

Department of Business and Management Master's Degree in Corporate Finance

IMPACT OF TLTROS ON BANKS' BALANCE SHEET AND FUNDING STRATEGIES: A FOCUS ON BOND ISSUANCE AND LIQUIDITY DISTRIBUTION

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ACADEMIC YEAR 2023/2024

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EXECUTIVE SUMMARY

This study analyses the impact of TLTRO operations on banks' balance sheet, with a focus on how the presence, as well as the maturity of these operations, influence banks' propensity to issue bonds. Indeed, bond issuance represents a relevant source of funding for banks, but the use of bonds as a form of external financing depends mainly on its relative cost compared with that of alternative sources of financing, such as central bank liquidity. TLTROs had a significant influence on banks' balance sheet dimension, contributed to avoid that banks shrink their loan books reducing the financing to the real economy. Moreover, TLTROs had a significant positive impact on banks' profitability, providing banks with extensive funding at a favourable price, weakening the transmission of financial shocks to borrowing costs via the financial markets, and supporting banks to maintain favourable lending conditions towards firms and households.

The study is organized as follows:

Chapter 1 describes the main features of the three series of TLTRO operations that took place from June 2014 to December 2024, when the last outstanding amount is due to be repaid. Chapter 1 goes through the overall economic and financial conditions that justified the Governing Council to adopt these measures; at the beginning in response to the market disruptions that followed the development of the Great Financial Crisis, afterwards, as a mean to address the adverse impact of the COVID-19 pandemic and maintain favourable financing conditions for the real economy.

Chapter 2 analyses the opportunities for participating banks offered by TLTROs. For ten years European banks had access to a large amount of liquidity at a reduced cost which became more easily accessible because the ECB also relaxed its rules on acceptable collateral. This had the effect to boost the long-term funding of the banks, which could invest in longer term loans – expanding their loan book – or longer term securities – increasing the size of their securities portfolio – or even increase the reserves held for precautionary reasons or to comply to new liquidity regulations. Finally, banks had also the chance to restructure their market funding taking advantage of the favourable TLTRO conditions.

Chapter 3 focuses on bond issuance of Italian banks in the period between the onset of the global financial crisis and the start of monetary policy normalisation process. In parallel with the TLTRO participation, while TLTRO provided banks with ample liquidity and gave a positive contribution to their liquidity ratios, I find that banks have decreased their issuance of certain securities, with the decline in issuance activity being particularly strong for small banks. I highlight that also other factors contributed to the lower activity in market issuance, however it appears clear that unconventional monetary policy measures adopted in the period between the end of the great financial crisis and the start of the tightening cycle, significantly altered banks' funding strategies, leading them to reduce their reliance on bonds as a source of funding. **Chapter 4** is more focused on recent years, characterized by monetary policy normalization as the ECB, since July 2022, has started a tightening cycle reducing its balance sheet, mostly through TLTRO redemptions. As the central bank balance sheet reduction continues, liquidity distribution patterns will become increasingly important to prevent fragmentation, uneven financing conditions and impairments in the monetary policy transmission. This raises the question of how banks are adjusting to an environment of lower aggregate liquidity and whether liquidity is flowing effectively from banks with still abundant liquidity to those with emerging liquidity needs. I then analyse most recent patterns in bond issuance and the role of repo markets as the most important channels of liquidity distribution.

TLTRO operations were effective in providing a record level of liquidity and funding support to the European banking sector throughout a period in which many lenders experienced serious difficulties to access market for funding. This was particularly true for TLTRO III operations that saw the participation of around 2,000 banks from 19 countries. The reason for this was that TLTRO conditions were perceived as favourable by all banks, independently of their jurisdictions.

A favourable borrowing allowance provided banks the capacity to fulfil their funding needs and to increase the reward they would receive when meeting the benchmark. The incentive scheme based on a price at or below the DFR and the large BA resulted in a record high take-up. Many banks have taken the opportunity to maximise this potential reward

TLTROs operated via multiple mechanisms to support the bank lending channel and should not be seen narrowly as a tool to mitigate the effect of negative interest rates. The objective of TLTRO was not to provide mitigation, but to keep bank lending conditions favourable.

Banks understood TLTRO potentialities and used this funding in many different ways. As policy normalisation progresses and TLTRO funds are completely reimbursed other ways of distributing liquidity within the Eurosystem are gaining momentum. Bond issuance is again on the rise and repo markets are becoming a very important channel for liquidity distribution, substituting effectively central banks intermediation.

CHAPTER 1

Understanding TLTRO's

On 5 June 2014 the Governing Council of the ECB announced new measures to support bank lending to the real economy via the provision of long term financing to euroarea banks. In order to do this the Governing Council decided to conduct, over a window of two years, a series of longer-term refinancing operations aimed at improving bank's capacity to extend loans to the non-financial private sector, excluding loans to households for house purchase¹. The acronym of TLTROS (Targeted Longer Term Refinancing Operations), that identified the new measures, was chosen to highlight that the objective of the Governing Council was not only to provide long term bank funding but to support lending to the real economy as well.

The new operations displayed some unique features. First, the tenor of the operations (4 years) was much longer that the general central bank refinancing operations (MRO/LTRO – Main/Long Term refinancing operations) of one-week or three months duration. Moreover, in order to push the banks (ECB monetary policy counterparties²) to channel the funding to the real economy financing, the Governing Council devised an incentivising mechanism that would apply to borrowing allowance (i.e. the amount of money that each bank was entitled to borrow under the new facility) and to the pricing of the operations (the cost of funding for borrowing banks).

Access to the new facility was not unrestricted. As a general rule counterparties can access central bank funding as long as they have acceptable collateral. Instead, initially, counterparties were entitled to a TLTRO borrowing allowance equal to 7% of the total amount of their already outstanding loans to the euro area non-financial private sector. Subsequently counterparties could borrow additional amounts, in a series of TLTROs conducted quarterly, that could reach up to three times each counterparty's net lending (i.e. lending in excess of the previous 12 months, up to April 2014). Fixed maturity for all operations was in September 2018, however counterparties could be requested to early repay the operations if they would fail to expand their loans to the private sector.

¹ In order to avoid the risk of creating real estate bubbles.

² Only credit institutions that were eligible Eurosystem counterparties could participate in the TLTROs directly. However, euro area credit institutions that were not eligible Eurosystem counterparties could be members of a TLTRO group. Each TLTRO group needed to appoint one group member as the lead institution of the group and the borrowing allowance would be the sum of the borrowing allowance of all group members.

The interest rate on the TLTROs was fixed over the life of each operation at a very attractive rate, i.e. the rate on the one-week Eurosystem's main refinancing operations plus a fixed spread of only 10 basis points. However, shortly after (January 2015), in order to further support the effectiveness of the targeted longer-term refinancing, the Governing Council decided to eliminate the 10 basis points spread for the operations to be conducted thereafter.

Starting 24 months after each TLTRO, counterparties had the option to repay any part of the amounts they were allotted in that TLTRO at a six-monthly frequency (voluntary early repayment). However, counterparties that borrowed under the TLTROs and whose net lending to the private sector resulted below the benchmark were requested to pay back borrowings in September 2016 (mandatory early repayments).

A thorough analysis of the take-up of TLTROs is beyond the scope of this paper, however it is important to have a clear picture of how different banking systems relied on TLTROs in order to understand the impact these operations had on market issuance from banks and their clients during the years after the global financial crisis until 2023. In particular it seems useful to recap the overall economic and financial conditions that justified the Governing Council to adopt these measures.

In response to the global financial crisis (GFC) and its aftermath, to address financial market dislocations, many central banks introduced special lending programs, generally of longer tenor vis-à-vis the ordinary central bank financing. At the beginning special lending programs were adopted to address general market strain because, in a number of countries, bank funding conditions and money market liquidity had deteriorated significantly. For example, the ECB 3 years VLTROs, that were conducted between 2011 and 2012, were focused on providing counterparties with access to liquidity, which had become difficult to obtain in stressed funding markets.

Subsequently the aim of central bank funding shifted towards providing additional monetary stimulus amid concerns that the liquidity they were injecting was not being sufficiently passed-through to the broader economy. The European Central Bank, the Bank of England and the Bank of Japan introduced lending programmes "with additional conditions" beginning in 2010 and all these programmes provided incentives to institutions to extend credit to targeted sectors of the real economy, including by offering lower-cost, higher-volume, and/or longer-maturity loans from the central bank in an environment of very low or negative short-term rates.

The underlying reasoning was that the incentivizing provisions included in the TLTRO would stimulate banks' use of respective funds for granting more loans to the real economy. Of course, the extent to which these funds could actually reach the real economy depended upon the further economic development and the recovery of loan demand more specifically.

It cannot not be excluded that some of the funds injected via the TLTRO operations have been used by banks to invest in bonds, but this did not happen on a large scale. The design features of the TLTROs (in particular the calibration of borrowing allowances and mandatory early repayments) provided incentives for banks to use the funds mainly to grant new loans to the euro area non-financial private sector.

Besides the incentivising features, the ECB developed a close monitoring of banks' lending behaviour. Within this monitoring framework, banks participating in the TLTROs were required to report data on their loan portfolio until the TLTRO programme end.

The provision of long term funding via TLTROs was welcomed by the market but the initial take-up was below expectations. The reasons for this were primarily the lack of immediate credit demand, the negative carry of any short-term investments where funds could be temporarily parked and the uncertainty concerning the capacity of many banks to be able to expand their loan book. Only at a later stage a large number of banks switched from the 3-year LTRO into the TLTRO as the pricing of the new operation made it more convenient compared to other ECB operations.

As expected, the largest take-up of TLTRO-I was in Italy. Relatively large take-up was also observed in France and Spain. Demand from core countries (Germany, The Netherlands, Luxembourg) was lower. A number of reasons can justify this behaviour by banks located in core countries. Ahead of the first TLTRO certain market participants expressed concerns that participation in these operations could signal a bank's weakness and difficulty in accessing funding markets – introducing so-called "market stigma" - which could further harm the bank's reputation in the market. These concerns were further supported by the experience of certain banks with their take-up in the 3-year LTROs, which had been scrutinised by rating agencies, and the use of the funds to buy securities, which had been criticised in the media.

On the other hand banks that decided not to participate mentioned also other reasons, such as sufficient long-term funding or low credit growth. Certain banks were also wary of the risk of forced repayment, as it could have implied loss of reputation. In particular, the bank could be perceived as underperforming in terms of loan creation and bad in judging its own prospects when it took up the liquidity. This risk introduced an implicit limit on TLTRO participation.

At the same time, many banks made their TLTRO take-up public and used the TLTROs to advertise new lending campaigns to the real economy and to profile the bank this way. This was the case for almost all large Spanish and Italian banks, that used the announcement as an opportunity to market new SME lending programmes.

As Spanish and Italian banks accounted for 54% of the total take-up in TLTRO-1 and 43% in TLTRO-2, this motivation appears to have played an important role in determining the TLTRO take-up. Overall, the fact that TLTRO participation could have positive reputational effects drew in more participation in TLTROs and gave rise to positive stigma.

On March 10th 2016, approaching the end of the first series of operations, the ECB decided to launch a new series of four targeted longer-term refinancing operations (TLTRO II), to be conducted from June 2016 to March 2017 to reinforce the ECB's accommodative monetary policy stance, incentivising bank lending to the real economy.

