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Regulatory incentives and the structure of euro area money markets

Implications for reserve redistribution and interest rate formation

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Abstract

This paper quantifies the regulatory cost of short-term money market transactions and analyses how post-global financial crisis prudential reforms shape the structure of euro area money markets and the redistribution of central bank reserves. As the stock of reserves declines with the normalisation of the European Central Bank's balance sheet, trading in money markets is becoming increasingly important to banks' liquidity management. As the related money market volumes rise, regulatory constraints may become a more visible determinant of trading activity and short-term rate formation. Focusing on key Basel III requirements – the liquidity coverage ratio, net stable funding ratio and leverage ratio – the paper derives stylised estimates of the marginal regulatory cost associated with unsecured and secured interbank transactions. The results indicate that unsecured interbank lending entails material regulatory costs, estimated at around 35 basis points for lenders and around 15 basis points for borrowers in the second half of 2025, reflecting capital and stable funding requirements. By contrast, secured transactions such as repurchase agreements benefit from substantially lower costs, typically well below 10 basis points when backed by high-quality collateral. These differences create structural incentives favouring secured over unsecured intermediation, suggesting that repo markets are likely to remain the main channel for reserve redistribution as the stock of reserves declines. The findings imply that post-crisis regulation has contributed to a persistent shift in the structure of euro area money markets, with implications for liquidity distribution and monetary policy implementation.

JEL codes: E43, E52, E58, G21, G28

Keywords: money markets, bank regulation, repo markets, liquidity regulation, monetary policy implementation

Non-technical summary

Money markets play an important role in the financial system by allowing banks and other financial institutions to manage short-term liquidity and redistribute central bank reserves among banks. Following the global financial crisis (GFC), the regulatory framework for banks was substantially strengthened through new capital, liquidity and leverage requirements. At the same time, large-scale asset purchases by the European Central Bank (ECB) created an environment of abundant reserves, reducing the need for banks to actively borrow and lend reserves in interbank markets. As the ECB's balance sheet gradually normalises and the stock of reserves declines, it is increasingly important to understand how regulation affects banks' incentives to trade reserves when assessing the future functioning of euro area money markets and the transmission of monetary policy.

This paper examines how post-crisis regulation affects the relative attractiveness of different types of short-term money market transactions. In particular, it compares unsecured lending between banks with secured transactions such as repurchase agreements (repos), in which borrowing is backed by collateral – typically government bonds. The analysis focuses on key regulatory requirements introduced after the GFC, including the liquidity coverage ratio (LCR), the net stable funding ratio (NSFR) and the leverage ratio (LR). These rules aim to make banks more resilient by requiring them to hold sufficient capital, stable funding and liquid assets, but they also influence the cost of financial transactions and therefore shape market activity.

Using stylised estimates, the paper shows that regulatory requirements increase the cost of unsecured interbank lending more strongly than the cost of secured transactions. For unsecured lending, banks must hold capital against counterparty credit risk and maintain stable funding, which raises the cost of such transactions. By contrast, secured transactions benefit from the presence of collateral, which reduces risk and results in lower regulatory costs. As a result, banks have an incentive to rely more heavily on repo markets when borrowing or lending short-term funds.

These findings suggest that the unsecured interbank market is unlikely to return to the levels observed before the GFC, even as the stock of reserves declines. However, this does not necessarily imply a deterioration in money market functioning. Instead, secured funding markets are expected to play an increasingly important role in redistributing reserves across banks in addition to their role in the lending and borrowing of securities. Repo markets have expanded and appear well suited to support liquidity redistribution in an environment with a smaller central bank balance sheet, although access to such markets may differ across institutions and influence how smoothly liquidity circulates within the banking system.

As the monetary policy portfolios of the European Central Bank (ECB) gradually mature, its balance sheet is shrinking.¹ Accordingly, the stock of central bank reserves held by commercial banks is declining. As aggregate reserves decline, the incentives for banks to actively trade reserves will strengthen. In this environment, the ability of the banking system to redistribute reserves efficiently and the presence of structural frictions in money markets become increasingly important for the smooth functioning of money markets and the transmission of monetary policy. Given that the ECB implements monetary policy by steering short-term interest rates, maintaining effective control over these rates is of central importance. Such control critically depends on the smooth redistribution of reserves across banks.

A key question is whether the interbank cash market will revive and thereby facilitate the smooth redistribution of a smaller aggregate amount of reserves among banks. If private markets efficiently reallocate reserves, then banks need less reserves and the ECB may be able to operate with a smaller balance sheet without generating upward pressure on money market spreads. Conversely, if market frictions persist, for example due to limited access or reduced willingness to lend, banks may rely more heavily on central bank facilities, increasing the structural demand for reserves.² Understanding the factors that may hinder or support this redistribution is therefore critical for assessing future money market conditions. In particular, regulatory requirements introduced after the global financial crisis (GFC) may affect the relative attractiveness of alternative money market instruments and thereby shape how reserves are redistributed across institutions.

Before the GFC, interbank transaction volumes were high, reflecting a regime of scarce reserves under so-called balanced liquidity conditions. Chart 1 shows that the unsecured interbank trading volume was relatively high before 2008. The market for repurchase agreements (repos), where cash is traded in exchange for securities, was equally active (Chart 1, panel b).

In the post-GFC period, interbank cash trading declined markedly. Banks have exchanged much smaller amounts of cash with each other post-GFC owing to heightened risk aversion and crowding-out by the central bank. First, the experience with the breakdown of the unsecured market segment during the GFC changed banks' risk perception towards unsecured lending. Second, especially since the rise in the ECB balance sheet that started in 2015, large excess liquidity holdings have reduced the need for interbank borrowing and lending. Chart 1, panel a) illustrates this with the convex relationship between unsecured interbank volume and excess liquidity, as well as between the share of cash-driven activity in repo markets and excess liquidity. Moreover, interbank volumes underlying the euro overnight index

¹ Monetary policy in the euro area is implemented by the Eurosystem, comprising the ECB and the national central banks. For expositional simplicity, we refer to the policymaker as "the ECB" throughout.

² In particular, banks can access liquidity through the main refinancing operation at a rate of 15 basis points above the deposit facility rate, against a broad set of eligible collateral.

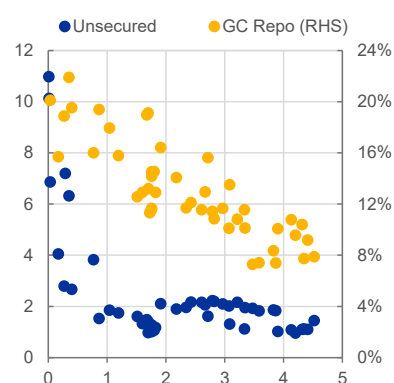
average (EONIA) declined sharply – from €27 billion to €2 billion between 2015 and 2019 – thereby undermining its representativeness as a benchmark rate. As liquidity injected via asset purchases increasingly reached non-banks, money market activity became dominated by non-banks placing funds with banks (see, for example, ECB, 2023, 2025). Chart 1, panel b) shows that unsecured interbank activity has remained subdued, while repo activity has grown overall, albeit with limited recovery in its cash-driven component, which has started picking up more recently.

