FSB FINANCIAL STABILITY BOARD

Vulnerabilities in Government Bond-backed Repo Markets

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Executive summary

This report assesses vulnerabilities in government bond-backed repo markets. The report makes use of quantitative and qualitative information from members, a review of published academic and practitioner research, and insights gained from outreach sessions with market participants and researchers. Repo backed by government bonds represented approximately 80% of the stock of all repo outstanding, at end-2024.

The report estimates that approximately $16 trillion in repo backed by government bonds was outstanding at end-2024. The US repo market represented almost 60% of the total of markets covered in this report, with approximately a further 15% each in the United Kingdom and the euro area, and 10% in Japan. Many other jurisdictions host government bond-backed repo markets, but their shares of global volumes outstanding are very small. Overall, approximately 40% of outstanding repo market transactions are cleared through a central counterparty (CCP).

Repo markets feature material cross-border linkages. Approximately 15% of government bond-backed repo involves foreign government bonds, with most of this activity concentrated in the euro area, Japan and the United Kingdom. Almost 40% of repo outstanding at end-2024 was between counterparties in different jurisdictions.

Repo markets are short-term wholesale markets with approximately half of the stock having an overnight term. There is some heterogeneity across jurisdictions with overnight repo most prevalent in India, Mexico and the United States. This may in part reflect the different market structures and level of activity by different types of market participants.

Repo markets play an important role in facilitating the flow of cash and securities throughout the financial system. Repo markets are an important source of funding in domestic and foreign currencies. Well-functioning repo markets benefit market participants by simplifying liquidity management, providing a low-risk means of deploying and acquiring cash resources and bonds, and facilitating risk hedging. Repo markets allow financial institutions to easily and flexibly transform sovereign debt holdings into cash, or the reverse, and to source specific securities as needed, thereby increasing the utility of sovereign debt to a broad range of investors. Central banks use the repo markets to fulfil their monetary policy and financial stability mandates, though this represents only a small proportion of market activity and specific analysis of these operations is outside the scope of this report.

Given the importance of repo markets within the global financial system, it is critical that their functionality is preserved, particularly during times of stress. Repo markets have been involved in several recent episodes of stress (see Box 3). This report highlights three interlinked potential sources of structural vulnerabilities within repo markets.

First, repo markets can facilitate a build-up of leverage. While measuring leverage in this context is particularly difficult, low haircuts and high levels of collateral reuse (or rehypothecation) may allow the buildup of leverage. Low haircuts may be the result of dealers netting exposures in repo trades with other trades (e.g. in futures markets as part of the basis trade) and undertaking cross-margining practices, as this, together with rehypothecation, increases efficiencies. For centrally cleared repos, initial margins, commonly collected by CCPs, perform a similar role to haircuts. Nevertheless, hedge fund cash borrowing in repo markets has increased over the past few years, and now amounts to almost $3 trillion, or 25% of their assets.

Second, demand and supply imbalances in repo markets can arise quickly in stress periods. When volatility in financial markets spikes, cash borrowers require additional liquidity for a variety of purposes, including meeting margin calls. At the same time, cash lenders may be unable or unwilling to provide funding in periods of stress.

Third, repo markets are highly concentrated along various dimensions. The plumbing of the market relies on central nodes, such as CCPs and custodians. Analysis also indicates concentration within cash borrowers, cash lenders and intermediaries (banks and broker-dealers). This concentration increases the probability that operational failures, financial distress, or capacity constraints in key market participants may disrupt market activity.

Vulnerabilities within repo markets' segments have the potential to spread through the financial system through a number of channels. This report identifies three important sources of potential contagion risk.

First, deleveraging by cash borrowers in repo markets during times of stress can put downward pressure on the prices of sovereign debt instruments. Empirical studies find that repo markets can act as a conduit for the transmission of shocks to sovereign debt markets through sudden unwinding of leveraged trading strategies financed by repo. Asset managers such as hedge funds who rely on repo markets to finance their sovereign bond positions may have to rapidly liquidate their asset holdings, leading to fire sale dynamics in the pricing of sovereign debt.