Taking stock of the experience matured in managing TLTRO I, the ECB decided to be even more generous in setting the financial conditions and borrowing allowance of TLTRO II. All operations had a maturity of four years and were not subject to mandatory early repayments; at the same time, the measure provided flexibility as counterparties were able to voluntarily repay the amounts borrowed under TLTRO II at a quarterly frequency. Counterparties were able to borrow in the operations a total amount of up to 30% of their outstanding loans (less any amount which was previously borrowed under the first TLTRO operations). The interest rate applied was the same of the MROs but counterparties whose eligible net lending exceeded their benchmark were charged a lower rate for the entire term of the operation. This lower rate was linked to the interest rate on the deposit facility (i.e. a negative rate). The pricing mechanism of TLTRO II was intended to incentivise banks to pass on to ultimate borrowers the accommodative funding conditions it offered. Counterparties would achieve the lower rate if they exceed their benchmark stock of eligible loans. This means that all counterparties with positive eligible net lending or with an improved lending performance were able to borrow at a rate lower than the MRO rate prevailing at the time of allotment.

While approaching the termination of the TLTRO II program, market conditions in the EU were still far from normalized. Even though banks were increasingly more able to refinance themselves very short-term, many lenders were still facing problems to get stable market funding. Access to longer-term money markets was limited, as no entity was willing to provide liquidity for longer periods of time, given the general uncertainty how liquidity needs would develop going forward. Unsecured money market financing, e.g. via bank issuance of commercial papers, was available only for maturities of a few days and in the repo market, longer-term refinancing was only available against HQLA collateral, which was scarce also because of ongoing central bank asset purchases.

Another issue for concern was the need to avoid the so called "cliff effects"³ stemming from the contemporary expiration of TLTROs which could imply the drain of a large amount of liquidity from the banking system.

Therefore, in March 2019, the ECB announced a third series of quarterly targeted longer-term refinancing operations (TLTRO III), to be carried out between September 2019 and March 2021. Like the previous programmes, the operations featured built-in incentives for credit conditions to remain favourable: a duration of three years and interest rate indexed to the main refinancing operations, with the possibility to benefit from a further interest rate reduction for those who achieved the required lending targets. Among other things TLTRO III acted as backstop, providing reassurance that banks could still access long term financing.

³ The term "Cliff effects" refers to the concentration of payments and maturities over a short time frame.

The following year, due to the Coronavirus outbreak, revenues of many corporates and households had decreased, while they needed liquid funds in order to cover ongoing expenditures. Banks were losing more and more stable funding sources; in particular, deposits had become more volatile as clients needed to withdraw them at short notice. Therefore, in order to address the adverse impact of the COVID-19 pandemic, the Governing Council introduced even more favourable conditions for TLTRO III operations⁴.

The last TLTRO operation took place in December 2021. In the end these measure achieved one of the largest liquidity injections by the ECB as the total uptake amounted to \notin 2.2 trillion. In particular, the operations conducted in response to the Covid-19 crisis were effective in providing a record level of liquidity and funding support to the European banking sector throughout the entire pandemic period. TLTROs take-up was proportionally distributed among all euro area jurisdictions and in line with the size of the banking sector in the various countries. This was particularly true for TLTRO III operations that saw the participation of around 2,000 banks from 19 countries. The reason for this was that TLTRO conditions were perceived as favourable by all banks, independently of the jurisdictions, with no signs of stigma attached to participation.

Analysing TLTRO one could observe that they proved complex operations. Fixed costs for participating banks were not negligible due to IT investments that were necessary to comply with ECB reporting requirements; ECB also introduced the need for auditing verification, which added to total costs.

However the total burden was offset by some technical features like the possibility of bidding via group that favoured the participation from small banks⁵. Most of all, while not originally presented by the Eurosystem as a mitigated instrument, due to extremely favourable price conditions, TLTRO ended up representing a powerful tool to mitigate effects of NIRP (Negative Interest Rate Policy) on banks' profitability.

Suffice it to say that, at minimum, participating banks (if lending targets were met) could benefit from the spread between the cost of funding and the remuneration on additional reserves deposited at the Eurosystem (DFR).

Having said so some less positive side effects were also observable. For example the growth of excess liquidity coincided with a decline in interbank trading activity⁶, which can have negative implications for the erosion of market infrastructures and banking know-how and for weaker market discipline, with possible implications for financial stability.

⁴ Other long term financing operations were launched to counter the COVID related crisis; later, following the persistence of the pandemic, financial conditions and borrowing allowances were further eased and three additional operations were held between June and December 2021.

⁵ In order to participate in TLTROs, banks that had a close link to another participating bank could form a "TLTRO Group". The formation of TLTRO groups was intended to "facilitate the participation of institutions that, for organisational reasons, borrow from the Eurosystem by means of a group structure", so that the borrowing allowance and the benchmark calculations could be performed for the entire group. The ECB, (through the single NCBs), dealt with a single counterparty (the group's lead institution) that would distribute the borrowing to the other group members.

⁶ See BIS report Large central bank balance sheets and market functioning October 2019

Also, the large take-up of central bank liquidity contributed to reduce disposable collateral (that was encumbered at the central bank) in a similar way of central banks' purchase programmes.

During 2023, TLTRO outstanding amounts decreased from EUR 1,318 billions to EUR 392 bn. The biggest single repayment took place in June 2023, when banks repaid EUR 506 billions. The expiration of the last operation will fall in December 2024 but, following the revision of the financial conditions applicable to borrowings, most banks have already completed the early repayment of the outstanding amounts.

It's therefore the right moment to draw some conclusions on how TLTRO availability impacted both banks' and non financial firms' behaviour regarding market issuance and how are they positioning to substitute central bank funding.

CHAPTER 2

Impact of TLTROs on Banks' Balance Sheets

In analysing the impact of large lending programs like TLTROs on market-functioning and the banks' funding strategy one must preliminary understand the effect of these operations on participating banks' balance sheet and their P/L accounts.

The initial effect of a bank's participation in TLTROs is the expansion of the bank's balance sheet, with the addition of the funding requested from the Eurosystem on the liabilities side and, consequently, an increase in reserves held at the central bank on the assets side. The bank must then decide what to do with its new funding.

Indeed TLTROs offered a number of opportunities for participating banks. First, the cost of funding was reduced and it became more easily accessible because the ECB relaxed its rule on acceptable collateral. This offered the opportunity for collateral upgrades, because the bank could post rather illiquid assets (such as loans) with the Eurosystem to collateralize TLTRO borrowing. The liquidity obtained encumbering illiquid assets could then boost the long-term funding of the bank, which could invest in longer term loans or longer term securities because the maturity mismatch between assets and liabilities was reduced and the banks could better control interest rate risk.

For these reasons TLTROs became a powerful tool to counter the tendency of the banking system to "deleverage", i.e. to reduce the size of their balance sheet, which is a typical behaviour for banks experiencing financial distress in order to survive (see Ben-David, Palvia and M. Stulz, 2019).

2.1 Expanding the loan book

The first option for a bank accessing TLTRO funds was to increase the provision of loans to households and non-financial corporations⁷, which was TLTRO primary goal and a prerequisite for lowering the cost of borrowing, using the operations built-in incentives.

The existing literature, which estimates the impact of LTROs and TLTROs on lending growth using aggregate and bank-level data for the Euro Area or for specific countries, confirm how large lending programs had indeed a positive effect on loan origination.

A first set of studies is related to the 3-year LTROs implemented in 2011 and 2012; Darracq-Paries and De Santis (2015), Balfoussia and Gibson (2016), Casiraghi et al. (2016), García-Posada and Marchetti (2016), and Carpinelli and Crosignani (2017) find expansionary impacts of LTRO on industrial production (around 5.7%) and loans (between 2 and 2.9 percentage points), especially for banks holding few sovereign bonds in their balance sheet and operating in less concentrated markets. Andrade et al. (2019) estimate that every 100€ of VLTROs, which had an original duration of 3 yrs, corresponded to an expansion in loans by 18.5€ with a stronger impact for banks having a low level of liquid assets (sovereign bonds).

A related branch of the literature studies the effect of TLTROs on loan expansion. Benetton and Fantino (2018, 2021) estimate an overall impact of TLTRO-I on loan growth of 4% after one year, and find that Italian banks participating in TLTROs increased lending by 17% with a stronger effect in more competitive markets. Andreeva and García-Posada (2020), Bats and Hudepohl (2019), Afonso and Sousa-Leite (2020), Da Silva et al. (2021), and Laine (2021) provide evidence that TLTROs increased lending (between 9 and 16 percentage points), especially in very competitive markets, and did not significantly affect government bond holdings.

Regarding the last series of TLTROs, Altavilla et al. (2023) estimate that the April 2020 recalibration of TLTRO-III, which lowered the cost of funding to -1 %, increased lending by 1.4 percentage points per year. Boeckx et al. (2020) show that the impact is stronger for banks which are small, illiquid, more reliant on wholesale funding, and less capitalized.

Evidence from aggregated balance sheet data show that the growth in bank credit to the private sector has been substantial among TLTRO III participants since the start of the pandemic – especially if compared with the figure for non-participants over the same period of time (Figure 1) – together with an increase in the maturity of loans, which was also favoured by the availability of public guarantee schemes.

⁷ When a loan is repaid into a customer's current account, it expands the loans on the assets side and increases the deposits on the liabilities side, which has an immediate effect on the balance sheet. The reserves would then decrease by the same amount in the event that the deposit were moved to a different bank, negating the original growth.

This suggests that the operations helped banks to meet the increased credit demand in a sustainable way, allowing for a rotation from the initial emergency credit demand towards lending for longer-term purposes.



Figure 1: Volume of loans: TLTRO III participants vs non-participants

According to ECB Bank Lending Survey, banks mainly expected to use TLTRO III funds either to grant loans to the non financial private sector or to roll over expiring funds from TLTRO II. This is because TLTRO III offered more advantageous pricing on borrowed funds and the favourable pricing was conditional on participants achieving lending targets. TLTROs also helped to avoid adverse equilibria for banks' riskiness, contributing to preserving accommodative funding conditions. Euro area banks have consistently reported that TLTROs spurred an increase in their lending volumes and a decrease in their lending rates, especially for loans to firms.

The increased propensity to lend, despite the uncertain situation following the pandemic that would normally have induced banks to tighten credit standards, had positive effects on general lending conditions because, as participants aimed to lend more, competitive pressures in lending markets increased which also induced non-participants to ease lending criteria to maintain their market share.

Regarding the primary objective pursued by the ECB, in terms of monetary policy stance, the availability of TLTRO funds contributed to mitigate a potential increase in lending rates due to the surge in credit risk in the context of the economic disruptions following the pandemic. TLTROs therefore contributed to preserve the smooth transmission of monetary policy by enabling banks to lower lending rates while preserving lending margins and avoiding excessive credit risk-taking.

Source: ECB Economic Bulletin Issue 6/2021; Eurosystem calculation

2.2 Increase reserves holding

While incentive for loan provision is the ultimate objective of TLTRO III, a significant number of participating banks kept the liquidity obtained from TLTROs in their account at the central bank rather than using it. This can be seen as an especially intriguing tactic once the bank reached its lending target, since the interest rate on funds obtained through TLTRO III was 50 bp lower than the DF rate, which remunerated reserves held at the central bank. Put otherwise, the bank would receive a positive spread of 50 bp on the amount applied for under TLTRO III if it was retained as reserves. However one should consider that in most cases the increase in liquid reserves by a bank was driven by other reasons.

One important driver for the growth of banks' reserves was the need to comply with the new liquidity regulations introduced by the Basle Committee in the aftermath of the GFC. Indeed TLTRO liquidity boosted the long-term funding of the bank and offered the opportunity to buy high quality liquid assets, which could improve the net stable funding ratio and liquidity coverage ratio, respectively.