Chart 1

Money market activity and bank excess liquidity holdings

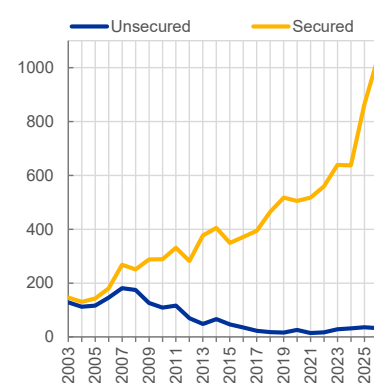
a) Unsecured interbank volume and share of cash-motivated repos in total repos, as a function of excess liquidity

(total unsecured turnover, quarterly data; EUR trillions (lhs); GC repo share, % (rhs); excess liquidity, EUR trillions (x-axis))



b) Unsecured and secured interbank volume

(average daily turnover, quarterly data; EUR billions)



Sources: BrokerTec/MTS, ECB, EMMS and MMSR.

Notes: In panel a) unsecured total turnover is based on the euro money market survey (EMMS) for the second quarters of 2003-15 and on MMSR for the quarters of 2016-26. Turnover is shown for the overlapping sample of 38 reporting agents. GC repo stands for the average share of repos against general collateral in the total repo volume of BrokerTec & MTS, where data are shown as of 2010. Excess liquidity is the sum of excess reserves (total reserves minus minimum reserve requirements) and holdings on the ECB deposit facility. Panel b) shows average daily unsecured and secured (repo) turnover for the second quarter of each year. Until 2015 the series included EMMS data for 38 reporting agents overlapping with the MMSR reporting agents and retroplated data for the 14 MMSR reporting agents not covered in the survey. The performed retroplation applies the growth rates of the overlapping sample series to the missing data backwards in time. Transactions between MMSR agents (reported twice) are included solely to prevent duplication. Secured data include interbank transactions and transactions with (non-bank) central clearing counterparties. The latest observations are for the second quarter of 2026.

The regulatory landscape also changed substantially following the GFC. As the crisis revealed weaknesses in banks' risk management, regulation and supervision, new requirements were introduced to strengthen capital and liquidity positions and constrain leverage. At a global level, these reforms were implemented through the Basel III framework (BCBS, 2010), and in the European Union through corresponding capital and liquidity regulations.

These regulatory reforms have implications for money market activity by increasing the cost of certain transactions, and consequently affect reserve redistribution and money market functioning. Banks take the additional capital and funding costs into account when pricing their money market activity. Importantly, the effects of these requirements have so far been particularly obscured by the environment of abundant excess liquidity but may also drive some of the developments described above. Their impact is likely to become more visible as reserves decline and borrowing needs re-emerge.

Taken together, these developments motivate the following research question: how do regulation-induced costs of different money market transactions compare, and how might these costs influence the redistribution of reserves and short-term rate formation as excess liquidity declines? In particular, the paper assesses whether regulatory requirements structurally favour secured over unsecured transactions and examines the implications of this for the future configuration of euro area money markets.

This paper estimates the regulatory cost of various money market transactions to quantify the incentives created by the regulation and assess their implications for the functioning of euro area money markets. We focus on short-term interbank segments that are central to the redistribution of reserves and, hence, to the implementation of monetary policy. Rather than providing bank-specific estimates, we aim to characterise the order of magnitude and cross-instrument variation of these costs, thereby shedding light on their potential macro-financial relevance. The objective is not to evaluate the overall welfare implications of post-crisis regulation, but to isolate one transmission channel through which prudential requirements may shape market functioning and equilibrium reserve demand.

Our results indicate that regulatory costs differ substantially across instruments and counterparties, creating incentives that favour secured forms of intermediation such as repo over unsecured interbank lending. This suggests that, even as excess liquidity declines, repo markets are likely to play a central role in supporting the redistribution of reserves, while unsecured activity may remain structurally limited relative to pre-GFC levels.

The paper is structured as follows. Section 2 explains the relevant regulations and how they apply to money market transactions. In Section 3, the costs are estimated, distinguishing between unsecured and secured activity and taking the perspective of both the cash lender and borrower. Section 4 discusses several caveats to our approach, including reasons why observed market spreads may deviate from our estimates. Section 5 discusses the implications of regulatory costs for money markets. Section 6 concludes.

2 Regulations and money market transactions

The GFC exposed significant shortcomings in banks' risk management, regulation and supervision, prompting the introduction of enhanced prudential requirements aimed at strengthening resilience to risks related to capital, liquidity and leverage. At a global level, these reforms were agreed under the Basel III framework (BCBS, 2010), while in the European Union they were implemented through capital adequacy and liquidity regulation, which established binding requirements on key prudential metrics: the liquidity coverage ratio (LCR), the net stable funding ratio (NSFR) and the leverage ratio (LR).³

The LCR requires banks to hold high-quality liquid assets (HQLAs) to withstand net cash outflows over a 30-day stress scenario. The LCR was implemented progressively in the European Union, with minimum requirements rising from 60% in October 2015 to 100% as of 1 January 2018. For its part, the NSFR aims to ensure that institutions have a sustainable funding structure by limiting excessive maturity transformation between assets and liabilities. It became a binding requirement in the European Union in June 2021. Finally, the LR provides a non-risk-based backstop by relating a bank's Tier 1 capital to its total exposure, including off-balance-sheet items. A minimum Pillar 1 requirement of 3% has applied since 28 June 2021 for banks under ECB supervision. In addition, global systemically important banks (G-SIBs) are subject to a higher LR requirement through a capital add-on equal to 50% of their risk-based G-SIB buffer.

These regulations affect a wide range of financial activities, including money market transactions that are both secured (e.g. repurchase agreements) and unsecured (e.g. interbank lending). Assessing their impact on money market conditions requires a granular understanding of how each regulatory constraint applies to specific transaction types and counterparties. In this section, we review the implications of the LCR, NSFR and LR across different money market instruments, distinguishing between the perspectives of borrowers and lenders.⁴ The analysis focuses on short-term interbank transactions, which play a key role in the rapid redistribution of central bank reserves within the banking system.

2.1 Unsecured transactions

In an unsecured money market transaction, the lender provides short-term funds (reserves) to a borrower without collateral. In the absence of collateral, the lender is

³ See the Capital Requirements Regulation (Regulation (EU) No 575/2013) and Capital Requirements Directive (Directive 2013/36/EU) (CRR/CRD IV).

⁴ Additional potential costs arise from resolution standards such as total loss absorbing capacity (for G-SIBs) and the minimum requirement for own funds and eligible liabilities (MREL), which are based on the RWA and LR exposures of the institutions. These are not considered in the analysis. Contributions to the Single Resolution Fund are also not considered, as the fund has been built up.

fully exposed to the borrower's credit risk, rendering such transactions inherently riskier than secured lending.

