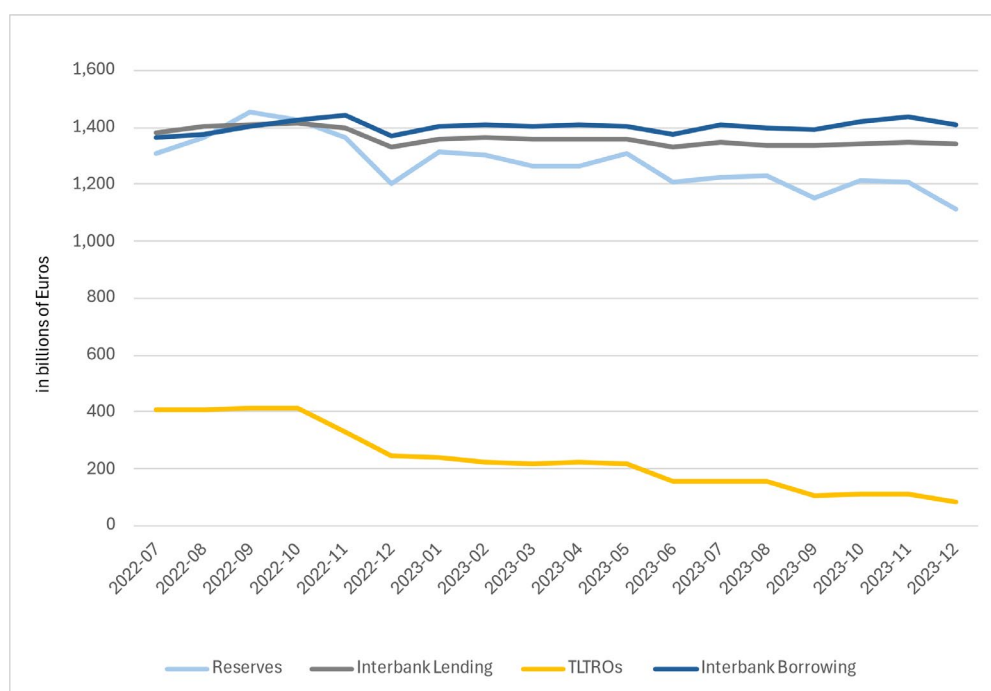
Source: ECB's aggregated balance sheet of MFIs (excluding the Eurosystem) statistic, author's calculations

Note: Figure 9 presents the asset side of Germany's banking sector. The subcategories Rest, securities excl. Government, securities: General government, loans to Private sector, loans: Other deposit-taking corporations (banks) and loans: Eurosystem are presented in an ascending order and add up to total assets. Figures are presented in billions of Euros.

While the asset and liability side give a good understanding about the overall evolution of the banking system, changes in the interbank market are difficult to see. Figure 10 therefore looks explicitly at central bank liquidity provision and at liquidity provision via the interbank market. As shown in Figure 6, banks face two options when repaying their TLTROs: They can either shrink their balance sheet or replace their TLTROs by interbank funding. Figure 10 shows that the amount of TLTRO-supplied reserves (400bn) is small relative to the overall amount of reserves (1300bn) before the repayments. Then, as we have already seen, German banks repay their TLTROs, which is mainly covered by a reduction in reserves. As most of the TLTRO repayments took place during the voluntary phase, it is intuitive that banks then do not need to offset it by interbank borrowing. The data supports this as interbank borrowing remained fairly flat during the last 18 months. Moreover, the interbank activity of German banks remains stable throughout the entire period, which indicates that not only German banks did not borrow and lend more, but also that there is no borrowing from non-German banks, who may be more in need of replacing TLTRO-supplied liquidity.



**Figure 10:** Exiting TLTRO: Central bank and interbank funding for German banks



Source: ECB’s aggregated balance sheet of MFIs (excluding the Eurosystem) statistic, author’s calculations