Most importantly, TLTRO operations were an important tool to facilitate excess liquidity distribution and support banks remuneration that was suffering because of the negative interest rate policy (NIRP) conducted by the ECB⁸.

Indeed one of the consequences of the GFC was the build up of excess liquidity in core countries while banks in semi-core or peripheral countries suffered from a liquidity scarcity. This situation caused fragmentation in financing conditions across jurisdictions and uneven monetary policy transmission. However after January 2015, helped by TLTRO allowances, excess liquidity shares of high and low excess liquidity countries have decreased and increased, respectively (see graph on evolution of countries' excess liquidity shares).

⁸ During the time when the DF rate remained negative the banks carried a cost for holding excess reserves that very seldom could be passed on to their customers. For instance, in Italy practically no bank customer was ever charged for holding liquidity in a bank's account while the bank would pay 0,5 % on reserves held at the central bank. In other EA countries the situation was at times different and non individual clients in some cases were charged for the cost of liquidity.



Figure 2: Evolution of countries' excess liquidity shares

Source: Eurosystem balance sheet data.

The improvement of the excess liquidity distribution coincided with the increase of excess liquidity throughout the whole Euro Area - that reached a peak of EUR 4.7 tn in November 2022 (Figure 3) – due to sizable liquidity injections via purchases and refinancing operations. Indeed, the launch of TLTRO in June 2014 and the start of the asset purchase programme (APP) in March 2015 made excess liquidity much more accessible to all euro area banks while the introduction of the LCR⁹ in parallel boosted demand for central bank reserves.

⁹ The LCR was implemented progressively in the European Union, with binding ratios rising from 60% from October 2015 to 100% as of 1 January 2018.



Figure 3: Excess liquidity evolution and its drivers (EUR billions)

Source: ECB, Eurosystem calculations.

Notes: The future paths of monetary policy portfolios and credit operations are based on the median expectations by analysts as reported in the latest SMA surveys. The projection of excess liquidity is based on these projections subtracting the projections of autonomous factors and minimum reserve requirements, based on ECB internal assumptions and models.

As intended by the Eurosystem, the ability for banks to obtain a rate below the DFR in the event that they were successful in not deleveraging their loan book was crucial to explain the significant participation in TLTRO III from June 2020 onwards. This surge in participation led to an increasing correlation between TLTRO III take-up and excess liquidity holdings, especially for the 5th and 7th operations which received most interest (Figure 4) (although someone may argue that a precautionary build-up of liquidity has contributed to the increased correlation, see hereafter)



Figure 4: Correlation between TLTRO take-up and excess liquidity holdings

Source: ECB, Eurosystem calculations. Note: Blue and yellow bars represent the percentage of the TLTRO take up that remains undeployed in the balance sheet of the borrower 1 and 20 days after TLTRO settlement.

Moreover, while not being the main objective of TLTRO, the possibility to receive a borrowing rate 50bps below DFR until June 2022 has mitigated the impact of negative rates on banks' profitability (Figure 5). In September 2019 the Governing Council of the ECB decided to introduce a Two-Tier-System (TTS) for the remuneration of holdings by credit institutions of central bank reserves in excess of their minimum reserve requirement. Prior to that, all euro area credit institutions' excess liquidity holdings had been remunerated at the prevailing interest rate on the ECB's deposit facility, which was negative between June 2014 and July 2022. The TTS exempts a portion of credit institutions' excess reserve holdings from this negative rate. The exemption has been operationalised by introducing a remuneration structure with two distinct rates applicable to different parts of credit institutions' excess reserve holdings: the exempt tier is remunerated at zero percent, whereas the remainder continued to be remunerated at the deposit facility rate.





Source: Eurosystem calculations; ECB Occasional Paper Series No 302 / September 2022

The potential benefit of TLTRO III for 2020 and 2021 exceeds that of the Two-Tier System but the reward of TLTRO is distributed in a different manner than the Two-Tier System. While TLTRO III pricing mitigates the impact of negative rates only for TLTRO participants that reach the lending benchmark, the Two-Tier System is more general in nature and reaches all credit institutions subject to Minimum Reserves Requirement. Therefore, the potential benefit for banks is heterogeneous across jurisdictions. Countries with entities with higher loan production and high participation in TLTRO may obtain a higher benefit through TLTRO than jurisdictions with entities with lower loan production and lower participation in TLTRO; on the other side, countries with a higher aggregate Minimum Reserves Requirement obtain a higher benefit through Two-Tier System than countries with lower aggregate Minimum Reserves Requirement.

2.3 Increase the securities portfolio

Another way for banks to obtain a return on their TLTROs funding, is to use them to implement a carry trade strategy with euro area government bonds (provided that they offer a greater yield than the DF rate). In the balance sheet of a bank adopting this strategy one would observe a redistribution between asset items, with a decrease in reserves and an increase in government debt holdings.

Under TLTRO III, acquisitions of government securities increased initially, reflecting increased issuance and liquidity demand by governments in order to finance the public support measures. Following this initial period, the net flows into government securities since October 2020 were negative, which is consistent with banks favouring origination of loans to the private sector over potential acquisition of government securities and reflects the large absorption of these securities by asset purchases.

The literature finds evidence that banks in some juridsctions implemented this strategy during unconditional longer-term refinancing operations. Crosignani et al. (2020) find that Portuguese banks engaged in carry trades in response to the 3-year unconditional long-term operations and increased their holdings of short-term government bonds. Likewise, Carpinelli and Crosignani (2021) show that the liquidity support by ECB motivated Italian banks to also buy domestic government bonds and substitute missing wholesale funding.

This investment strategy, if put in place by banks incorporated in countries that suffered more for a loss of confidence by markets during the GFC, is well known in literature under the name of "gamble for resurrection". The term "gamble for resurrection" has been used for decades to denote excessive risk-taking by troubled banks. For example, Freixas, Rochet, and Parigi (2004) write that moral hazard and gambling for resurrection are "typical behaviors for banks experiencing financial distress".

In the period after the Global Financial Crisis, bank exposures to sovereign debt increased significantly in many economies deepening the linkage of bank balance sheets with domestic sovereign debt. Several reasons have contributed to this phenomenon:

- increased demand to hold sovereign debt of safe-haven economies;
- Sovereign bond exposures continued to attract 0% risk weight in home countries;
- Liquidity Coverage Ratio (LCR) regulation (under Basel-III) also requires banks to hold High Quality Liquid Assets (HQLA).

As banks become highly exposed to the domestic sovereign, any adverse movement in yields or materialisation of a sovereign event could trigger bank under-capitalization and bailouts, which imply further sovereign borrowing and rising sovereign yields, leading to further erosion of bank capital and need for further bailouts, and so on (Acharya, Drechsler and Schnabl, 2012; 2015).

In the aftermath of the GFC, mostly during the first half of 2012, banks from peripheral countries (Italian and Spanish banks in particular) were further incentivized to substantially increase their sovereign bond holdings that would yield higher returns. The majority of these bond purchases had maturities of three years or less and were mostly funded by the three-year LTROs that were conducted by the ECB in December 2011 and February 2012, the ECB. Through these operations the ECB channelled €1 trillion into the banking system at an initial interest rate of 1%, reducing the funding pressure and extended the carry trades of these banks.

On the other hand, other studies find evidence that this strategy was not implemented to the same extent during targeted operations, which were designed specifically to support credit provision to the non-financial private sector. De Haan et al. (2021) finds that the allocation of TLTRO funds via the conditionality agreement reduced the likelihood of banks engaging in carry trades. Overall, the literature points out that the structure of banks' balance sheets that were differentially dependent on the liquidity measures of the Eurosystem, developed differently in response of the two programs; Crosignani et al. (2020) find evidence that banks that used VLTROs developed higher maturity mismatches and lower selfinsurance for liquidity risk in stressed countries, while on the other hand there is some evidence that banks that borrowed heavily in the TLTROs overall increased their selfinsurance for liquidity risk.

Under TLTRO III, banks' total holdings of high-yielding government bonds have somewhat increased in terms of both market share and nominal holdings, while their overall holdings of sovereign bonds with relatively low yields have fallen (Figure 6).



Figure 6: Sovereign bond holdings in nominal value, per bond yield group and TLTRO take-up.

Source: SHS-G, IBSI, Eurosystem calculations.

Notes: Banks with large TLTRO volumes are those with a take-up over total assets above the median. High-yield bonds are those with a yield-to-maturity above the median for each maturity segment.

Banks that have participated in TLTRO III with relative strength are the ones driving this increase, while banks that have participated in TLTRO III with less vigor have also reduced their holdings of these bonds. Banks preferred bonds having a maximum three-year maturity that matched the funding period for the TLTRO. Lastly, the data does not indicate a rise in home bias, as domestic banks' percentage of all government bond holders has remained relatively constant (Figure 7).



Figure 7: share of sovereign debt held by domestic banks

Sources: SHS-S and C2D-EA data ; Eurosystem calculations

Therefore, the increase in government bond holdings with higher yields may have been a result of banks' liquidity management practices and does not seem to reflect participation in TLTRO with the intention of pursuing carry trades. In June 2023 a considerable number of banks have frontloaded large volumes of TLTROs in order to maximize their benefit. Therefore, especially large TLTRO borrowers had a sudden surge in liquidity and the increase of high-yielding government bonds could be expected from efficient liquidity management. Hence, experiences in for example the VLTROs, seems not to be happening during TLTRO III. The relatively low interest rate environment and the limiting borrowing allowance seem to have mainly contributed to the fact that banks did not use TLTRO funds massively to implement carry trade strategies.

From the large jurisdictions, Italian government bonds gave the largest potential benefit (ca. 80 bps above DFR, vs ca 10 bps for ES). Banks from Italy however only increased their holdings of domestic government bond holdings by roughly 35 bn compared to a net take up of 110 bn (data represents 80% of take-up).

2.4 Substitution for market funding

Finaly, banks can take advantage of the favourable TLTRO conditions using the funds received by the Eurosystem as substitute for their market funding, either by early repaying maturing debt or by not issuing new debt. This strategy was rather implemented by the institutions that responded to the tighter market conditions prevailing after the GFC deleveraging their balance sheet rather than expanding their assets. Indeed substituting market funding with TLTROs tends to shrink the balance sheet, reducing not only reserves on the assets side but also market funding on the liabilities side when that funding is repaid. If the bank were to decide not to issue new debt, any debt not renewed at maturity would have the same impact on the balance sheet, although more gradually over time.

Bond issuance represents a relevant source of funding for banks, together with traditional customer deposits, wholesale funding through the interbank market and other short-term debt, notably repurchase agreements and commercial paper. In addition to deposits and wholesale funding, banks can access central bank liquidity and raise capital through equity (Van Rixtel and Gasperini, 2013). Therefore, the use of bonds as a form of external financing mainly depends on its relative cost compared with that of alternative sources of financing.

Past experiences showed that unconventional monetary policy measures prompted banks to change their funding strategies; Fudulache and Goetz (2022), find that banks adjusted their market financing sources following the receipt of TLTRO II funds. Specifically, banks decrease their dependence on debt issuance and increase their reliance on money markets borrowing after obtaining funding from TLTRO II.