From a regulatory perspective, this credit risk exposure is primarily captured through the risk-weighted asset (RWA) framework. For example, under the standardised approach for credit risk, an exposure to an investment-grade counterparty (rated at least BBB-) with a residual maturity of less than three months attracts a 20% risk weight. This increases the lending bank's RWAs and, consequently, the amount of regulatory capital that must be held against the exposure. By contrast, the LR, which is not risk-sensitive, treats unsecured interbank loans in the same way as other on-balance-sheet exposures, requiring Tier 1 capital equal to 3% of their nominal value. However, to the extent that such lending substitutes reserve holdings, the overall size of the balance sheet – and thus the LR – remains broadly unchanged.

In addition, the NSFR assigns a required stable funding (RSF) factor of 10% to loans to financial institutions with a residual maturity below six months. This implies that lenders must back at least 10% of the exposure with stable funding sources, such as eligible liabilities or own funds.⁵ No such requirement arises if reserves are held at the central bank rather than lent in the market. Under the LCR, the effect of unsecured lending is broadly neutral over the 30-day horizon: a reduction in HQLAs in the numerator is offset by a corresponding decline in expected net cash outflows in the denominator.⁶ Strict neutrality holds when the initial LCR is exactly 100%, whereas for higher initial levels a marginally positive effect may arise.⁷

From the borrower's perspective, the primary regulatory impact stems from balance sheet expansion, which affects the LR.⁸ If the borrowed reserves are held as deposits at the central bank, then they carry a zero risk weight, implying no increase in RWAs.⁹ For the LCR, borrowing with a maturity below 30 days is broadly neutral when the initial ratio equals 100%, but may exert a small negative effect when the starting point is higher. For maturities exceeding 30 days, borrowing improves the LCR, as the associated repayment does not fall within the 30-day stress horizon. However, if the borrowed funds are invested in non-HQLAs, then the LCR impact becomes less favourable (Table 1). Finally, unsecured borrowing typically has little effect on the NSFR, as liabilities from financial counterparties contribute to available stable funding (ASF) only when their residual maturity exceeds six months.¹⁰

⁵ Depending on the available stable funding factor associated with the issued liability.

⁶ At maturity, the reimbursement of the loan is a cash inflow, decreasing the LCR denominator (outflows – inflows).

⁷ Starting from a 200% LCR level, lending 1% of the HQLA stock would increase the LCR by 1 percentage point.

⁸ The increase of the LR exposure would take place for any new borrowing and is not specific to the unsecured segment.

⁹ When reinvested to purchase riskier assets, a rise in RWAs is in principle expected.

¹⁰ With the exception of operational deposits, which are considered more stable.

Table 1

LCR impact of borrowing, depending on maturity and investment category

	HQLAs (including reserves)	Non-HQLAs
Below 30 days	Broadly neutral	Negative
Above 30 days	Positive	Broadly neutral

2.2 Secured transactions

In secured money market transactions, short-term lending of reserves is backed by collateral – typically high-quality securities such as government bonds. As the cash lender receives collateral, counterparty credit risk is significantly reduced relative to unsecured lending. In practice, such transactions are predominantly conducted as repos, whereby cash is exchanged for securities with a simultaneous agreement to reverse the transaction at a later date.

While this basic intuition suggests that well-collateralised repos should attract relatively low regulatory capital charges, the applicable framework is complex and depends on the regulatory treatment of collateral and counterparty exposures. In what follows, we focus on the main regulatory approach used in practice – the so-called comprehensive approach – to derive the implications for RWAs, which are subsequently quantified in Section 3.

Under the Capital Requirements Regulation (CRR, Regulation (EU) No 575/2013), the risk-weighted exposure amount of a repo is determined within the credit risk framework, either via credit risk mitigation (CRM) rules or the counterparty credit risk (CCR) framework for securities financing transactions. In practice, most institutions apply the CRM framework, while the CCR framework – particularly the internal model method – is typically used only by large institutions subject to supervisory approval. The exposure value is multiplied by the applicable counterparty risk weight, which may be determined under either the standardised approach or the internal ratings-based approach.

Under the standardised approach, an exposure to a bank with a credit quality step 2 rating and an original maturity of three months or less is assigned a 20% risk weight (Article 120 CRR), broadly corresponding to mid-investment-grade ratings. Cleared repo transactions generally attract substantially lower risk weights: exposures to qualifying central counterparties are typically subject to a 2% risk weight (Article 306 CRR). However, central clearing also entails additional costs, including initial and variation margins, default fund contributions and collateral requirements, which may increase transaction costs and (partially) offset the benefit from the lower capital charge.

Within the CRM framework, institutions may recognise collateral using either the simple approach or the comprehensive approach. Under the simple approach, subject to certain conditions, the risk weight of the counterparty may be substituted with that of the collateral for the collateralised portion of the exposure (Article 222

CRR), which makes this approach less risk-sensitive than the comprehensive approach. Under the comprehensive approach, the exposure value is adjusted using regulatory formulae and volatility haircuts to reflect the effects of collateral (Articles 223-224 CRR). These haircuts can be either the standard supervisory haircuts or internally modelled estimates of volatility adjustments, the latter being based on internal models and subject to supervisory approval. Large, active repo players will typically have master netting agreements in place such that the comprehensive approach with netting applies (Article 220 CRR).

Specifically, the bank calculates an adjusted exposure amount E^* , defined as

$$E^* = \max[0, E(1 + H_E) - C(1 - H_C)], \quad (1)$$

where E is the exposure value, C is the market value of collateral, H_E is the volatility adjustment (haircut) appropriate to the exposure and H_C is the volatility adjustment appropriate to the collateral. The adjusted exposure is then treated as an unsecured exposure to the counterparty and multiplied by the corresponding risk weight to obtain RWAs. As a result, even highly collateralised repos backed by high-quality government securities typically attract a small but positive capital charge.

Turning to the LR, the impact depends on the balance sheet mechanics of the transaction. For the cash lender, if the reverse repo is funded with existing on-balance-sheet reserves, the transaction effectively replaces cash with a repo receivable of equal value, leaving total leverage exposure broadly unchanged. By contrast, for the cash borrower, leverage exposure increases, as the received cash expands the balance sheet while the collateral generally remains on the balance sheet. Similarly, reverse repos can become leverage-intensive when they are funded through new liabilities or when matched-book intermediation is conducted without eligible netting, leading to a gross recognition of offsetting positions.

With respect to liquidity regulation, the effects of secured transactions are generally limited. For the cash lender, reverse repos reduce holdings of HQLAs, but this is largely offset under the LCR by the recognition of incoming cash flows over the 30-day horizon (subject to regulatory caps), resulting in a broadly neutral effect. Under the NSFR, reverse repos secured by Level 1 assets typically attract very low or zero RSF at short maturities, implying minimal impact on the funding profile. For the cash borrower, the effects on both the LCR and NSFR are likewise generally small under standard assumptions.