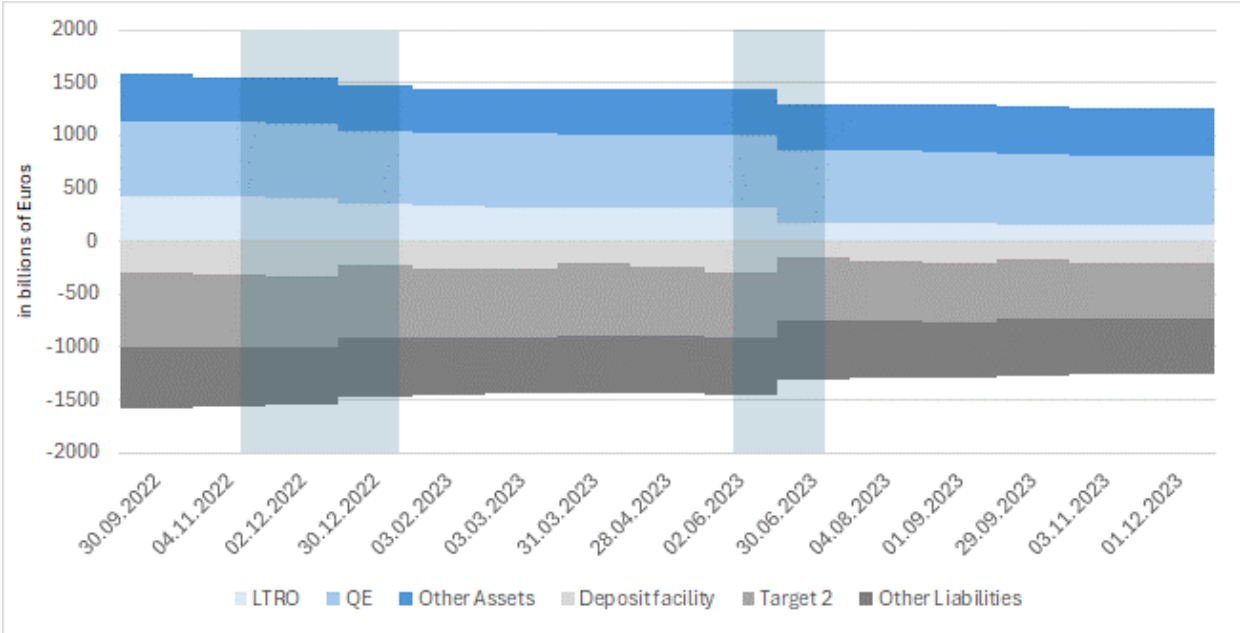
Note: Figure 10 presents the evolution of Germany’s banking sector assets and liabilities to the Eurosystem and other banks. The data source only provides LTROs, but given that 99% of LTROs are TLTROs, we use them interchangeable. Loans to the Eurosystem represent reserves, loans to other deposit-taking corporations represent interbank lending, deposits to the Eurosystem represent TLTROs and deposits to other deposit-taking corporations represent interbank borrowing. For better traceability, colours match with the colours in Figure 6. Figures are presented in billions of Euros.

Overall, the repayment of the TLTROs in Germany has been smooth. Interbank lending remained flat indicating that German banks did not need to replace TLTRO-supplied reserves. Indeed, most of the TLTRO repayments by German banks have been voluntary. We will now see that this is different for Italian banks, where TLTROs make up a larger volume in the banking system and a large fraction of TLTRO repayments was mandatory.

### 3.4. Italy’s banking system

Italy’s central bank balance sheet size shrunk consistently during the last two years, which is almost exclusively driven by a fall in TLTROs (Figure 11). In particular, the mandatory repayment in June 2023 led to significant reduction of the balance sheet. The reduction on the asset side (TLTRO, i.e., lending to euro area credit institutions for monetary purposes) is mirrored by a reduction of the deposit facility on the liability side.