Second, leveraged financial institutions may expose their counterparties to credit risk. Collateral haircuts, margin requirements and central clearing can protect repo market cash lenders from these risks, but member data indicates that approximately 70% of non-centrally cleared repo transactions operate with zero haircuts, though some of these repos are portfolio margined or take place among affiliates.

Third, the prevalence of cross-border repo market activity means that stress in one jurisdiction's market may adversely affect other markets. A significant proportion of cross-border activity involves dealer-bank intermediaries and hedge funds.

Authorities and market participants may wish to consider and continue various efforts in response to the evidence and the vulnerabilities identified above. Authorities could look to close the data gaps identified in this report, including through collecting and sharing data under the FSB's Global Securities Financing Transactions exercise. In order to strengthen surveillance capabilities – including through a more proactive identification of vulnerabilities – authorities may wish to make use of the metrics described in this report. Authorities are also encouraged to take into account the relevant aspects of recommendations by the FSB on leverage in nonbank financial intermediation (NBFI) and global securities financing, as well as other international standards, to address vulnerabilities around the build-up of liquidity imbalances and leverage.

Introduction

Repo markets perform a vital role in facilitating the flow of cash and securities. They allow some market participants to source required short-term funding or collateral and others to undertake short-term, low-risk investment of cash. At the same time, the structure and use of repo markets give rise to vulnerabilities. Borrowing through repo markets enables leverage, can lead to over reliance on short-term funding, and facilitates greater liquidity and maturity transformation. Additionally, repo markets serve as a key channel through which the financial system is interconnected. Recent stress events have highlighted how these vulnerabilities could amplify shocks quickly across the financial system.

This report forms part of the broader FSB work programme on enhancing the resilience of NBFI. While the functioning and resilience of some core funding markets have already been assessed by the FSB and other standard setting bodies, this report significantly extends previous work by providing an in-depth analysis of sovereign repo markets. It provides a comprehensive characterisation of the structure and functioning of these markets while mapping the key financial stability risks they may present.

The analysis in this report focuses on the repo markets backed by government bond collateral as this makes up the large majority of collateral used by market participants and enables the report to assess links between repo and government bond markets. The analysis is based on a variety of information sources on repo markets. FSB members shared information on repo markets within their jurisdictions through a series of three surveys.[1] The first focussed on quantitative data on the size, features and participants in repo markets; in some cases, members were able to utilise new data sources not available in previous reports. The second survey sought qualitative information on the use of repo markets, current market practices, cross border activity and previous stress episodes. The third sought additional quantitative information on foreign government bond-backed repo, which enabled a better understanding of cross-border related activity.

The report also draws insights from external sources. First, an outreach was held with relevant industry stakeholders, including asset managers, hedge funds, money market funds (MMFs), dealer bank intermediaries, CCPs and trade associations across the global markets. Second, a comprehensive literature review of academic studies on repo markets was undertaken, and an outreach event with researchers was organised. Third, some jurisdictions collected qualitative information on repo markets as part of their regular surveys of market participants.

The rest of this report contains five parts. Sections 1 and 2 explain how repo markets function and summarise information from jurisdictions on the size, structure, participants, and other key features of repo markets around the world. Section 3 discusses key vulnerabilities, Section 4 outlines ways to monitor vulnerabilities and associated data gaps and Section 5 provides conclusions with relevant policy implications. The report also contains two annexes with information on data sources used in this report (Annex 1) and descriptions for potential metrics for assessing repo market vulnerabilities (Annex 2).

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[1] The FSB members that provided data were from Canada, the euro area, India, Japan, Mexico, South Africa, Switzerland, the United Kingdom and the United States.