3 Cost estimate

To estimate the regulatory cost of interbank transactions, we assume that both lender and borrower seek to keep their regulatory ratios unchanged following the transaction. Operationally, this implies that banks issue additional capital and/or eligible liabilities to offset any adverse impact of a new transaction on the regulatory ratios. The regulatory cost of an interbank transaction is therefore defined as the sum of the marginal costs associated with issuing these instruments.

3.1 Unsecured lending and borrowing

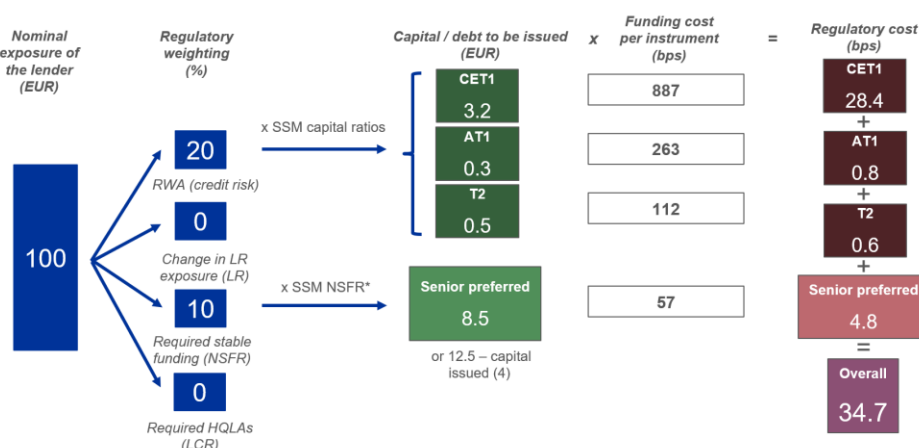
From the lender's perspective, a spread of about 34 basis points would be required to break even on a representative unsecured interbank loan. Consider a stylised transaction of €100. Applying a 20% risk weight implies an increase in RWAs of €20.

Given that the average own funds structure¹¹ of significant institutions supervised under the Single Supervisory Mechanism (SSM) consists of 16% Common Equity Tier 1 (CET1), 1.5% Additional Tier 1 (AT1) and 2.6% Tier 2 (T2) capital (as a share of RWAs), maintaining constant capital ratios requires the issuance of €3.2 (= €20*16%) of CET1 capital, €0.3 (= €20*1.5%) of AT1 and €0.5 (= €20*2.6%) of T2 instruments.

Chart 2

Overview of the regulatory cost estimate for unsecured loans

(EUR, percentage, basis points)



Source: iBoxx Markit, Altavilla et al. (2021), Bloomberg, SSM supervisory statistics.

Notes: Cost estimate for a transaction of €100. Funding cost is based on spreads to swaps for all instruments.

In addition, maintaining the NSFR at its average level of 125%¹² requires an increase in ASF. Specifically, the transaction generates RSF of €10, which must be

¹¹ Source: [SSM supervisory statistics](#), Q2 2026.

¹² Source: [SSM supervisory statistics](#), Q2 2026.

matched by €12.5 ($= €100 \times 10\% \times 125\%$) of ASF.¹³ Since the newly issued capital instruments contribute €4 to ASF (with a 100% ASF factor), an additional €8.5 ($= 12.5 - 4$) of liabilities must be raised. In practice, this residual funding need is likely to be met through senior preferred issuance, given its relatively low cost. Chart 2 summarises these components and applies a funding cost per instrument to obtain the regulatory cost. These funding costs are spreads as observed in the relevant market segments in the first half of 2026.¹⁴

From the borrower's perspective, the transaction primarily affects the LR, as the exposure measure increases by the nominal amount borrowed. To maintain a constant LR (assumed at 5.78%), the borrowing bank must raise additional Tier 1 capital.¹⁵ Assuming that AT1 instruments are used due to their lower cost relative to CET1, the bank would need to issue €5.8 of AT1 debt.¹⁶ At an assumed spread of 263 basis points, this implies a regulatory cost of approximately 15.2 basis points, which translates into a corresponding discount on the borrowing rate required to break even.

3.2 Secured lending and borrowing

RWAs associated with interbank repo transactions against government bonds are typically very low, particularly for short maturities, high-quality collateral and daily margining. To illustrate, consider a reverse repo transaction in which a bank lends €100 against €101 of highly rated ten-year sovereign bonds (i.e. a 0.99% haircut).

Under the comprehensive approach outlined in Section 2, the net exposure before adjustments is -€1. Applying a supervisory volatility adjustment of 2.828% to the collateral value (€101) yields €2.86 (Article 224 CRR). The resulting exposure is therefore $\max(0, -1 + 2.86) = €1.86$ (Article 223 CRR). For the counterparty, the corresponding exposure is $\max(0, 1 + 2.86) = €3.86$.

Assuming a 20% risk weight, this implies RWAs of €0.37 and €0.77 respectively. Where the conditions for core market participants are met, the volatility adjustment may be reduced, potentially to zero (Article 227 CRR), leading to RWAs as low as €0 and €0.20. Moreover, in practice, many bilateral repos are conducted without contractual haircuts, further affecting the RWA outcome.

¹³ As the NSFR RSF factor for loans to financial institutions with a residual maturity below six months is 10%.

¹⁴ We obtain the cost of equity from Altavilla et al. (2021), who combine various model estimates. For AT1 and T2 instruments and other debt instruments, asset swap spreads of iBoxx indices for European banks are used. Using spreads instead of the full interest rate paid reflects the fact that the funding raised will be employed, at least at the "risk free" (swap) rate.

¹⁵ Source: [SSM supervisory statistics](#), Q2 2026.

¹⁶ New unsecured borrowing does not add credit risk as long as the proceeds are held as central bank reserves. Hence, the borrower's RWAs remain unchanged (as central bank holdings have a 0% risk weight), making the transaction neutral from the perspective of risk-sensitive capital requirements (Supervisory Review and Evaluation Process capital requirements). As central bank reserves are HQLA-eligible with no haircut, the operation is also neutral from the LCR perspective: the new net outflow corresponding to the loan's maturity (denominator) is compensated by an increase of the same size of the HQLA buffer (numerator). The transaction would have no impact on the NSFR, as it is assumed to have a maturity below six months and take place with a financial institution.

For the purposes of the cost estimate (Chart 3), we assume an RWA impact equivalent to 2% of the transaction size, which should be interpreted as an upper bound for most short-term reverse repos against investment-grade sovereign collateral. This translates into a capital cost of approximately 2.8 basis points for the cash lender.

In addition, the NSFR may be affected depending on the characteristics of the collateral received. If the collateral does not qualify as Level 1 HQLAs (and is therefore subject to a 5% RSF factor rather than 0%), the lending bank may need to issue additional stable funding – again likely in the senior preferred segment – to maintain its NSFR. Taking these effects together, the lender may require a spread of up to around 3.6 basis points. The LR remains unaffected for the lender, and – assuming maturities below 30 days – the LCR impact is negligible.