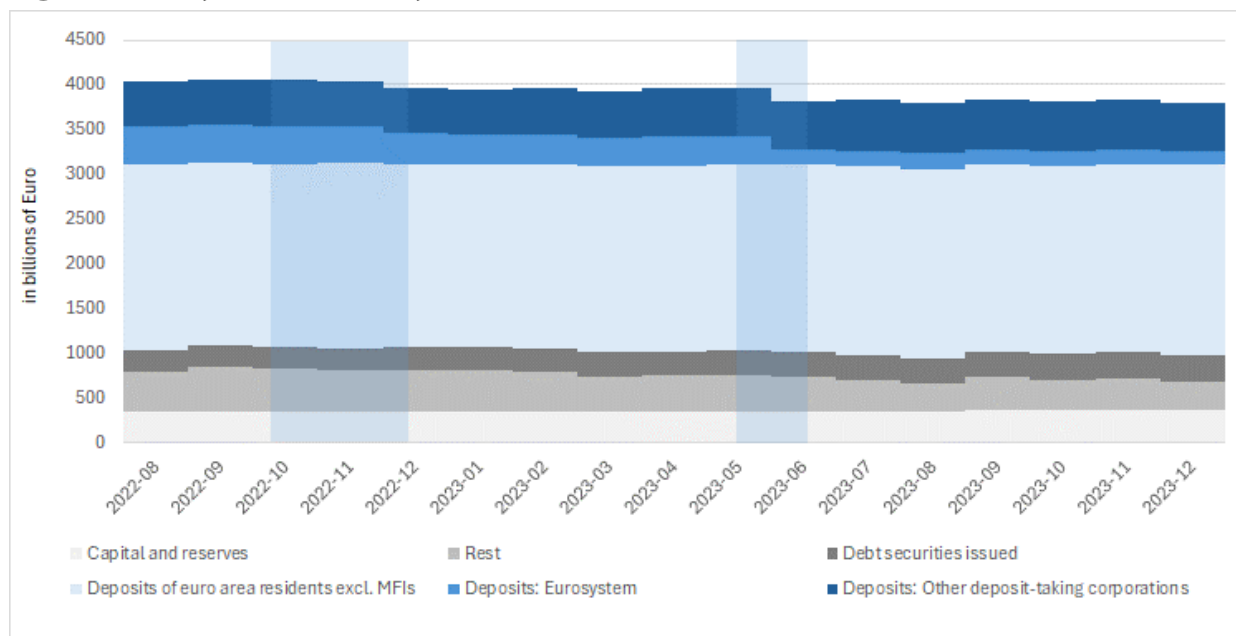
Figure 11: Italy's central bank balance sheet



Source: ECB's Disaggregated financial statement of the Eurosystem statistic, author's calculations  
Note: Figure 11 presents Italy's central bank balance sheet and its subcategories. On the asset side (positive figures) LTROs, QE and other assets are presented in ascending order. On the liability side (negative figures), deposit facility, Target 2 and other liabilities are presented in descending order. Figures are presented in billions of Euros.

The shrinking of the Banca d'Italia's balance sheet is accompanied by a shrinking of the balance sheet of the Italian banking sector. As for the central bank, the mandatory repayment of the TLTRO III loans in June 2023 stands out. This repayment shows up in the reduction of deposits from the Eurosystem on the liability side of the Italian banking sector (Figure 12). Interestingly, there is an increase in issued debt securities and in deposits from non-banks.

**Figure 12:** Italy’s banks liability structure

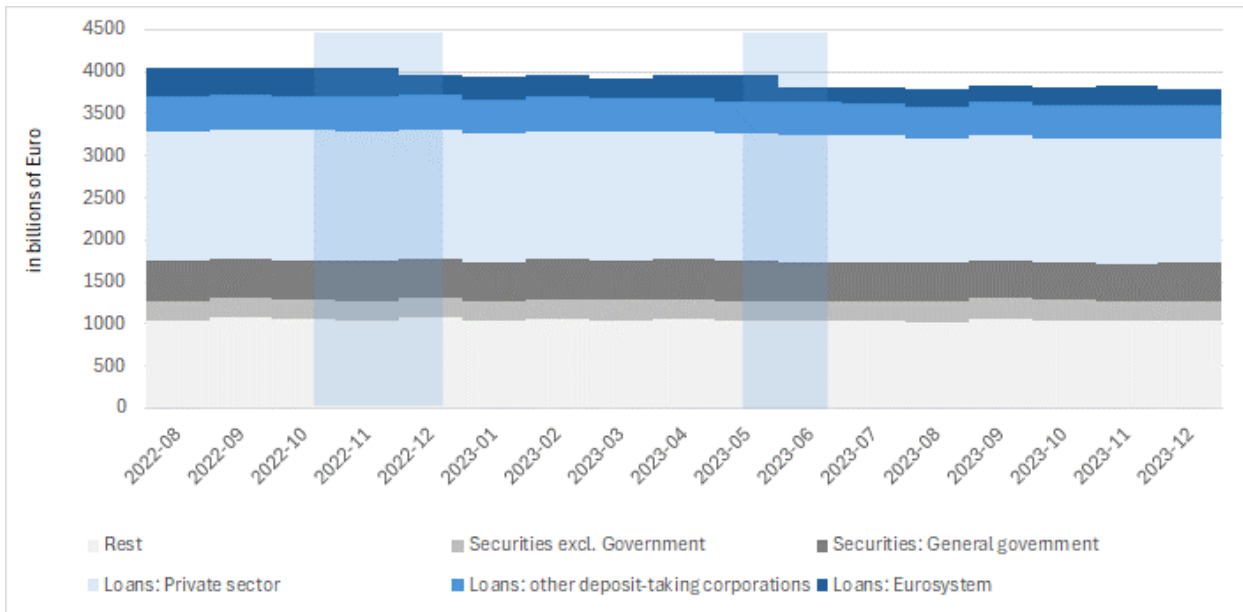


Source: ECB’s aggregated balance sheet of MFIs (excluding the Eurosystem) statistic, author’s calculations