Euro area gross bank bond issuance has been on a declining trend since 2006. While the global financial crisis led to an initial reduction in gross bank bond supply, this trend accelerated from end-2011 onwards following, among other factors, the Eurosystem longer-term credit operations and the sovereign debt crisis. However, if we look at the aggregate picture of euro-area banks' balance sheet following the receipt of TLTRO III, there has been a small decrease in outstanding market funding compared to the total take up (-EUR 0.2 tn). If at first sight funding substitution with TLTRO III seems very limited, a more in depth analysis shows differences between group of banks, depending on their size and market presence. If unconventional monetary policies caused a decline in recourse to the bond market by the banking sector as a whole, euro area G-SIBs have kept their issuance broadly stable from 2010 since 2018, while the overall gross issuance volume from other euro area banks has roughly halved.

Figure 8: Aggregate gross bond issuance by euro area banks



Sources: Dealogic, Bloomberg and ECB calculations.

Notes: The classification of G-SIBs follows the Financial Stability Board's November 2017 G-SIB list, including Nordea. Figures for 2018 are up to end-October 2018. AT1 refers to Additional Tier 1 capital, T2 to Tier 2 capital, NPS to nonpreferred senior bonds, HoldCo to structurally subordinated bonds issued by the holding company of the bank, and ABS to asset-backed securities

Figure 9: Senior unsecured >1Y bond issuances of non-GSIBs



Looking at the medium-long term bond market, the issuance of covered bonds was lower after TLTRO III was introduced, though it was compensated by higher issuances on the >5Y unsecured bonds segment. Market issuance of covered bonds has dropped substantially (around 35%) since the onset of the Covid-19 crisis, falling behind circa EUR 80 bn in total in comparison to the period between 2015-2019. This happened despite the fact that covered bonds, as well as asset-backed securities, were among the assets included in the ECB purchase programmes, which gave the issuers the certainty that the central bank would absorb a significant percentage of the new issuance. Overall, the medium-long term debt outstanding of TLTRO III participants remained however stable until March 2021, suggesting little use of TLTRO funding in substitution for medium-long term market funding on aggregate (Figure 10). While the favourable pricing of TLTRO in comparison to market funding rates incentivized banks to substitute their market funding with TLTRO, regulatory requirements seem to have forced banks to issue more MREL/TLAC debt. Smaller institutions, which are not subject to these requirements, show lower issuance of senior unsecured bonds; this supports the idea that these banks may have replaced a larger part of their long-term debt compared to G-SIBs. (Figure 8; Figure 9).





There are two more reason that explain why funding substitution by TLTRO was limited to smaller non-GSIB banks. First, banks were reluctant to appear too dependent on TLTRO funding to achieve their funding strategies, as investors and rating agencies could have perceived it as a source of financial fragility over the medium term; second, large banks were keen on maintaining their presence in the market to preserve stable financial relations.

In particular, regarding the first point, concerns were raised that participating banks could be stigmatised as lacking market access or for using the funds for other purposes than lending. However, most market commentary suggests that stigma concerns were not widespread and that, in fact, the opposite effect dominated in practice (reverse stigma). More specifically, banks did not want to be seen as not participating in a program that supported the real economy and so used the operations to advertise new lending programmes and profile the bank. The attractive pricing of the funds and the conditionality on loan performance were important elements that prevented stigma from taking hold.

Source: CSDB data.

Note: Retained covered bonds not included.

Regarding the second point, there is a clear decline in activity of TLTRO III participants in the commercial paper market (Figure 10), but this has also been driven by other external factors. The short-term (<1Y) debt outstanding of TLTRO III participants has declined since end-2019 and at a quicker pace since June 2020. While TLTRO clearly lowers the need to issue short-term debt, the lower appetite of banks for short term market funding is also related to the impact of the Covid-19 crisis on the market in the first half of 2020 and to the strong increase of corporate and retail deposits since the onset of the Covid-19 crisis.

To conclude, the main takeaway of this chapter are that:

- TLTRO amendments, in response to the Covid-19 crisis, were effective in providing a record level of liquidity and funding support to the European banking sector.
- Pricing below market rates/DFR and the increased borrowing allowance promoted high participation without stigma concerns.
- TLTRO participation was proportionally distributed in geographical terms within the Euro area and helped redistribute liquidty between jurisdiction in surplus and the ones with liquidity scarcity;
- TLTRO III increased asset encumbrance. Although collateral availability was not a constraining factor for the participation at large, the easing of collateral acceptance rule by the ECB contributed to collateral optimization.
- Banks maintained lending conditions favourable;
- There are no signs of large scale carry trades on an aggregate level;
- TLTRO III participants continued issuing in financial markets, although their issuance of short term paper and covered bonds decreased.

While the amount of funding substitution was limited under TLTRO III compared to the total take-up in aggregate terms, banking systems that heavily relied on long-term lending programs by the ECB, such as Italian banks, experienced noteworthy change both in the type of securities issued and of the securities placed with investors, as we will see in the next chapter.

CHAPTER 3

Bond issuance by Italian banks in times of crises

In the period between the onset of the global financial crisis and the monetary policy normalisation process that is under way, the gross issuance of bonds by Italian banks has been influenced by the macroeconomic environment as well as fiscal and monetary policy measures put in place.

Gross Bond issuance, as a share of total bank funding, decreased considerably from 25% to 7% in the period under review. More specifically, gross bond issuance by Italian banks has dropped from over €300 billion in 2011 to just €61 billion in 2021. This trend can be partially explained by longer-term refinancing operations gradually replacing most other sources of funding, given the highly favorable terms applied by the Eurosystem (Bank of Italy, Annual Report on 2021). At the same time, the reduction in gross bond issuance was partially offset by the increase in bank deposits, which have recorded positive annual growth rates over the past 15 years (Figure 11).





Source: Bank of Italy occasional paper n°778; Bank of Italy calculations

Notes: Percentage changes are adjusted to take account of the effects of securitisations, reclassifications, write-downs, exchange rate adjustments and other changes not due to transactions.

As regards the maturity structure, the average maturity of bank bond issues has also changed. The share of securities with an initial maturity of up to one year (mainly commercial paper) exceeded 10% in the last five years, partly due to market turbulence following the outbreak of Covid-19 and, more recently, interest rate hikes reflecting the normalisation of monetary policy aimed at preventing the de-anchoring of longer-term inflation expectations. By contrast, before 2019 the share of short-term securities was very low, with the exception of 2011, when there was a temporary peak following the introduction of a new regulation ("Salva Italia" Decree, Legislative Decree No. 201/2011, Figure 12). Most of the bonds with an initial maturity of more than one year were issued directly by banks, while a minor share was issued by financial companies on behalf of Italian banks (Figure 13).



Figure 12-13: Gross bond issuance by Italian banks: disaggregation by maturity and issuer type (billions of euro)

Source: Bank of Italy occasional paper n°778; Bank of Italy calculations

Italian banks also modified the type of securities issued, by decreasing the issuance of straight (unsecured) bonds and increasing the issuance of Covered bonds (including securities backed by state guarantees), and Asset backed securities, which became fundamental in order to manage risk and maintain liquidity conditions.

Figure 14: Gross bond issuance by Italian banks with maturity at issuance longer than 1 year: disaggregation by instrument type (billions of euro)



Source: Bank of Italy occasional paper n°778; Bank of Italy calculations

Due to various legislative actions by Italian and European political authorities, the percentage of securitizations in the total amount of bonds issued—about 5% between 2008 and 2022—significantly increased at the end of 2008, during 2015-16, and at the end of 2020. Key measures that facilitated the securitization process included: (i) the broadening of eligible collateral for main refinancing operations (Bank of Italy, Annual Report on 2008); (ii) the creation of an investment fund by the Italian Ministry of Economy and Finance in February 2016 to provide public guarantees for the securitization of non-performing loans (known as GACS; Bank of Italy, Financial Stability Report, 1, 2021); and (iii) the introduction of temporary, more favourable evaluation criteria for "own used" bonds and other types of bonds posted in the ECB collateral pool in April 2020 (Bank of Italy, Financial Stability Report, 2, 2020).¹⁰

¹⁰ The temporary haircut easing measures taken in the context of the COVID-19 crisis were unwound with the entry into force of recalibrated haircuts as a result of the review announced in December 2022.

With specific reference to the last point, it's important to bear in mind that a sizable number of the issued securities were repurchased by the same banks either immediately or within a few months from the issuance in order to be used as collateral in Eurosystem credit operations, meaning that a sizable fraction of the securities were not employed as a direct source of funding. The issuance and repurchase of bonds after listing was particularly high in the 2011-2012 period, and then decreased when the economic recovery resumed in 2014, but remained on average higher than one-third of the total.

It is evident that the rules on Eurosystem collateral, implemented during the years between 2011 and 2021, that witnessed such a large expansion of the financing provided to banks through large lending programs like TLTROs, encouraged the issuing of ad hoc bank bonds meant for buyback and use as collateral in refinancing operations, such as Covered bonds and "Monti bonds", as well as the securitization of one's own assets (self-securitization).¹¹

In the most acute phase of the sovereign debt crisis in 2011-12, the proportion of nonmarketable securities utilized for Eurosystem credit operations was significant, accounting for more than half of the total amount issued (figure 15). On the one hand, uncertainty in financial markets made it more difficult to issue bonds on the wholesale market, while on the other hand the introduction of unconventional monetary policy measures has given banks the opportunity to obtain funding at lower cost and to use the bonds themselves as collateral in refinancing operations with the Eurosystem.

The average overall level of mobilised own-used covered bonds and retained ABS increased all over the Euro Area. Relative to all mobilised covered bonds the share of own-used covered bonds reached 73.2% in 2020. At the same time, the share of retained ABS among all mobilised ABS increased to 78.8%. Besides Italy, own-used covered bonds were primarily mobilised in Spain (26.5%) while retained ABS were particularly concentrated in the Netherlands, France and Spain.

¹¹ In contrast to traditional securitizations, with self-securitizations the issuing bank entirely purchases the securities issued by the vehicle company, which are backed by the bank's original loans, rather than selling them on the open market. As a result, these instruments do not constitute a direct source of funding and do not include a transfer of the credit risk, which remains solely within the bank that carried the transaction.

Figure 15: Gross bond issuance by Italian banks with maturity at issuance longer than 1 year: used as collateral in refinancing operations with the Eurosystem (billions of euro)



Source: Bank of Italy occasional paper n°778; Bank of Italy calculations

Bank bonds were thereafter used less frequently as collateral, as Italian banks could dispose of other types of collateral to access Eurosystem refinancing operations. This tendency could stem from the Additional Credit Claims (ACC) rules set by the ECB's Governing Council, which permitted national central banks to temporarily increase the pool of bank loans that qualified as collateral for Eurosystem refinancing operations (Bank of Italy, Financial Stability Report, 2, 2014).

Overall, the collateral pool's assets changed as a result of these initiatives, with bank loans gradually replacing bank bonds, whose share increased from 14% to 31% between 2014 and 2021 while the latter nearly halved from 35% to 22% during that period (figure 16).



Figure 16: Composition of the Eurosystem collateral pool (billions of euro)

Bank bonds placed among investors

Historically, Italian banks place most of their bonds (around 80%) directly to their customers over the counter (Gentile and Siciliano, 2009; Coletta and Santioni, 2016), thus avoiding the costs associated to the listing of these securities. As a consequence, up until the sovereign debt crisis, unsophisticated retail investors were the main holders of the banks debt securities (Grasso et al., 2010), and Italian banks benefited from their placing power, which allowed them to raise funding via bonds issuances quite cheaply.

During the period under review, there was a progressive drop in the gross bond issuance, net of the bonds used as collateral by banks in refinancing operations with the Eurosystem (Figure 15). Bond placements decreased annually by about 15% between 2011 and 2016, eventually stabilizing below €50 billion. This resulted from a 20% yearly average reduction in the issuance of unlisted bonds between 2011 and 2021, whilst the issuance of listed bonds was substantially more stable (Figure 17).