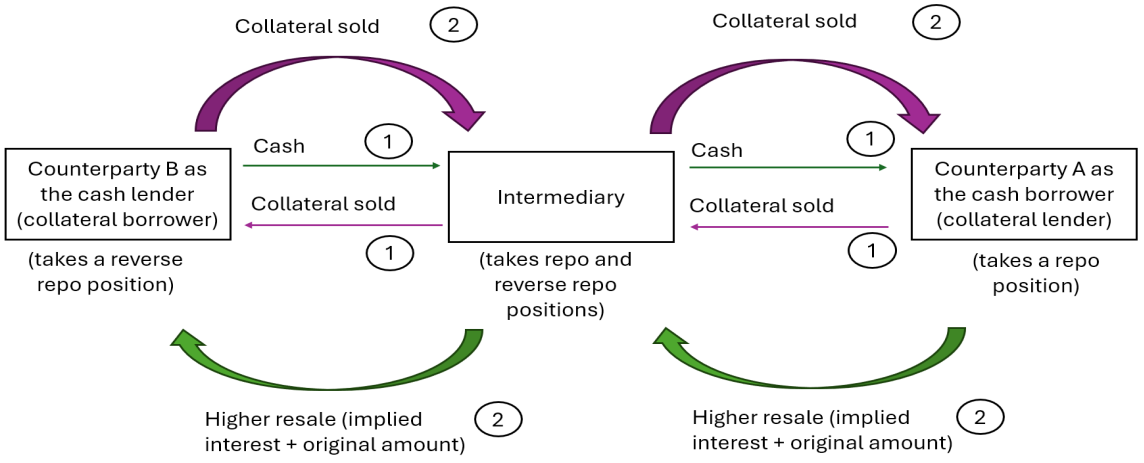
1. What are repo markets?

1.1. How a repo transaction works

Repo markets match the demand and supply that market participants have for cash and collateral. In its simplest form, a repo transaction is a short term secured borrowing arrangement between two counterparties structured as a temporary asset sale.[2] At least one side of a typical repo transaction involves a market making intermediary, mostly a large bank or a bank-affiliated broker-dealer.

Figure 1 illustrates two separate repo transactions. In the first transaction, counterparty A (cash borrower, collateral lender) undertakes a repo with an intermediary (cash lender, collateral borrower). The transaction includes an agreement for the repurchase of the collateral at a future date and the transfer of cash and collateral occurs on the opening leg of the transaction.[3] At the end of the agreement another exchange occurs where the cash borrower buys back the collateral at a pre-agreed higher price.[4] This price difference, along with the term of the repo, determines an implicit repo interest rate. Some repos may be undertaken with an open term, where the transaction does not have a specified maturity date. Instead, each day either market participant (i.e. the cash borrower or the cash lender) can end the transaction by giving notice before a certain time. If an open repo is not closed by that time, it automatically rolls over into the next day.

Illustration of repo transactions **Figure 1**



[1] In the figure, (1) denotes the start of the transaction and (2) denotes the end of the transaction; across a one period movement of cash and collateral. In certain cases, an intermediary is not necessary.

Source: FSB

Every transaction is both a repo and a reverse repo, depending on the perspective of each counterparty. In the initial transaction, counterparty B in Figure 1 takes a reverse repo position

[2] See Adrian et al (2013), *Repo and Securities Lending*, February.

[3] In some jurisdictions, the repo is effectively a secured loan as the asset remains on the balance sheet of the cash borrower thereby increasing its balance sheet size.

[4] There may be instances of a lower price such as during a period of negative interest rates.

(cash lender). As the intermediary sits in the middle of two transactions, it takes both a repo and reverse repo position between two different end users in what is sometimes referred to as a 'matched book' repo. The intermediary attempts to match their repo positions with their reverse repo positions across clients and with CCPs to potentially reduce balance sheet costs. Embedded within a matched book repo is the concept of rehypothecation where collateral received is re-used by the intermediary to allow an efficient use of their balance sheet. Intermediaries may also be end users themselves, for example, if a bank needs to undertake its own short term liquidity management or a broker-dealer needs to finance inventory.

1.2. Economic benefits of repo markets

There are several key economic benefits of repo markets, including:[5]

- **Source of funding** by facilitating the monetisation of liquid assets to cover temporary shortfalls in cash, helping the management of liquidity.[6]
- **Providing a liquid, low risk investment opportunity** for cash-rich financial institutions (e.g. MMFs).
- **Source of specific securities** by facilitating the demand for certain securities to be met. Those who need to source specific securities for specific purposes can access them quickly and efficiently, while those who hold securities for liquidity management or other purposes, can gain a return on high quality liquid assets on their balance sheets.
- **Supporting market functioning by facilitating intermediation of government bond markets and associated derivatives markets**. Repo markets can help improve government bond market liquidity, market functioning and price discovery, by enabling arbitrage and relative-value strategies that keep prices aligned across cash, futures, and derivatives markets.
- **Facilitating the hedging of risk** for intermediaries and end user counterparties.