Note: Figure 12 presents the liability side of Italy’s banking sector. The subcategories Capital and reserves, Rest, debt securities issued, deposits of euro area residents excl. MFIs, deposits of other deposit-taking corporations and deposits of the Eurosystem are presented in an ascending order. Figures are presented in billions of Euros.

While total assets of the Italian banking sector remained fairly constant prior to the TLTRO III repayments, they drop in June 2023 by EUR 136 bn (3.4% of total assets) and do not recover from it (Figure 13). This drop is almost identical to the mandatory TLTRO repayments on 28.06.2024 (EUR 145 bn).

**Figure 13: Italy's banks asset structure**

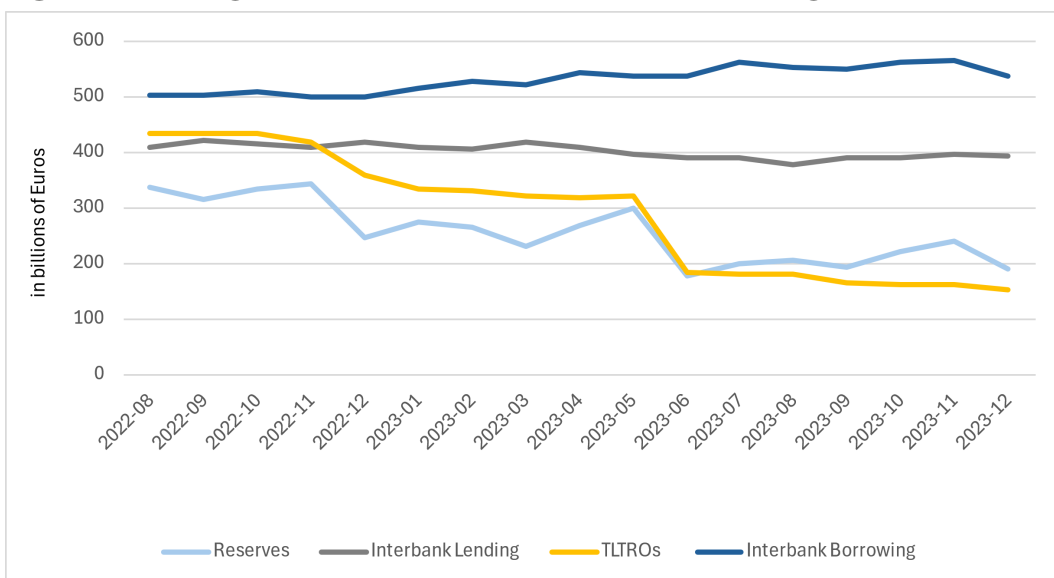


Source: ECB's aggregated balance sheet of MFIs (excluding the Eurosystem) statistic, author's calculations

Note: Figure 13 presents the asset side of Germany's banking sector. The subcategories Rest, securities excl. Government, securities: General government, loans to Private sector, loans: Other deposit-taking corporations (banks) and loans: Eurosystem are presented in an ascending order and add up to total assets. Figures are presented in billions of Euros.

We have seen that the balance sheets have decreased due to TLTRO repayments. What is next to analyse is if the interbank market was able to offset some of these effects. Like in Figure 9 for Germany, we can zoom into central bank liquidity provision in relation to interbank activity in Italy (Figure 14). As seen before, Italian banks repay their TLTROs, and mostly so in the mandatory repayment in June 2023. What is noteworthy is the magnitude of TLTROs in comparison to interbank funding and lending and reserves. While in Germany, TLTRO are less than one-third of reserves and interbank funding and lending, TLTRO exceeded reserves and interbank lending. Again, reserves decreased with TLTROs. Interestingly, and in contrast to Germany, some of this was offset by an increase in interbank funding.