Source: ECB website; Eurosystem calcultions

Figure 17: Gross bond issuance by Italian banks with maturity at issuance longer than 1 year: disaggregation by listing (left-hand scale: billions of euro; right-hand scale: percentage of unlisted bonds on total bonds issued). (billions of euro)



Source: SUERF Policy Brief No 703, October 2023; bank of Italy calculations

A breakdown of bank bond composition by borrower type, excluding bonds pledged as collateral and repurchases (Figure 18) shows us that bank bonds owned by wholesale investors (namely, monetary financial institutions), constitute a relatively stable portion of bank bond issuance overall and have not played a significant role in the overall reduction observed over the last ten years. Bonds held by monetary financial institutions saw an exclusive drop in the years following the sovereign debt crisis, due to the downgrade of Italian government debt by credit agencies and the subsequent difficulties faced by Italian banks in accessing international financial markets.



Figure 18: Marketed gross bond issuance by Italian banks with maturity at issuance longer than 1 year: disaggregation by borrower type (billions of euro)

Source: SUERF Policy Brief No 703, October 2023; bank of Italy supervisory statistical reports

Conversely, Figure 17 illustrates a notable reduction in the gross issuance of unlisted bonds placed with retail clients; this amount decreased from around €70 billion in 2011, over half of all unlisted placements, to €5 billion in 2016, roughly one-fifth of all unlisted placements.

The decline is the result of multiple factors. On the supply side, bank bond issuance was hindered as the introduction of unconventional monetary policy measures allowed banks to borrow from the Eurosystem at a lower cost. At the same time, due to the progressive reduction in global interest rates, the interest received from bondholders decreased due to the lower remuneration for new issues, which reduced investors' demand for bank bonds. As interest rates started to increase in mid-2022 due to the tightening of monetary policy stance, there was a notable 43% increase in the issuance of listed bonds in 2023 compared to the previous year.

Moreover, according to the "Reform of taxation on financial income," which was originally announced in August 2011 and subsequently adopted in September 2011, the tax rate on bank bond coupons in Italy was raised from 12.5% to 20% in January 2012 and later to 26% in July 2014 (Legislative Decree No. 66/2014). The demand for bonds among investors was subsequently impacted by the ensuing shift in tax treatment. This evidence was already investigated in past studies; for example Carletti et al. (2021) proved that the 2011 reform caused a positive shock on bank deposits and a negative shock on bond financing.

Another factor that may have influenced banks' propensity to issue bonds is the implementation of the European Directive 2014/59, also known as Banking Recovery and Resolution Directive, (BRRD), which in 2014 introduced the general principle of "bail-in", that allows resolution authorities, under resolution conditions, to order the reduction of the value of the bank's shares and certain debt instruments, or to convert such instruments into shares, to absorb losses and recapitalize the bank in a sufficient manner as to restore adequate capitalization and maintain market confidence.

Under the new legislation, the costs of the crisis must be first of all absorbed by the categories of shareholders and creditors of the banks, in line with the bankruptcy hierarchy. Specifically, in the event of resolution the costs arising from the need to cover losses and recapitalize the intermediary are absorbed first by the shareholders, then by bondholders (subordinated and otherwise), and finally by depositors holding funds for the part exceeding €100,000 (Visco, 2018). Given the banking crises that have occurred over the past ten years, the implementation of the "bail-in" principle may have deterred savers from purchasing bank bonds since they are no longer seen as a low-risk investments. Furthermore, to enhance their revenue from fees and commissions, banks have shifted their funding strategy, prioritizing the sale of investment funds, pension funds, and insurance products above retail bond financing (Bank of Italy, Financial Stability Report, 1, 2014).

Overall, the data presented in this chapter suggest that unconventional monetary policy measures adopted in the period between the end of the great financial crisis and the start of the tightening cycle at the end of 2021, such as longer-term refinancing operations, significantly altered banks' funding strategies, leading them to reduce their reliance on bonds as a source of funding. In Italy the reduction in the amount of bonds issued is particularly evident in the retail segment.

The Italian banking system suffered the impact of the sovereign debt crisis in a more pronounced way compared to other core countries, to the point that a considerable amount of debt securities were non-marketable for a period of time; as such TLTRO funds became an important source of funding for Italian banks. However, if on one hand the observed replacement of bank bonds with alternative sources of funding – such as bank deposits and longer-term refinancing operations – has weakened the transmission of financial shocks to borrowing costs via the financial markets, on the other hand, it has also made the banking system more dependent on unconventional monetary policy measures. At the same time, the recalibration of TLTRO III operations in late 2022, as well as the approaching maturity of these operations (by the end of 2024), prompted banks to frontload their repayments and to begin a process of repayment and replacement of this funding source with other forms of market funding, although this is happening to a different degree across European banks. At this point I think it is the right time to assess how banks are reacting to the normalisation of monetary policy and to discuss how the recomposition of these funding sources (bond issues) are crucial in a context of ample but decreasing excess liquidity.

CHAPTER 4

Bond issues and repos as instruments for liquidity redistribution

Since July 2022 the ECB has been tightening monetary policy and reducing its balance sheet, mostly through TLTRO III redemptions. In chapter 3 we explained the interaction between TLTRO take-up and bond issuance by Italian banks during the years from the aftermath of the GFC to the beginning of TLTRO III reimbursement. We wish now to have an insight on other forms of substitution for central bank funding in a context of decreasing excess liquidity, which took place especially through the repo market, while market participants are still waiting to see if the ECB will devise other instruments to provide long term funding to their counterparties. As the balance sheet reduction continues, excess liquidity distribution patterns will become increasingly important. Abundant, broad based excess liquidity may have indeed disguised unevenness in the distribution as all jurisdictions held ample liquidity and made effective redistribution across jurisdictions not necessary. When the balance sheet shrinks, if liquidity is unevenly distributed and redistribution of liquidity across jurisdictions is impaired, pockets of illiquidity may arise, engendering fragmentation, uneven financing conditions and impairments in the policy transmission; this raises the question of how banks are adjusting to an environment of lower aggregate liquidity and whether liquidity is flowing effectively from banks with still abundant liquidity to those with emerging liquidity needs.

The experience of several crises, a changed regulatory environment and banks' stricter risk management practises suggest that banks will want to hold on to more central bank liquidity as a buffer than before. Of course, the desired amount of extra reserves will differ across banks and will depend on their risk preferences or business model. As the amount of reserves declines, some banks with lower excess reserves may find themselves short of the desired minimum even if aggregated reserve supply remains ample. In such a case, banks will either have to redistribute reserves among themselves more evenly, so that demand for reserves for all banks can be met, or the banks with a shortfall will have to source the needed reserves from standard refinancing operations. If such a redistribution was impaired and banks were at the same time reluctant to borrow from the ECB in its standard refinancing operations, this could give rise to liquidity shortages, volatility in money market rates and ultimately hamper the smooth transmission of monetary policy.

Different channels for reserve redistribution:

The market solution for redistribution can be carried on via various channels. Conceptually, banks can obtain reserves via issuing debt or equity to be placed with investors, borrowing from those banks with reserves in excess of their optimal reserve target, via unsecured or secured money markets, attracting wholesale or retail deposits by raising deposit rates as well as rebalancing their asset allocation in favour of reserves and other HQLA at the cost of lower non-HQLA securities and loans.

With standard refinancing operations offered at backstop rates, banks will turn to standard refinancing operations when market funding will not be available or becomes too expensive.

Cross-border redistribution via bank bond issuance:

Figure 19: Year-to-date euro area

bank bond issuance volumes (€ billions)

Prior to the Targeted Longer-Term Refinancing Operations (TLTRO III) repayments, banks increased their market-based funding, issuing a record number of covered and senior unsecured bonds In 2022 and 2023, to replace the TLTRO III funding that was redeeming with long-term debt that would count toward NSFR fulfilment. According to the European Banking authority, as of end of July 2023 banks had already issued more instruments across all debt classes (including Tier 2 instruments and AT1 instruments) than year to date in the previous two years (Figure 19). Likewise, the picture emerging from various Bank of Italy's Financial Stability Reports (years from 2022 to 2024) signals that financial conditions on bond markets have eased, and despite the significant increase in costs, due to the high yields environment, the issuance of bonds by Italian banks, since Q2 2022, have largely exceeded their redemptions (Figure 20).



Figure 20: Bonds issued and redeemed by Italian banks(1) (quarterly data; \in billions)

(1) Does not include issues retained on issuers' balance sheets and those earmarked for the retail market. Includes securitized bonds.

Sources: ECB Financial stability review, May 2024; Bank of Italy financial stability report, April 2024

The record issuance of the past two years confirms that cross-border redistribution of reserves has already started amid the large TLTRO III repayments, and the newly issued bonds are playing a special role in the funding and liquidity redistribution in the euro area banking system.

Interestingly, looking specifically at the covered bonds segment, banks were a major investor absorbing a large part of the covered bond issuance of other banks (figure 21). Covered bonds are secured bank debt securities that are collateralised with public sector debt or mortgage loans and where investors benefit from a double-recourse protection. Covered bonds, as other fixed income instruments, became particularly attractive for investors when yields moved higher since 2022. In the euro area banks traditionally held around 30% of publicly placed covered bond issuance. This share temporarily decreased while the Eurosystem increased its covered bond holdings through the CBPP3. Banks have now quickly recovered their market share by playing an overwhelming role as an investor from 2022 to early 2024, as they absorbed around 70% of net issuance of covered bonds.



Figure 21: Banks' investments in covered bonds issued since the end 2021, split by jurisdictions (%)

Source: ECB, SHS.

Investments flows and bank bond issuance patterns indicate that the absorption of banks' bond issuance has been largely absorbed by investors that previously kept their cash balances in core countries, such as Germany and Austria. While for banks and other investors that are located in countries with lower yields and higher excess liquidity investing into bank bonds issued by higher yielding countries offers better returns, there is little financial incentive for the opposite flows. In addition, the absorption capacity of new bank bond issuance is higher among banks and other investors domiciled in core countries due to their larger excess liquidity holdings. As banks have invested in covered bonds of their peers, including those domiciled in different jurisdictions, this has further contributed to redistributing liquidity within the euro area banking system.

Cross border redistribution via repo market:

If on one hand, bank bond issuance is one of the channels for reserve redistribution in the long term, on the other hand, short-term interbank reserve redistribution takes place mostly via repos. Repo markets play an important role in the facilitation of the flow of cash and securities around the financial system. As repos are economically similar to a collateralised loan (since the securities provide credit protection in the event of a counterparty default), they create and support opportunities for the low-risk investment of cash, as well as the efficient management of liquidity and collateral.

Repo markets bring together two types of end users. The first type includes those that provide collateral in return for cash (repo transactions). The second type of end users is those investing in cash while receiving collateral (reverse repo transactions). Banks and broker-dealers are significant end users of repos and reverse repo in their own right, in order to finance their market-making inventory, source short-term funding or invest cash. In particular, reverse repos are used heavily by the cash-rich market players such as money market funds, asset managers, central counterparties and other institutional investors or corporates as a means of investing their cash¹², while, through repos, banks and other financial institutions are able to monetise liquid assets and cover temporary shortfalls in cash flows.

In general, the flexibility of repo transactions and the low cost to access the market allows all market participants to manage their liquid assets and, in periods of stress, a wellfunctioning repo market can contribute to financial stability by offering a relatively resilient mean of raising cash without forcing institutions to liquidate assets, thus avoiding fire sales and contagion.