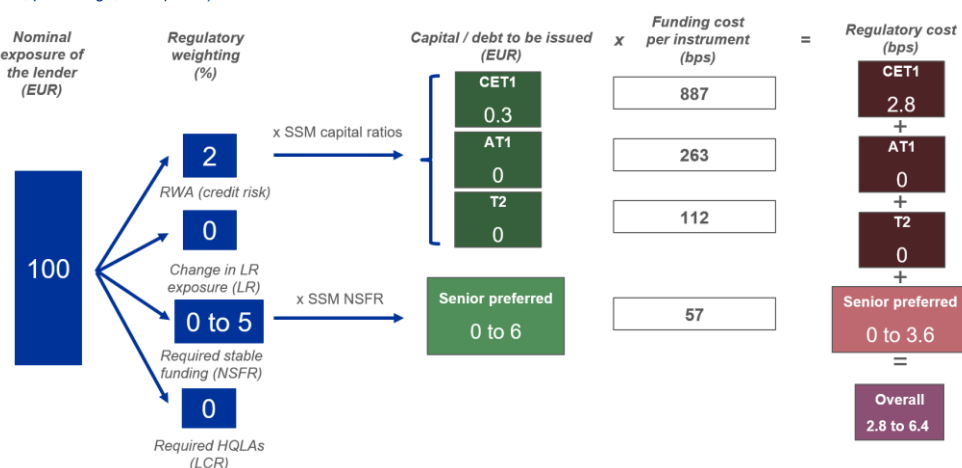
For the borrower, the balance sheet expansion increases the LR exposure measure, implying a cost broadly similar to unsecured borrowing (around 15.2 basis points). A small additional RWA-related cost may also arise, although this is typically limited. In practice, banks that participate in repo markets aim to net transactions as much as possible in order to avoid the LR impact. We largely ignore this fact in this paper, because we are interested in the bank that aims to increase its reserves through trading and hence cannot net.

Overall, secured transactions benefit from significantly more favourable regulatory treatment than unsecured ones. The estimated regulatory cost for the lender ranges between approximately 2.8 and 6.4 basis points, compared with around 35 basis points for an equivalent unsecured transaction (Chart 3).

Chart 3

Overview of the regulatory cost estimate for secured loans

(EUR, percentage, basis points)



Source: iBoxx Markit, Altavilla et al. (2021), Bloomberg, SSM supervisory statistics.

Notes: Cost estimate for a transaction of €100. Funding cost is based on spreads to swaps for all instruments.

4 Deviations from the cost estimate

The cost estimates derived in Section 3 are not expected to map one-to-one into observed money market spreads. Two broad sets of factors explain potential deviations. First, market spreads reflect a wider set of determinants beyond regulatory costs, including the marginal liquidity value that institutions attach to reserves (see, for example, Clouse, Infante and Senyuz, 2025). Second, the estimates presented above should be interpreted as benchmark or reference values rather than precise predictions for all cases. This section focuses on the latter set of considerations and discusses the main sources of variation around these benchmarks.

4.1 Dispersion across banks and over time

The estimates in Section 3 abstract from heterogeneity across banks, in particular with respect to funding costs and the cost of capital.¹⁷ The calibration relies on average market spreads for a representative sample of euro area banks, implying that individual institutions may face materially higher or lower marginal costs.

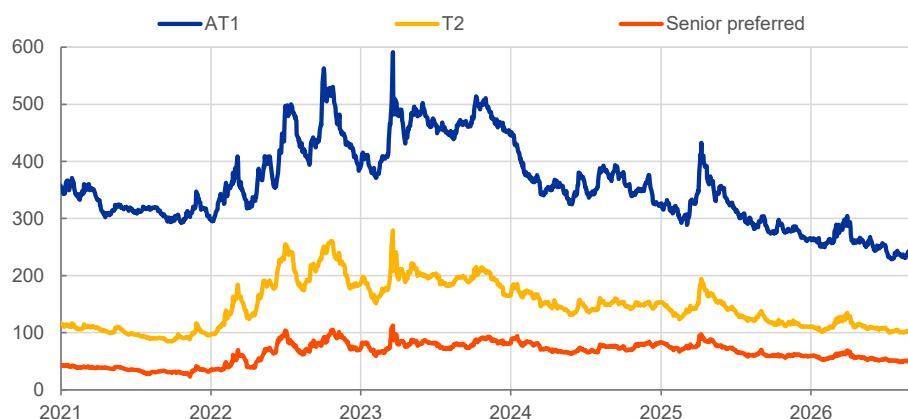
As a result, banks' willingness to participate in specific money market segments may differ significantly. Some institutions may remain active even in segments where the benchmark regulatory cost appears high, while others may find the same activities economically unattractive. Accordingly, the central estimates should be interpreted as indicative of aggregate incentives rather than as binding constraints at the level of individual institutions.

In addition, funding and capital costs vary over time. Chart 4 shows the evolution of average spreads on instruments typically used to meet capital and liquidity requirements, as incorporated in the calculations in Section 3. The cost of equity also exhibits substantial time variation. These dynamics provide a direct channel through which changes in funding conditions affect money market activity. At the same time, feedback effects may arise if higher money market rates translate into higher bank funding costs.

¹⁷ Some banks may use the internal-ratings based approach instead of the standard approach assumed in our calculation, but the output floor foreseen in the regulation limits the potential difference from our estimate. Furthermore, UK banks can be more competitive than euro area peers for deposit-taking in euro because the Prudential Regulation Authority applies a waiver for the LR exposure on central bank reserves.

Chart 4**Bank funding spreads per type of bond**

(basis points)



Source: iBoxx Markit.

Notes: Asset swap spreads for different types of bank bond. Additional Tier 1 (AT1) bonds and Tier 2 (T2) bonds are bank capital instruments. Senior preferred bonds are bank debt instruments that rank above subordinated capital (AT1 and T2). The latest observation is for 18 September 2026.

4.2 Regulatory buffers and cross-selling

The relevance of the cost estimates depends on how close a bank operates to its internal targets for regulatory ratios. For institutions with limited buffers, even small balance sheet expansions may lead to breaches of internal constraints, increasing the likelihood that regulatory costs are passed through to counterparties or that transactions are curtailed.

By contrast, banks with ample buffers above internal targets may have greater flexibility. Such institutions can, in principle, accommodate temporary deteriorations in regulatory ratios without immediately incurring additional issuance costs. For example, a retail-oriented bank with structurally high NSFR levels may attach little marginal cost to this constraint when engaging in money market transactions.

However, this reasoning requires an active allocation of scarce balance sheet capacity. Regulatory buffers can be deployed across multiple business lines, and money market activity must compete with alternative uses. Consequently, a “cost waiver” is more likely to arise for banks that strategically prioritise money market intermediation. In such cases, institutions may absorb regulatory costs up to an internal limit, effectively using existing buffers to support their market-making activities.