**Figure 14: Exiting TLTRO: Central bank and interbank funding for Italian banks**



Source: ECB's aggregated balance sheet of MFIs (excluding the Eurosystem) statistic, author's calculations

Note: Figure 14 presents the evolution of Italy's banking sector assets and liabilities to the Eurosystem and other banks. The data source only provides LTROs, but given that 99% of LTROs are TLTROs, we use them interchangeable. Loans to the Eurosystem represent reserves, loans to other deposit-taking corporations represent interbank lending, deposits to the Eurosystem represent TLTROs and deposits to other deposit-taking corporations represent interbank borrowing. For better traceability, colours match with the colours in Figure 6. Figures are presented in billions of Euros.

The comparison of the TLTRO III repayments of German and Italian banks reveals some differences. First, the size of the Italian banking sector shrinks because of the repayments, while the size of the German banking sectors increases after the repayments. Second, TLTROs were a much bigger fraction of total liabilities for Italian banks than for German banks, so that its balance sheet size decreased more significantly. And third, the difference between the voluntary and the mandatory repayment shows up in the Italian banking sector. German banks repaid mostly voluntarily so that there was most likely no need for substitute funding. Italian banks repaid mostly mandatorily and were able to offset some of the effects by an increase in interbank lending. Overall, there are therefore indications that the exit from TLTRO III was smoother for German than for Italian banks.

## 4. OUTLOOK

TLTRO III repayments lead to a reduction of the ECB's deposit facility where banks have to store their reserves. We know that the final four TLTRO III series are all due in 2024. Subtracting the remaining outstanding TLTROs from the current balance on the deposit facility at the national level gives the expected<sup>8</sup> amount of reserves across euro area countries at the end of 2024.

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<sup>8</sup> Under the assumption that no other liquidity operations, asset purchases or cross-border reserve lending take place.

**Figure 15:** Deposit Facility net of TLTROs

	Absolut	% of Bank's total assets
Belgium	199543	15%
Germany	1075858	10%
Estonia	7551	18%
Ireland	79064	5%
Greece	8957	3%
Spain	227034	8%
France	664830	6%
Croatia	13591	17%
Italy	58540	2%
Cyprus	18028	26%
Latvia	5619	20%
Lithuania	8800	14%
Luxembourg	154820	11%
Malta	5150	12%
Netherlands	282187	10%
Austria	81899	8%
Portugal	33860	8%
Slovenia	9876	18%
Slovakia	11833	10%
Finland	116177	16%

Source: ECB's Disaggregated financial statement of the Eurosystem statistic, author's calculations

Note: Figure 15 presents the expected outstanding deposit facility by subtracting the current deposit facility by the outstanding TLTROs, expressed in millions of Euros. The data source only provides LTROs, but given that 99% of LTROs are TLTROs, we use them interchangeable. The second column sets the absolute figure into perspective by dividing it by total assets of the country's banks total assets.

The distribution of expected reserves at the end of 2024 differs substantially among countries (Figure 15). In absolute terms, banks in Germany, France, Netherlands and Spain will have the most reserves. It is therefore no coincidence that banks from these countries paid back the most of the TLTRO III during the voluntary phase between November and December 2022. To normalize the holdings for the country's size, the expected reserves remaining on the national deposit facilities are expressed as a percentage of the national bank's total assets in the second column. Here, Italian banks clearly stand out with only 2% of reserves relative to the size of Italy's banking sector.

TLTRO III and QE work differently. TLTRO III is channelling reserves directly between the Eurosystem and individual banks. For QE, the Eurosystem buys securities from the market. Nevertheless, the Eurosystem pays for these securities with reserves, which finally will land on the bank's balance sheets. The two programs are therefore similar in the sense that both generate excess reserves for the banking system. This is the reason why the deposit facility can still be positive for all countries even when all TLTROs have been repaid. The abundance of QE induced reserves is most likely the reason why the previous TLTRO III repayments went so smoothly without creating any stress in the banking system or in financial markets. The next question then is what happens when QE-induced reserves shrink (see also Acharya et al., 2022).

Note that the figures in the second column are at the aggregated banking sector level. If some banks in Italy hold substantially more than 2% of reserves, other Italian banks need to hold less. In general, the lower the figure for a country, the more likely it is that a number of banks in that country are expected not to have any reserves in the central bank deposit facility. Theoretically, this is not per se an issue for individual banks. Any bank could still borrow from other banks, either at the national or the

euro area level. The question remains if national and cross-border interbank lending will be able to increase (further) when it is needed to match the shrinking of the ECB's balance-sheet and hence, the reduction in central bank reserves available for banks.