Volumes of outstanding repo transactions spiked at the beginning of the GFC (2007-2008) but in the following years have remained broadly unchanged across most jurisdictions, although a general upward trend was more visible for high quality collateral (e.g., German and French government bonds). This pattern was also due to unconventional monetary policy that, via large-scale asset purchases, reduced the availability of high-quality collateral

¹² Other important roles performed by the repo market are: 1) transformation of collateral, to obtain specific securities or cash to be used in other transactions; 2) support cash market efficiency and liquidity, exploiting pricing discrepancies (arbitrage) and finance trading activity or to cover short sales; 3) support dealers' market-making activities and fund the trading inventories; 4) facilitate hedging of risk.

to be pledged in repo transactions, whereas the large amount of reserves in circulation reduced the need to obtain short-term funding at a higher premium.

However, in other cases QE implementation had conflicting effects on repo markets because when some assets became really scarce, market participants used repo transactions to obtain those assets. There is ample evidence of increased repo activity to source comparatively scarce collateral in euro area.

After 2018, as liquidity regulation (NSFR and LCR) kicked-in, banks became subject to requirements as to the quantity of liquid assets (among which central bank reserves) that they hold and incur penalties when they hold reserves short of these requirements. Such a system incentivised the redistribution of reserves between central bank counterparties. Where this took place in the repo market, it lead to increased repo market activity, albeit sometimes limited to specific collateral segments. Leverage ratio regulation instead put some constrain on repo expansion, as it required banks to hold capital in proportion to the overall size of their balance sheet (including repos).

A Study Group established by the Committee on the Global Financial System of the Bank of International Settlements, to analyse trends in the availability and cost of repo financing¹³ found that during the years of monetary expansion (2012-2017), a clear pattern was observable between repo market volumes and excess liquidity. When the latter increased, the former abated (Figure 22).



Figure 22: Excess liquidity provided by the ECB and repo trading volume (2012-2017)

Source: CGFS Papers No 59 Repo market functioning

¹³ CGFS Papers No 59: Repo market functioning. Report prepared by a Study Group established by the Committee on the Global Financial System. April 2017

Conversely, with excess liquidity declining, banks have visibly increased their activity in repo, a sign of banks increasingly tapping this market for active liquidity management. Also the unsecured interbank market activity slightly increased but remains very limited in size, mainly due to its costs from a regulatory perspective (figure 23).





Sources: ECB website, MMSR, ECB calculations.

Updated figures (Dec. 2023) on the value of the total repo business are provided by the semi-annual survey of the repo market in Europe, published by the European Repo and Collateral Council (ERCC) of the International Capital Market Association (ICMA). According to the survey, the total value of the repo contracts outstanding on the books of the 60 survey contributors (mostly banks) grew by 5.1% year-on-year. However, there was a significant slowing-down in the rate of growth since 2022.

This pattern reflected the shift in trading towards US Treasuries and JGBs, which diverted activity away from European market, where, in most jurisdictions, banks experienced easier supplies of cash and collateral, as central banks withdrew from the market and bond issuance surged.

Within this general market trend, differences can be found in banks' behaviour belonging to different jurisdictions. In particular, the share of government securities used as collateral in repo transactions tells us something about the nationality of the banks that mostly use repo market as a mean of redistributing reserves within the Eurozone.





Source: ICMA Repo Market Survey (2024)

The most recent ICMA survey highlights that Government bonds issued by Italy have become, in the past year, the second most common government securities pledged in repo operations. This means that Italian banks fund themselves to a significant degree through repo market, much more than, for example, French banks, despite the fact that the French banking system has a much larger dimension that the Italian one. Covered bonds were also used more often as collateral by all market participants as the ECB's TLTRO facility continued to be unwound and these securities, that in the past years were mostly pledged by banks to access ECB operations like TLTROs, became unencumbered.

The overall picture emerging from this analysis confirms that, while the TLTRO refund accelerated, the repo market contributed to redistribute the existing liquidity within the Eurosystem, channelling the flows from cash-rich banking systems (the ones from core countries) to banks with less excess liquidity. However it remains to be seen to what extent this trend is likely to continue as the liquidity needs – determined by precautionary reasons or to meet regulatory limits – stabilizes.

Italian banks still borrow large amounts on the repo market, compared to French and German peers, and the amount of their repo operations (i.e. the amount of liquidity they borrow) is much larger than their reverse-repo transactions (i.e. the amount of liquidity they lend). However, repos are mostly short-term operations and for this reason they are unfit to satisfy regulatory limits (the Net Stable Funding Ratio requirement). Banks' ability to raise new funding, both on the repo market and the bond market, reduced the need for recourse to the ECB's standard refinancing operations, especially for large banks. Recourse to regular central bank refinancing to repay their maturing operations was only used by smaller banks, the market access of which remains limited for operational reasons and capacity constraints, while larger ones held an amount of excess liquidity that largely exceeded their outstanding TLTRO III amounts.

Demand for SROs initially picked up at the end of August 2022. The most notable increase came however only with the redemption of the fourth TLTRO III operation in June 2023, after which the outstanding SRO amount rose to its highest level since October 2017, from EUR 3.5 bn to EUR 24.4 bn. Subsequently, the outstanding amount has steadily decreased to approximately EUR 12 billion, a level typically observed in early 2019. The decline suggests that some banks initially used SROs to replace part of the TLTRO funding but could gradually reshuffle their funding mix towards more attractive funding sources. SROs have therefore mostly been utilized as partial bridge towards market funding. There is also a pattern of slightly increasing demand upon month-, quarter- and year-ends driven by regulatory reasons and seasonal/monthly payment flows at national level.





Source: ECB website, ECB calculations.

SRO demand is very muted relative to the amount of TLTRO III redemptions. This suggests that so far markets have effectively redistributed reserves across jurisdictions so that recourse to SROs has not been needed in large scale.

SRO demand is held back by abundant liquidity conditions and SRO pricing, both of which give a strong incentive for the banks to seek for market solution over central bank recourse.

SROs are indeed priced 50 bps above DFR or between 50 to 60 bps above the cost of short-term funding in the secured or unsecured segment. The pricing and infrequent usage of SROs might have also stigmatized SROs to some extent, which further discourage banks' intentions to utilize SROs in their day-to-day business.

Despite the low overall SRO demand driven mostly by the TLTRO III bridging needs, also persistent demand has reappeared in small scale, particularly among Italian and German banks. Persistent bidders are mostly either retail or co-operative banks or diversified lenders, have a small balance sheet of just a few billion euros and have low excess liquidity compared to their balance sheet size. These bidders typically borrow only small amounts from the SROs and their participation is mostly driven by maintaining internal or regulatory liquidity metrics above thresholds.

The overall picture emerging from the arguments presented in this chapter is that excess liquidity distribution has worsened only moderately in the balance sheet run down phase as reserve redistribution across borders has been effective. Stronger confidence in the euro area banking system, effectively addressing previous pockets of vulnerability, as well as the establishment of effective financial market infrastructure arrangements to better manage counterparty risk like CCPs have enabled cross border redistribution.

When the Eurosystem balance sheet started to shrink, giving way to the normalization of the monetary policy, a significant flow of reserve redistribution took place, from cash-rich jurisdictions toward countries in which reserve scarcity was more pronounced. The reduction of monetary policy holdings and TLTRO III repayments were the driving force for the decline of reserves.

During this period Italian banks proved able to manage their liquidity position very effectively. The average measure of NSFR and LCR for Italian banks always remained well above the regulatory minimum of 100 % (between 130 and 135 % the NSFR and around 190 % the LCR). A number of elements contributed to maintain refinancing and liquidity risk under control.

Both market-based and customer funding remained ample. In 2022 retail deposits continued to grow (Bank of Italy Financial stability report 2022 n.1 and 2). When in 2023 changes in the preferences of households and firms regarding the allocation of liquidity, with a view to protecting their purchasing power, led to a decline in sight deposits in favour of higher-yielding assets, Italian banks proved able to shift their funding using relatively more expensive market instruments like bond issuance and repo funding.

The largest share of TLTRO III reimbursement that took place in this lag of time was done reducing excess reserves, which declined significantly between Q2 2022 and Q2 2023, but then stabilized. An ample recourse to the European repo market helped sustaining these outflows while the recourse to ECB standard refinancing operations was limited to few small banks.

As the Eurosystem balance sheet continues to shrink, more reserve redistribution will have to take place, as reserve scarcity at country levels will become greater and more broad-based even if aggregate reserves remain ample.

CONCLUSION

In this paper I highlight the critical role of unconventional monetary policy measures, particularly the Targeted Longer-Term Refinancing Operations (TLTROs), in shaping the European banking sector's funding strategies. TLTROs provided unprecedented liquidity and funding support, with favorable pricing and expanded borrowing allowances driving high participation across the Euro area. These measures helped address liquidity disparities across jurisdictions and maintained favorable lending conditions without triggering significant carry trades. They also increased asset encumbrance, though collateral availability did not constrain participation, largely due to the ECB's easing of collateral rules.

Moreover, TLTROs significantly shifted banks' funding models, reducing reliance on bond issuance in favor of long-term refinancing operations. This shift, particularly pronounced in the Italian banking system, made banks more dependent on central bank interventions, while insulating them from market-based financial shocks to some extent. At the same time, with the recalibration of TLTRO III and the upcoming maturity of these operations, banks have begun substituting these funding sources with market-based alternatives.

The recomposition of these market-based funding sources are crucial in the context of the ongoing normalization of monetary policy, as they function as channels for the reallocation of reserves from cash-rich banking systems to banks with less liquidity, while aggregate excess liquidity is rapidly decreasing. As of now, excess liquidity redistribution has generally been well-managed, as demonstrated by the limited recourse to standard refinancing operations; with Italian banks demonstrating strong liquidity management metrics.

However, as the Eurosystem balance sheet continues to shrink, greater reserve redistribution will eventually be needed. There might be upper constraints to the extent in which this takes place reflecting counterparty, country, and collateral limits. If these constraints become binding, the dispersion of money market rates could widen between different jurisdictions, which might in turn cause increasing and uneven recourse to refinancing operations across the euro area, thereby impairing the smooth and even transmission of monetary policy.

In this context I personally find the newly changes in the ECB operational framework very meaningful, because fragmentation could re-emerge as financing conditions may substantially diverge between the different jurisdictions. Pre-emptily to prevent it from happening, the MRO-DFR spread has been narrowed to better anchor rates, even if this might crowd out some private market activity.

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SUMMARY

This study analyses the impact of TLTRO operations on banks' balance sheet, with a focus on how the presence, as well as the maturity of these operations, influence banks' propensity to issue bonds.

On 5 June 2014 the Governing Council of the ECB announced new measures to support bank lending to the real economy via the provision of long term financing to euroarea banks. In order to do this the Governing Council decided to conduct, over a window of two years, a series of longer-term refinancing operations aimed at improving bank's capacity to extend loans to the non-financial private sector, excluding loans to households for house purchase.

The new operations displayed some unique features. First, the tenor of the operations (4 years) was much longer that the general central bank refinancing operations (MRO/LTRO – Main/Long Term refinancing operations) of one-week or three months duration. Moreover, in order to push the banks (ECB monetary policy counterparties) to channel the funding to the real economy financing, the Governing Council devised an incentivising mechanism that would apply to borrowing allowance (i.e. the amount of money that each bank was entitled to borrow under the new facility) and to the pricing of the operations (the cost of funding for borrowing banks).