In addition, cross-selling considerations may weaken the pass-through of regulatory costs and are key for interpreting observed money market spreads. Banks may accept lower or even negative margins on money market transactions if these facilitate broader client relationships that are profitable at the portfolio level. Such strategies are more likely in relationships with non-financial clients (e.g. corporates)

and less prevalent in interbank activity, where counterparties are often viewed as competitors and interactions are more transactional in nature.

4.3 Risk management practices and window dressing

The estimates in Section 3 can be interpreted as an upper bound on the marginal impact of regulation, as banks' internal risk management frameworks may impose constraints even in the absence of regulatory requirements. This consideration is particularly relevant for unsecured exposures, which entail full CCR. The analysis is therefore not intended as an assessment of the overall efficiency or desirability of the Basel III framework.

Banks' internal risk tolerance and management practices also influence how tightly regulatory ratios are managed. Some institutions aim to comply with regulatory requirements on a continuous basis, while others allow for temporary deviations within reporting periods. The reporting framework itself is relevant in this context. When ratios are measured at specific reporting dates (e.g. quarter-ends) rather than as period averages, banks may be more willing to engage in transactions whose maturities do not span these dates.

Empirical evidence points to such behaviour in repo markets. Behn et al. (2022) and Bassi et al. (2024) document "window-dressing" effects around quarter-end reporting dates, characterised by declines in transaction volumes and spikes in repo rates associated with LR constraints in the European Union. At the same time, such behaviour is constrained by banks' need to provide continuous services to clients, which limits the extent of these effects.

4.4 Scope: euro area estimates

The cost estimates and their implications are specific to the euro area institutional and regulatory environment. Extrapolation to other jurisdictions should be made with caution.

Several factors may lead to different outcomes elsewhere. First, the scope of application of regulatory requirements varies: while the Basel III framework is broadly applied to all banks in the European Union, other jurisdictions may exempt smaller institutions or apply simplified regimes. Second, there are cross-country differences in the implementation of internationally agreed regulatory frameworks, including variations in risk weights, liquidity parameters and capital requirements. Third, funding and capital costs differ across jurisdictions and across banking systems.

These differences imply that both the level and the dispersion of regulatory costs, and their impact on money market conditions, may vary materially across regions.

5 Impact on money markets

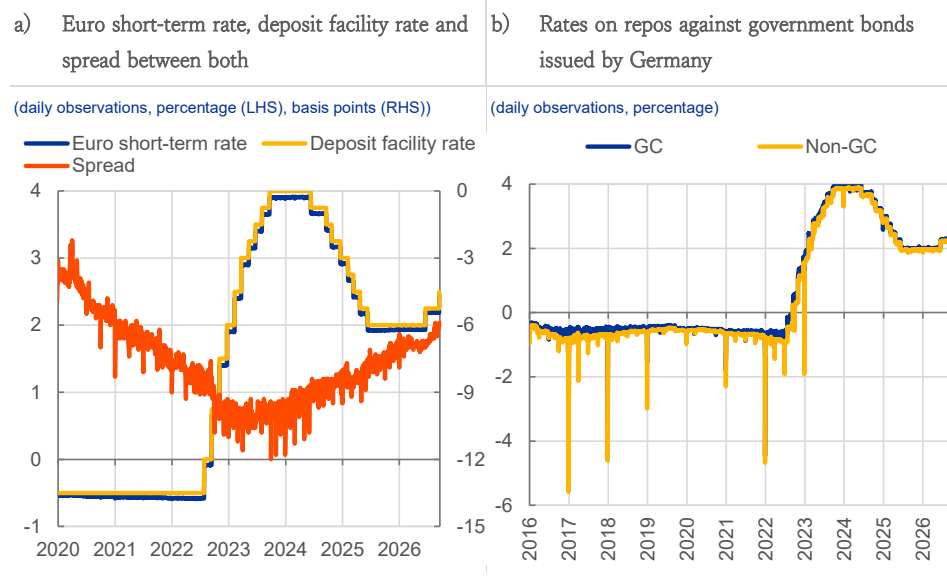
5.1 Banks pass on regulatory costs

Although aggregate excess liquidity remains ample and partly obscures regulatory effects, there are nonetheless clear signs in money markets that regulatory costs are being passed on to market participants.

The overnight unsecured market segment is one area where the effect of regulation is apparent. The euro short-term rate (€STR) hovers below the ECB's deposit facility rate (DFR) (Chart 5, panel a). Abundant reserves can explain why the market deposit rate is pushed down to the rate on deposits with the central bank, but on their own cannot explain why the market rate is below the DFR. As the €STR is an unsecured wholesale borrowing rate for banks, such borrowing reduces the LR and, when the bank already has an LCR above 100%, can also lower the LCR. In this situation, the marginal unsecured liability adds regulatory costs, creating incentives for banks to pass these costs on to their unsecured wholesale depositors. Under the current regime of ample reserves, banks essentially provide a liquidity "parking" service to non-banks for funds banks do not strictly need for their liquidity management, which further strengthens the incentive to reflect regulatory costs in pricing.

The observed spread between the DFR and market rates can understate the full regulatory cost. The DFR-to-€STR spread of around 6 to 10 basis points is smaller than the estimated 15.2 basis points LR effect derived in Section 3. Several factors help explain this discrepancy. First, deposits may be accepted at relatively high rates when banks can generate additional income by cross-selling other products to the same clients (Section 4), so the all-in relationship value is larger than suggested by the funding rate alone. Moreover, some banks may only partially pass on costs outside reporting dates, adjusting their pricing more aggressively around quarter-ends. Second, the DFR-to-€STR spread may not be the appropriate benchmark against which to compare the cost estimate. On the one hand, the average market rate is a truncated measure because it only reflects the terms on which trades actually occur; banks with particularly high regulatory or funding costs may choose not to transact at all, so their required compensation is not visible in the observed spread. On the other hand, banks may compare unsecured borrowing to alternative uses of reserves that yield more than the DFR (for example, lending in repo or other market segments), in which case the DFR understates the relevant opportunity cost.

The downward spikes in rates on short-term repos against euro area government bonds at quarter-ends during the period 2016-22 are another clear indicator of regulatory costs being passed on. During that period of abundant reserves and scarce collateral, balance sheet size costs such as the LR caused downward spikes (Chart 5, panel b).

Chart 5**Selected money market spreads**

Sources: ECB and BrokerTec.

Notes: GC stands for repos against general collateral. The latest observation is for 18 September 2026.

5.2 Unsecured interbank activity is likely to remain low

Before the GFC, the unsecured interbank market was seen as a key segment and registered sizeable transaction volumes. This explains the common expectation that an unsecured interbank market will revive and is desired as aggregate reserves recede.