Due to high liquidity buffers during the previous years, banks were not dependent on the interbank market. The more liquidity is drained, the more banks will be dependent on interbank lending. Future shocks to the economy and the banking system, which will impact interbank lending, are therefore more likely to spread risks than in the past. In this respect, it is not clear whether interbank markets can establish the same role they had before 2009.

To claim that exit from the TLTROs was smooth during the previous payback periods does not automatically mean there will be no stress regarding banks' liquidity situation in the future. It needs more caution on the upcoming TLTRO III repayments as more and more liquidity is drained for certain banks and countries, although repayments will be smaller in size than the previous payback periods.

## 5. CONCLUSION

This study analyses the potential consequences of TLTRO III exit. TLTRO III has been introduced to support bank lending within the Euro Area. Starting in 2019, ten TLTRO III series have been implemented, each with a duration of three years. As inflation has been consistently above target, no additional series have been implemented so that the tenth TLTRO III series is due at the end of 2024 and seven series have already fully paid back. Furthermore, the ECB increased the lending rates, which made TLTRO III less advantageous for banks, and set up early repayment dates. As of January 2024, around 80% of outstanding TLTRO III is already paid back.

Unfortunately, bank level data was not publicly available for this study, so we had to access and analyse central bank and aggregated banking statistic instead. Two major payback periods have taken place. The first appeared between November and December 2022 and was voluntary. The second appeared on 28.06.2023, which was mandatory as the Corona series was due, which amounted for around 50% of all TLTRO III series. This distinction is crucial as the upcoming TLTRO III repayments will be mandatory and not voluntary.

If we analyse the two payback periods at national level, we see that for instance German banks paid back most of their TLTRO III during the voluntary repayment phase, while Italian banks were reluctant to use that window and had to payback most of their TLTROs during the mandatory repayment in June 2023. This shows that some national banking systems are in more need of reserves than others. Nevertheless, even the mandatory repayment phase in June 2023 did not create stress in the banking sector.

This can be explained with the impact of Quantitative Easing (QE). TLTRO III and QE share the similarity that both create excess reserves which are located in the deposit facility. The difference is that TLTRO III is directly channelled to banks and therefore leads to an increase in banks' balance sheet. It is therefore no surprise that central bank balance sheets as well as banks' balance sheets shrink during the repayment phases. Nevertheless, as QE has created reserves as well, the Eurosystem as a whole contains still sufficient amounts of liquidity.

That assessment may not hold true anymore if one looks at a national level. For instance, Italian banks' expected reserves at the end of 2024 are only 2% of bank's total assets. Although the upcoming TLTRO repayments will be smaller, they become important in relative terms as more and more liquidity is drained. 2% on the aggregated level makes it likely that some Italian banks are already dependent on the national interbank market, which is indeed seen somewhat in the data we present. As the Eurosystem contains overall sufficient liquidity, more bank lending between member states would be highly desirable. In particular, the German banking system still appears to have plenty of reserves.

In the past, the interbank market was not a necessary funding tool for most banks, so that shocks to the economy or the banking sector did not accelerate via reluctant interbank lending. This might change in the future as more and more banks will be dependent on this sort of funding again. Therefore, interbank lending needs to be monitored more closely and the open question remains if especially cross-border interbank funding will be able to expand again when it is needed. Nevertheless, one should not forget that the ECB can counteract anytime and increase QE or introduce new series of TLTRO to overcome liquidity crisis. Of course, this would indicate that at least some banks were indeed dependent on central bank funding, or phrased differently, dependent on central bank reserves.



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This study analyses potential consequences of exiting the Targeted Long-Term Refinancing Operations (TLTRO) of the European Central Bank (ECB). Thanks to its asset purchase programs, the Eurosystem still holds plenty of reserves even with a full exit from the TLTROs. This explains why voluntary and mandatory repayments of TLTRO III borrowing went smoothly. Nevertheless, the more liquidity is drained from the banking system, the more important becomes interbank market borrowing and lending, ideally between euro area member states. Right now, the usual fault lines of the euro area show up. The German banking system has plenty of reserves while there are first signs of aggregate scarcity in the Italian banking system. This does not need to be a source of concern if the interbank market can be sufficiently reactivated. Moreover, the ECB has several tools to address possible future liquidity shortages. document was provided by the Economic Governance and EMU Scrutiny Unit at the request of the ECON Committee).

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