A thorough analysis of the take-up of TLTROs is beyond the scope of this paper, however it is important to have a clear picture of how different banking systems relied on TLTROs in order to understand the impact these operations had on market issuance from banks and their clients during the years after the global financial crisis until 2023. In particular it seems useful to recap the overall economic and financial conditions that justified the Governing Council to adopt these measures.

In response to the global financial crisis (GFC) and its aftermath, to address financial market dislocations, many central banks introduced special lending programs, generally of longer tenor vis-à-vis the ordinary central bank financing. At the beginning special lending programs were adopted to address general market strain because, in a number of countries, bank funding conditions and money market liquidity had deteriorated significantly. For example, the ECB 3 years VLTROs, that were conducted between 2011 and 2012, were

focused on providing counterparties with access to liquidity, which had become difficult to obtain in stressed funding markets.

Subsequently the aim of central bank funding shifted towards providing additional monetary stimulus amid concerns that the liquidity they were injecting was not being sufficiently passed-through to the broader economy. The European Central Bank, the Bank of England and the Bank of Japan introduced lending programmes "with additional conditions" beginning in 2010 and all these programmes provided incentives to institutions to extend credit to targeted sectors of the real economy, including by offering lower-cost, higher-volume, and/or longer-maturity loans from the central bank in an environment of very low or negative short-term rates.

The underlying reasoning was that the incentivizing provisions included in the TLTRO would stimulate banks' use of respective funds for granting more loans to the real economy. Of course, the extent to which these funds could actually reach the real economy depended upon the further economic development and the recovery of loan demand more specifically.

The provision of long term funding via TLTROs was welcomed by the market but the initial take-up was below expectations. The reasons for this were primarily the lack of immediate credit demand, the negative carry of any short-term investments where funds could be temporarily parked and the uncertainty concerning the capacity of many banks to be able to expand their loan book. Only at a later stage a large number of banks switched from the 3-year LTRO into the TLTRO as the pricing of the new operation made it more convenient compared to other ECB operations.

On March 10th 2016, approaching the end of the first series of operations, the ECB decided to launch a new series of four targeted longer-term refinancing operations (TLTRO II), to be conducted from June 2016 to March 2017 to reinforce the ECB's accommodative monetary policy stance, incentivising bank lending to the real economy.

Taking stock of the experience matured in managing TLTRO I, the ECB decided to be even more generous in setting the financial conditions and borrowing allowance of TLTRO II. All operations had a maturity of four years and were not subject to mandatory early repayments; at the same time, the measure provided flexibility as counterparties were able to voluntarily repay the amounts borrowed under TLTRO II at a quarterly frequency. Counterparties were able to borrow in the operations a total amount of up to 30% of their outstanding loans (less any amount which was previously borrowed under the first TLTRO operations). The interest rate applied was the same of the MROs but counterparties whose eligible net lending exceeded their benchmark were charged a lower rate for the entire term of the operation.

While approaching the termination of the TLTRO II program, market conditions in the EU were still far from normalized. Even though banks were increasingly more able to refinance themselves very short-term, many lenders were still facing problems to get stable market funding. Access to longer-term money markets was limited, as no entity was willing to provide liquidity for longer periods of time, given the general uncertainty how liquidity

needs would develop going forward. Unsecured money market financing, e.g. via bank issuance of commercial papers, was available only for maturities of a few days and in the repo market, longer-term refinancing was only available against HQLA collateral, which was scarce also because of ongoing central bank asset purchases.

Therefore, in March 2019, the ECB announced a third series of quarterly targeted longer-term refinancing operations (TLTRO III), to be carried out between September 2019 and March 2021. Like the previous programmes, the operations featured built-in incentives for credit conditions to remain favourable: a duration of three years and interest rate indexed to the main refinancing operations, with the possibility to benefit from a further interest rate reduction for those who achieved the required lending targets. Among other things TLTRO III acted as backstop, providing reassurance that banks could still access long term financing.

The following year, due to the Coronavirus outbreak, revenues of many corporates and households had decreased, while they needed liquid funds in order to cover ongoing expenditures. Banks were losing more and more stable funding sources; in particular, deposits had become more volatile as clients needed to withdraw them at short notice. Therefore, in order to address the adverse impact of the COVID-19 pandemic, the Governing Council introduced even more favourable conditions for TLTRO III operations.

The last TLTRO operation took place in December 2021. In the end these measures achieved one of the largest liquidity injections by the ECB as the total uptake amounted to \notin 2.2 trillion. In particular, the operations conducted in response to the Covid-19 crisis were effective in providing a record level of liquidity and funding support to the European banking sector throughout the entire pandemic period. TLTROs take-up was proportionally distributed among all euro area jurisdictions and in line with the size of the banking sector in the various countries. This was particularly true for TLTRO III operations that saw the participation of around 2,000 banks from 19 countries. The reason for this was that TLTRO conditions were perceived as favourable by all banks, independently of the jurisdictions, with no signs of stigma attached to participation.

During 2023, TLTRO outstanding amounts decreased from EUR 1,318 billions to EUR 392 bn. The biggest single repayment took place in June 2023, when banks repaid EUR 506 billions. The expiration of the last operation will fall in December 2024 but, following the revision of the financial conditions applicable to borrowings, most banks have already completed the early repayment of the outstanding amounts. It's therefore the right moment to draw some conclusions on how TLTRO availability impacted both banks' and non-financial firms' behaviour regarding market issuance and how are they positioning to substitute central bank funding.

In analysing the impact of large lending programs like TLTROs on market-functioning and the banks' funding strategy one must preliminary understand the effect of these operations on participating banks' balance sheet and their P/L accounts. The initial effect of a bank's participation in TLTROs is the expansion of the bank's balance sheet, with the addition of the funding requested from the Eurosystem on the liabilities side and, consequently, an increase in reserves held at the central bank on the assets side. The bank must then decide what to do with its new funding.

The first option for a bank accessing TLTRO funds was to increase the provision of loans to households and non-financial corporations, which was TLTRO primary goal and a prerequisite for lowering the cost of borrowing, using the operations built-in incentives.

The existing literature, which estimates the impact of LTROs and TLTROs on lending growth using aggregate and bank-level data for the Euro Area or for specific countries, confirm how large lending programs had indeed a positive effect on loan origination.

Evidence from aggregated balance sheet data show that the growth in bank credit to the private sector has been substantial among TLTRO III participants since the start of the pandemic – especially if compared with the figure for non-participants over the same period of time – together with an increase in the maturity of loans, which was also favoured by the availability of public guarantee schemes. This suggests that the operations helped banks to meet the increased credit demand in a sustainable way, allowing for a rotation from the initial emergency credit demand towards lending for longer-term purposes.

According to ECB Bank Lending Survey, banks mainly expected to use TLTRO III funds either to grant loans to the non financial private sector or to roll over expiring funds from TLTRO II. This is because TLTRO III offered more advantageous pricing on borrowed funds and the favourable pricing was conditional on participants achieving lending targets. TLTROs also helped to avoid adverse equilibria for banks' riskiness, contributing to preserving accommodative funding conditions. Euro area banks have consistently reported that TLTROs spurred an increase in their lending volumes and a decrease in their lending rates, especially for loans to firms.

While incentive for loan provision is the ultimate objective of TLTRO III, a significant number of participating banks kept the liquidity obtained from TLTROs in their account at the central bank rather than using it. This can be seen as an especially intriguing tactic once the bank reached its lending target, since the interest rate on funds obtained through TLTRO III was 50 bp lower than the DF rate, which remunerated reserves held at the central bank. Put otherwise, the bank would receive a positive spread of 50 bp on the amount applied for under TLTRO III if it was retained as reserves. However one should consider that in most cases the increase in liquid reserves by a bank was driven by other reasons.

As intended by the Eurosystem, the ability for banks to obtain a rate below the DFR in the event that they were successful in not deleveraging their loan book was crucial to explain the significant participation in TLTRO III from June 2020 onwards. This surge in participation led to an increasing correlation between TLTRO III take-up and excess liquidity holdings, especially for the 5th and 7th operations which received most interest (although someone may argue that a precautionary build-up of liquidity has contributed to the increased correlation).

Moreover, while not being the main objective of TLTRO, the possibility to receive a borrowing rate 50bps below DFR until June 2022 has mitigated the impact of negative rates on banks' profitability.

Another way for banks to obtain a return on their TLTROs funding, is to use them to implement a carry trade strategy with euro area government bonds (provided that they offer a greater yield than the DF rate). In the balance sheet of a bank adopting this strategy one would observe a redistribution between asset items, with a decrease in reserves and an increase in government debt holdings.

Under TLTRO III, acquisitions of government securities increased initially, reflecting increased issuance and liquidity demand by governments in order to finance the public support measures. Following this initial period, the net flows into government securities since October 2020 were negative, which is consistent with banks favouring origination of loans to the private sector over potential acquisition of government securities and reflects the large absorption of these securities by asset purchases.

The literature finds evidence that banks in some juridsctions implemented this strategy during unconditional longer-term refinancing operations, while other studies find evidence that this strategy was not implemented to the same extent during targeted operations, which were designed specifically to support credit provision to the non-financial private sector.

Under TLTRO III, banks' total holdings of high-yielding government bonds have somewhat increased in terms of both market share and nominal holdings, while their overall holdings of sovereign bonds with relatively low yields have fallen. Banks that have participated in TLTRO III with relative strength are the ones driving this increase, while banks that have participated in TLTRO III with less vigor have also reduced their holdings of these bonds. Banks preferred bonds having a maximum three-year maturity that matched the funding period for the TLTRO. Lastly, the data does not indicate a rise in home bias, as domestic banks' percentage of all government bond holders has remained relatively constant.

Therefore, the increase in government bond holdings with higher yields may have been a result of banks' liquidity management practices and does not seem to reflect participation in TLTRO with the intention of pursuing carry trades.

Finaly, banks can take advantage of the favourable TLTRO conditions using the funds received by the Eurosystem as substitute for their market funding, either by early repaying maturing debt or by not issuing new debt. This strategy was rather implemented by the institutions that responded to the tighter market conditions prevailing after the GFC deleveraging their balance sheet rather than expanding their assets. Indeed substituting market funding with TLTROs tends to shrink the balance sheet, reducing not only reserves on the assets side but also market funding on the liabilities side when that funding is repaid. If the bank were to decide not to issue new debt, any debt not renewed at maturity would have the same impact on the balance sheet, although more gradually over time.

Euro area gross bank bond issuance has been on a declining trend since 2006. While the global financial crisis led to an initial reduction in gross bank bond supply, this trend accelerated from end-2011 onwards following, among other factors, the Eurosystem longer-term credit operations and the sovereign debt crisis. However, if we look at the aggregate picture of euro-area banks' balance sheet following the receipt of TLTRO III, there has been a small decrease in outstanding market funding compared to the total take up (-EUR 0.2 tn). If at first sight funding substitution with TLTRO III seems very limited, a more in depth analysis shows differences between group of banks, depending on their size and market presence. If unconventional monetary policies caused a decline in recourse to the bond market by the banking sector as a whole, euro area G-SIBs have kept their issuance broadly stable from 2010 since 2018, while the overall gross issuance volume from other euro area banks has roughly halved. While the amount of funding substitution was limited under TLTRO III compared to the total take-up in aggregate terms, banking systems that heavily relied on long-term lending programs by the ECB, such as Italian banks, experienced noteworthy change both in the type of securities issued and of the securities placed with investors.