From a monetary policy perspective, the segment was important because the operational target of the central bank was typically an overnight unsecured interbank rate. Also, benchmark rates were often unsecured (EONIA, euro interbank offered rate – EURIBOR) and having high volumes behind those rates could strengthen the functioning of interest rate derivatives that use such benchmark rates as the underlying. In addition, many central banks steered short-term interest rates in corridor systems with a central role for the interbank market to redistribute the “balanced” amount of reserves. For instance, Potter (2016) and Deutsche Bundesbank (2019) describe that after having met unplanned payment requests by customers, banks with too few reserves would borrow from counterparts with excess reserves towards the end of the day to meet requirements and manage their end-of-day cash balances. Virtually no buffers in the form of excess reserves were held at the end of the day.

From a financial stability perspective, the segment is seen by some as beneficial for addressing unexpected liquidity needs. In addition, most of the academic literature has argued that peer monitoring makes this segment key for market discipline, because banks need to assess their counterparty’s credit risk (Rochet and Tirole,

1996; Blasques, Bräuning and van Lelyveld, 2018). Therefore, rising market rates in the segment would signal when individual banks face issues.

There is evidence supporting the monitoring role of interbank markets and the pricing of counterparty risk in these markets (see e.g. Furfine, 2001). King (2008) and Dinger and von Hagen (2009) argue that market participants have incentives to monitor counterparties on a continuous basis, i.e. “testing their name”. Li and Lai (2022) find that interbank borrowers have incentives to manage their liquidity risks more prudently than their counterparts. In addition, there is evidence that the interbank market does not function in a fully decentralised manner, but in a network where large, diversified banks work as “money centres” for lenders and borrowers, allowing for a reduction in monitoring costs (Craig and Ma, 2022; Affinito, 2019).

The cost estimates presented in Section 3, however, suggest that the regulatory burden associated with unsecured interbank lending is sizeable and may prevent this market from regaining its former role. A bank acting as lender in the unsecured segment would seek to earn at least around 34 basis points above the DFR to cover the additional regulatory costs, with any CCR premium coming on top of this. For borrowers, this would make unsecured market funding clearly more expensive than borrowing from the central bank. The current spread of 15 basis points above the DFR for borrowing from the ECB’s main refinancing operation (MRO) is relatively small and thus does not strongly favour interbank borrowing over recourse to the central bank. Even if the MRO spread were higher, the implied market spread required for lenders to break even would likely weigh strongly on trading volumes and market liquidity. In other words, regulatory costs structurally compress the economically viable size of the unsecured interbank market.

As an exception, the network of German saving and cooperative banks remains active in the unsecured segment. This reflects the fact that they are members of an institutional protection scheme and thereby exempt from relevant RWA constraints.

5.3 Money markets have moved on

At first glance, the prospect of a permanently small unsecured interbank market appears problematic given the potential benefits outlined in Section 5.2. It might seem that, if reserves do not circulate because unsecured interbank activity remains subdued, the gradual reduction in aggregate excess reserves could soon lead to higher and more volatile overnight rates, necessitating more frequent recourse to central bank facilities (see also Borio, 2023).

However, once the broader structural changes in the financial system are taken into account, the social cost of a smaller unsecured segment appears more limited. First, post-crisis regulation and supervision have deliberately tilted incentives in favour of secured transactions, reflecting the risk-mitigating role of collateral. Unsecured wholesale funding has been shown to be volatile and prone to abrupt dry-ups in times of stress, often requiring central bank intermediation. For example, Cappelletti and Guazzarotti (2017) document the difficulties faced by Italian banks in accessing

the foreign unsecured interbank market during periods of tension. Regulation explicitly addresses the financial stability risks associated with dense unsecured interbank networks and contagion (Iyer and Peydró, 2011; Fukker and Kok, 2024; Macchiati, Brandi and Di Matteo, 2022). Against this background, CCR is also an important consideration in repo transactions, but the collateral provides and insurance and clearing is a possibility. Therefore, it is natural that repo markets become the main channel for the redistribution of reserves among banks going forward. Indeed, cash-driven repo activity has already been recovering, supporting the reallocation of liquidity in an environment of scarcer reserves.

Second, key benchmark rates with an unsecured character (€STR, EURIBOR) have been (re)designed to reflect the fact that banks continue to take deposits from non-banks and, more generally, to remain robust in an environment with limited interbank borrowing. Their construction no longer depends exclusively on traditional interbank activity. Moreover, the high pre-GFC volumes in the unsecured segment were, to a significant extent, a by-product of operational frameworks that incentivised active redistribution of reserves with minimal holdings of excess reserves at the end of the day (Potter, 2016), rather than a reflection of an intrinsically desirable market size. Third, the LCR and related liquidity regulations encourage banks to maintain buffers in the form of HQLAs and to rely more on term funding, thereby reducing the structural demand for very short-term unsecured borrowing.

The traditional argument that unsecured interbank markets are indispensable for peer monitoring and market discipline can also be revisited. Other market instruments – such as bank bonds and credit default swaps – arguably provide richer and more persistent signals of bank creditworthiness than overnight deposit rates, which can be withdrawn on a daily basis (Rochet and Tirole, 1996). Banks are more likely to invest in costly monitoring when they have longer-term exposures to their counterparties. Furthermore, the experience of the GFC showed that even sophisticated institutions struggled to assess and price each other's credit risk accurately, despite large volumes of unsecured interbank activity. This suggests that, in practice, counterparty risk was not adequately reflected in unsecured rates, weakening the disciplining role of that market. Finally, the expansion of centrally cleared (secured) markets has significantly reduced the scope and need for bilateral peer monitoring (Blasques, Bräuning and van Lelyveld, 2018).

5.4 Liquidity redistribution will rely on repos

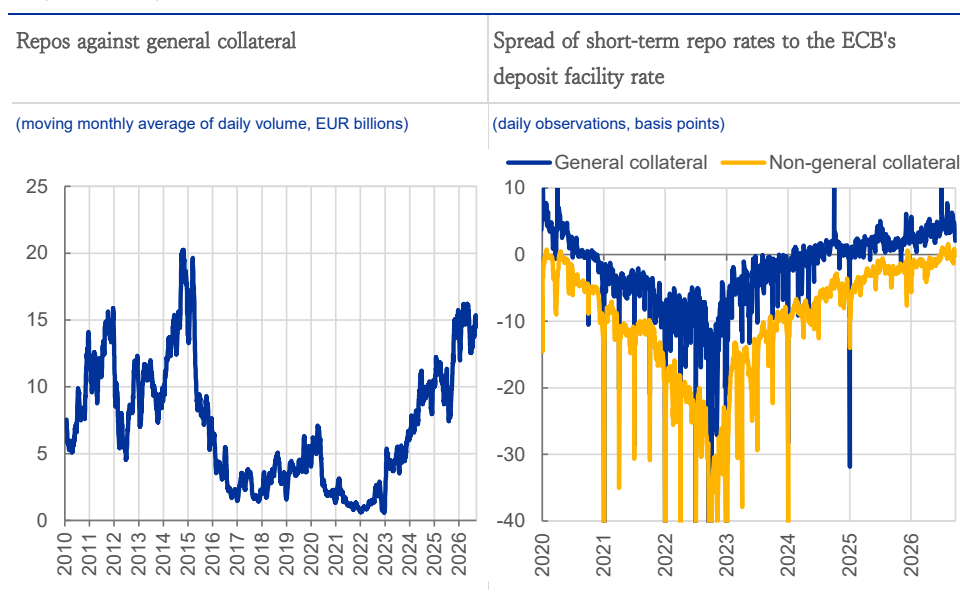
Money market activity is therefore likely to remain predominantly secured, i.e. repo-based, reflecting both regulatory incentives and banks' internal risk management practices. Looking ahead, repo markets are expected to play a central role in enabling banks to obtain and redistribute reserves. For the cash lender, the incremental regulatory cost of providing funds against high-quality government bond collateral can be close to zero basis points, in stark contrast to the substantial costs associated with unsecured lending. Even if one considers that repos may be associated with higher operational costs, these are unlikely to materially alter the relative advantage. Besides repos, banks can also obtain euro reserves via foreign

exchange swaps, by exchanging other currencies for euro cash or by issuing debt in foreign currencies, depending on where this is more cost-effective. These alternative channels are not discussed in this paper.