In the period between the onset of the global financial crisis and the monetary policy normalisation process that started at the end of 2021, the gross issuance of bonds by Italian banks has been influenced by the macroeconomic environment as well as fiscal and monetary policy measures put in place. Gross Bond issuance, as a share of total bank funding, decreased considerably from 25% to 7% in the period under review. More specifically, gross bond issuance by Italian banks has dropped from over €300 billion in 2011 to just €61 billion in 2021. This trend can be partially explained by longer-term refinancing operations gradually replacing most other sources of funding, given the highly favorable terms applied by the Eurosystem.

As regards the maturity structure, the average maturity of bank bond issues has also changed. The share of securities with an initial maturity of up to one year exceeded 10% in the last five years, partly due to market turbulence following the outbreak of Covid-19 and, more recently, interest rate hikes reflecting the normalisation of monetary policy aimed at preventing the de-anchoring of longer-term inflation expectations. By contrast, before 2019 the share of short-term securities was very low, with the exception of 2011, when there was a temporary peak following the introduction of a new regulation ("Salva Italia" Decree, Legislative Decree No. 201/2011).

Italian banks also modified the type of securities issued, by decreasing the issuance of straight (unsecured) bonds and increasing the issuance of Covered bonds (including securities backed by state guarantees), and Asset backed securities, which became fundamental in order to manage risk and maintain liquidity conditions.

Due to various legislative actions by Italian and European political authorities, the percentage of securitizations in the total amount of bonds issued—about 5% between 2008 and 2022—significantly increased at the end of 2008, during 2015-16, and at the end of 2020. Key measures that facilitated the securitization process included: (i) the broadening of eligible collateral for main refinancing operations; (ii) the creation of an investment fund by the Italian Ministry of Economy and Finance in February 2016 to provide public guarantees for the securitization of non-performing loans (known as GACS); and (iii) the introduction of temporary, more favourable evaluation criteria for "own used" bonds and other types of bonds posted in the ECB collateral pool in April 2020.

With specific reference to the last point, it's important to bear in mind that a sizable number of the issued securities were repurchased by the same banks either immediately or within a few months from the issuance in order to be used as collateral in Eurosystem credit operations, meaning that a sizable fraction of the securities were not employed as a direct source of funding. The issuance and repurchase of bonds after listing was particularly high in the 2011-2012 period, and then decreased when the economic recovery resumed in 2014, but remained on average higher than one-third of the total.

It is evident that the rules on Eurosystem collateral, implemented during the years between 2011 and 2021, that witnessed such a large expansion of the financing provided to banks through large lending programs like TLTROs, encouraged the issuing of ad hoc bank bonds meant for buyback and use as collateral in refinancing operations, such as Covered bonds and "Monti bonds", as well as the securitization of one's own assets, and that that unconventional monetary policy measures adopted in the period between the end of the great financial crisis and the start of the tightening cycle at the end of 2021, such as longerterm refinancing operations, significantly altered banks' funding strategies, leading them to reduce their reliance on bonds as a source of funding. In Italy the reduction in the amount of bonds issued is particularly evident in the retail segment; a breakdown of bank bond composition by borrower type, excluding bonds pledged as collateral and repurchases shows us that bank bonds owned by wholesale investors (namely, monetary financial institutions), constitute a relatively stable portion of bank bond issuance overall and have not played a significant role in the overall reduction observed over the last ten years. Bonds held by monetary financial institutions saw an exclusive drop in the years following the sovereign debt crisis, due to the downgrade of Italian government debt by credit agencies and the subsequent difficulties faced by Italian banks in accessing international financial markets.

The Italian banking system suffered the impact of the sovereign debt crisis in a more pronounced way compared to other core countries, to the point that a considerable amount of debt securities were non-marketable for a period of time; as such TLTRO funds became an important source of funding for Italian banks. However, if on one hand the observed replacement of bank bonds with alternative sources of funding – such as bank deposits and longer-term refinancing operations – has weakened the transmission of financial shocks to borrowing costs via the financial markets, on the other hand, it has also made the banking system more dependent on unconventional monetary policy measures.

At the same time, the recalibration of TLTRO III operations in late 2022, as well as the approaching maturity of these operations (by the end of 2024), prompted banks to frontload their repayments and to begin a process of repayment and replacement of this funding source with other forms of market funding, As interest rates started to increase in due to the tightening of monetary policy stance, there was a notable 43% increase in the issuance of listed bonds in 2023 compared to the previous year.

The recomposition of these funding sources (bond issues) are crucial in a context of ample but decreasing excess liquidity. As the balance sheet reduction continues, excess liquidity distribution patterns will become increasingly important. Abundant, broad based excess liquidity may have indeed disguised unevenness in the distribution as all jurisdictions held ample liquidity and made effective redistribution across jurisdictions not necessary. When the balance sheet shrinks, if liquidity is unevenly distributed and redistribution of liquidity across jurisdictions is impaired, pockets of illiquidity may arise, engendering fragmentation, uneven financing conditions and impairments in the policy transmission; this raises the question of how banks are adjusting to an environment of lower aggregate liquidity and whether liquidity is flowing effectively from banks with still abundant liquidity to those with emerging liquidity needs.

The market solution for redistribution can be carried on via various channels. Conceptually, banks can obtain reserves via issuing debt or equity to be placed with investors, or borrowing from those banks with reserves in excess of their optimal reserve target via unsecured or secured money markets. At the same time, banks can turn to standard refinancing operations if market funding is not be available or becomes too expensive.

Ahead of the Targeted Longer-Term Refinancing Operations (TLTRO III) repayments, banks increased their market-based funding, issuing a record amount of covered and senior unsecured bonds in 2022 and 2023 to substitute the redeeming TLTRO III funding with long-term debt, that counts towards NSFR fulfilment. According to the European Banking authority, as of end of July 2023 banks had already issued more instruments across all debt classes (including Tier 2 instruments and AT1 instruments) than year to date in the previous two years. Likewise, the picture emerging from various Bank of Italy's Financial Stability Reports (years from 2022 to 2024) signals that financial conditions on bond markets have eased, and despite the significant increase in costs, due to the high yields environment, the issuance of bonds by Italian banks, since Q2 2022, have largely exceeded their redemptions.

The record issuance of the past two years confirms that cross-border redistribution of reserves has already started amid the large TLTRO III repayments, and the newly issued bonds are playing a special role in the funding and liquidity redistribution in the euro area banking system. Interestingly, looking specifically at the covered bonds segment, banks were a major investor absorbing a large part of the covered bond issuance of other banks. . As banks have invested in covered bonds of their peers, including those domiciled in different jurisdictions, this has further contributed to redistributing liquidity within the euro area banking system.

If on one hand, bank bond issuance is one of the channels for reserve redistribution in the long term, on the other hand, short-term interbank reserve redistribution takes place mostly via repos. Repo markets play an important role in the facilitation of the flow of cash and securities around the financial system. As repos are economically similar to a collateralised loan (since the securities provide credit protection in the event of a counterparty default), they create and support opportunities for the low-risk investment of cash, as well as the efficient management of liquidity and collateral.

Volumes of outstanding repo transactions spiked at the beginning of the GFC (2007-2008) but in the following years have remained broadly unchanged across most jurisdictions, although a general upward trend was more visible for high quality collateral (e.g., German and French government bonds). This pattern was also due to unconventional monetary policy that, via large-scale asset purchases, reduced the availability of high-quality collateral to be pledged in repo transactions, whereas the large amount of reserves in circulation reduced the need to obtain short-term funding at a higher premium.

After 2018, as liquidity regulation (NSFR and LCR) kicked-in, banks became subject to requirements as to the quantity of liquid assets (among which central bank reserves) that they hold and incur penalties when they hold reserves short of these requirements. Such a system incentivised the redistribution of reserves between central bank counterparties. Where this took place in the repo market, it lead to increased repo market activity, albeit sometimes limited to specific collateral segments. Leverage ratio regulation instead put some constrain on repo expansion, as it required banks to hold capital in proportion to the overall size of their balance sheet (including repos).

A Study Group established by the Committee on the Global Financial System of the Bank of International Settlements, to analyse trends in the availability and cost of repo financing found that during the years of monetary expansion (2012-2017), a clear pattern was observable between repo market volumes and excess liquidity. When the latter increased, the former abated. Conversely, with excess liquidity declining, banks have visibly increased their activity in repo, a sign of banks increasingly tapping this market for active liquidity management. Also the unsecured interbank market activity slightly increased but remains very limited in size, mainly due to its costs from a regulatory perspective.

Updated figures (Dec. 2023) on the value of the total repo business are provided by the semi-annual survey of the repo market in Europe, published by the European Repo and

Collateral Council (ERCC) of the International Capital Market Association (ICMA). According to the survey, the total value of the repo contracts outstanding on the books of the 60 survey contributors (mostly banks) grew by 5.1% year-on-year. However, there was a significant slowing-down in the rate of growth since 2022.

This pattern reflected the shift in trading towards US Treasuries and JGBs, which diverted activity away from European market, where, in most jurisdictions, banks experienced easier supplies of cash and collateral, as central banks withdrew from the market and bond issuance surged.

Within this general market trend, differences can be found in banks' behaviour belonging to different jurisdictions. In particular, the share of government securities used as collateral in repo transactions tells us something about the nationality of the banks that mostly use repo market as a mean of redistributing reserves within the Eurozone.

The most recent ICMA survey highlights that Government bonds issued by Italy have become, in the past year, the second most common government securities pledged in repo operations. This means that Italian banks fund themselves to a significant degree through repo market, much more than, for example, French banks, despite the fact that the French banking system has a much larger dimension that the Italian one. Covered bonds were also used more often as collateral by all market participants as the ECB's TLTRO facility continued to be unwound and these securities, that in the past years were mostly pledged by banks to access ECB operations like TLTROs, became unencumbered.

The overall picture emerging from this analysis confirms that, while the TLTRO refund accelerated, the repo market contributed to redistribute the existing liquidity within the Eurosystem, channelling the flows from cash-rich banking systems (the ones from core countries) to banks with less excess liquidity. However it remains to be seen to what extent this trend is likely to continue as the liquidity needs – determined by precautionary reasons or to meet regulatory limits – stabilizes.

Banks' ability to raise new funding, both on the repo market and the bond market, reduced the need for recourse to the ECB's standard refinancing operations, especially for large banks. Recourse to regular central bank refinancing to repay their maturing operations was only used by smaller banks, the market access of which remains limited for operational reasons and capacity constraints, while larger ones held an amount of excess liquidity that largely exceeded their outstanding TLTRO III amounts. Therefore, excess liquidity distribution has worsened only moderately in the balance sheet run down phase as reserve redistribution across borders has been effective. Stronger confidence in the euro area banking system, effectively addressing previous pockets of vulnerability, as well as the establishment of effective financial market infrastructure arrangements to better manage counterparty risk like CCPs have enabled cross border redistribution. This has contained the recourse to SROs as excess liquidity has declined and encouraged banks to seek for market-based solutions

for reserve redistribution. SRO pricing has also encouraged banks to use them only as a backstop.

However, as the Eurosystem balance sheet continues to shrink, greater reserve redistribution will eventually be needed. There might be upper constraints to the extent in which this takes place reflecting counterparty, country, and collateral limits.

If these constraints become binding, the dispersion of money market rates could widen between different jurisdictions, which might in turn cause increasing and uneven recourse to refinancing operations across the euro area, thereby impairing the smooth and even transmission of monetary policy.

In this context I personally find the newly changes in the ECB operational framework very meaningful, because fragmentation could re-emerge as financing conditions may substantially diverge between the different jurisdictions. Pre-emptily to prevent it from happening, the MRO-DFR spread has been narrowed to better anchor rates, even if this might crowd out some private market activity.