The repo segment has been growing over time, and most of this activity is between banks. For several years, the activity has been collateral-driven as government bonds became scarce during the period of ECB large asset purchases. However, more recently the cash-driven activity as proxied by overnight repos against general collateral has picked up (Chart 6, panel a). The growing repo activity also reflects efficiency advantages: the low risk (when high-quality collateral is used) makes repos more suitable for central clearing than unsecured deposits, which in turn facilitates the usage of central limit order books for trading.

A key concern for liquidity redistribution is that smaller banks frequently have limited access to repo markets, owing to fixed participation costs – such as the set-up and operation of a repo desk and subscription fees for trading platforms – and the need for legal documentation and collateral management infrastructure. Tri-party repos, where a third-party agent sits between the two counterparties and handles trade processes, can remove some operational and legal hurdles but involves service fees. Some institutions may find it optimal to adjust their business models and infrastructure in order to gain access to repo markets, but others may remain weakly connected and consequently rely more on intragroup funding, correspondent banking relationships or unsecured borrowing. This may create an uneven distribution of access to market-based liquidity redistribution.

Chart 6
Repo developments



Sources: Bloomberg, Brokertec and MTS.
Notes: Volume of overnight repos against GC pooling basket (lhs). One-day repos against general collateral or non-general collateral from France, Germany, Italy and Spain (rhs). The latest observation is for 18 September 2026.

Short-term repo rates hover close to the DFR and thus below the MRO rate, which stands 15 basis points above the DFR (Chart 6, panel b). Accordingly, the 15 basis points spread provides room for trading such that the MRO would not crowd out

activity at rates near the DFR. As aggregate reserves become less abundant, short-term repo rates may gradually move closer to the MRO rate, particularly if more banks rely on central bank facilities to replace lost deposits and to support their intermediation in repo markets. The relative pricing of the DFR, MRO and market repo rates will therefore play an important role in shaping the future balance between market-based and central bank intermediation in the redistribution of liquidity.

6 Conclusion

This paper has quantified the regulatory cost of key money market transactions in order to assess how post-crisis prudential reforms shape incentives for the redistribution of reserves and, ultimately, the functioning of euro area money markets. The analysis was motivated by the transition from an environment of abundant reserves towards one in which central bank balance sheets are gradually declining and the private sector may again need to play a more active role in reallocating reserves across institutions. In such an environment, regulatory constraints may become a more visible determinant of trading behaviour and price formation in short-term funding markets.

The main finding is that regulatory requirements materially affect the relative attractiveness of unsecured and secured money market instruments. Under a stylised calibration, the marginal regulatory cost of unsecured interbank lending is estimated at around 35 basis points for the lender, reflecting capital requirements associated with CCR as well as funding costs linked to the NSFR. For borrowers, LR requirements imply an additional cost of around 15 basis points. By contrast, the regulatory cost of secured lending against high-quality collateral is substantially lower, typically in the range of around 3 to 7 basis points for the cash lender, while the borrower continues to face leverage-related costs of a similar magnitude as in unsecured borrowing. These estimates are, however, time-varying, as they depend on the funding costs of the instruments used to manage regulatory ratios, which themselves fluctuate over time.

Regulatory requirements materially influence the incentives to engage in different types of money market transaction and thereby affect the channels through which reserves are redistributed within the banking system. In particular, the results suggest that regulatory costs are sufficiently large to limit the economic attractiveness of unsecured interbank activity, even as the aggregate amount of reserves declines. This implies that a return to pre-GFC patterns of unsecured interbank trading appears unlikely. The network of German saving and cooperative banks may remain a notable exception as members of an institutional protection scheme, exempt from key risk-weighting constraints. At the same time, the analysis suggests that repo markets are comparatively well positioned to support liquidity redistribution owing to their significantly lower regulatory burden.

Importantly, the paper shows that the implications of these developments for monetary policy implementation may be less far-reaching than a simple comparison with the pre-crisis environment might suggest. Structural changes in both regulation and market structure have reduced the reliance on unsecured interbank activity for benchmark formation, liquidity management and market discipline. Benchmark rates have been redesigned to remain robust in an environment with limited interbank borrowing, while liquidity regulation encourages banks to hold buffers of HQLAs, thereby reducing the need for frequent short-term unsecured funding. Moreover, secured markets have expanded and increasingly provide an alternative mechanism

for reserve redistribution, supported by central clearing and improved collateral infrastructure.

At the same time, the results highlight that regulatory costs are unlikely to translate one-for-one into observed market spreads. Heterogeneity across banks, the existence of regulatory buffers, cross-selling motives and differences in internal risk management practices all contribute to dispersion around the benchmark estimates. The reported cost measures should therefore be interpreted as indicative magnitudes that help explain structural patterns in market activity rather than precise predictions of individual transaction spreads. Moreover, since banks might in any case impose internal limits on counterparties and exposures even in the absence of regulation, the estimates can also be viewed as an upper bound on the marginal effect of regulatory requirements on observed spreads.

Overall, the analysis suggests that the post-crisis regulatory framework has contributed to a structural reconfiguration of euro area money markets, reinforcing the shift from unsecured to secured forms of intermediation. As excess liquidity declines, repo markets are likely to play an increasingly central role in facilitating the redistribution of reserves across institutions. While access to repo markets may remain uneven across banks, the evidence indicates that secured funding markets are capable of supporting the smooth transmission of monetary policy in an environment with a smaller central bank balance sheet. The findings therefore suggest that the structural decline in unsecured interbank activity does not necessarily imply a deterioration in the functioning of money markets, but rather reflects an adjustment to a regulatory and institutional framework that places greater emphasis on resilience and collateralisation.

Taken together, the results imply that the effectiveness of future monetary policy implementation will depend not only on the aggregate level of reserves but also on the functioning and accessibility of secured funding markets. Monitoring developments in repo market participation, collateral availability and the interaction between regulatory constraints and market pricing will therefore remain important as the ECB continues to normalise its balance sheet.

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