1.3. Repo and government bond markets

Repo markets and government bond markets are closely linked as the majority of the repo market is backed by government bond collateral (see Section 2). Repo markets support market-making activities in government bond markets by helping intermediaries fund their bids at bond auctions and their underwriting positions in syndicated bond issues at reasonable costs. A well-functioning repo market dramatically improves the liquidity in the secondary bond market by reducing the need for intermediaries to hold larger inventories, which would raise the cost of their activity and make it more difficult for them to efficiently match buyers and sellers. An efficient repo market also promotes price discovery in primary and secondary cash markets. Investors

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5 See CGFS (2017) *Repo market functioning*, April.

6 The FSB identified liquidity risk management and governance weaknesses of some market participants as key causes of their inadequate liquidity preparedness for margin and collateral call, and as such set out policy recommendations to enhance the liquidity preparedness of non-bank market participants for margin and collateral calls in centrally and non-centrally cleared derivatives and securities markets, see FSB (2024), *Liquidity Preparedness for Margin and Collateral Calls: Final report*, December.

and intermediaries can also use repos to hedge risk. For example, an intermediary in a primary government bond market can hedge the interest rate risk on a long position in a newly issued government bond by taking an off-setting short position in an existing government bond issue with similar risk through repo borrowing.[7] Well-functioning repo markets make it easier for investors to participate in the cash government bond markets as they enable the bonds to be more cash-like, liquid and easily transformable.

1.4. Role of central bank operations

Specific analysis of central banking operations falls outside the scope of this report. Many central banks use the repo markets to fulfil their monetary policy and financial stability mandates. Repo markets are a core part of central bank monetary policy operations in many jurisdictions and are used to expand or contract banks' holdings of central bank reserves, steer short-term interest rates and signal the central bank's monetary policy stance. For example some central banks, such as the Federal Reserve, use the repo markets as an additional tool to help set a floor on the interest rate band they desire to maintain by adjusting the overnight reverse repo rates they offer to market participants.[8] By offering a risk-free investment option at a fixed rate, the central bank limits the attractiveness of rates lower than the overnight reverse repo rate for counterparties. Other central banks, such as the Bank of England and Swiss National Bank, use short term repo operations to ensure the short-term market interest rates stay close to the desired policy rate. [9] In the case of the Bank of England, central banks can use repo operations to meet the demand for reserves by commercial banks.

Repo markets are also used by central banks to help fulfil their financial stability mandates by providing liquidity in periods of stress.[10] Standing repo facilities offered by a number of central banks allow eligible counterparties (typically deposit takers but not exclusively) to borrow via repo for liquidity management purposes. [11] Some central banks offer additional contingent repo facilities that are only provided in response to a market wide stress. A number of these facilities were activated during the COVID-19 pandemic but have since been deactivated.[12] Recently the Bank of England launched a contingent facility designed specifically for eligible non-bank financial institutions based on their material contribution to gilt market functioning.[13] Central banks may also use repo lines to obtain needed foreign currency under severe stress conditions.[14]

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7 See De Luigi et al (2024), *The fundamental role of the repo market and central clearing*, July.

8 See St Louis Fed (2020), *The Fed's New Monetary Policy Tools*, August.

9 See Bank of England (2022), *Explanatory Note: Managing the operational implications of APF unwind for asset sales, control of short-term market interest rates and the Bank of England's balance sheet*, August and SNB (2025), *Guidelines of the Swiss National Bank on monetary policy instruments*, August.

10 For example see *BoE's Contingent Non-Bank Financial Institution Repo Facility*, the *FRBNY's standing repo facility*, and *ECB's standing facilities*.

11 For example, see Bank of England (2015), *The Bank of England's Sterling Monetary Framework*, June, the *Federal Reserve's standing repo facility*, and *ECB's standing facilities*.

12 See BoC (2021), *Bank of Canada announces the discontinuation of market functioning programs introduced during COVID-19, March*, BoE (2020), *Bank of England launches Contingent Term Repo Facility*, March.

13 See BoE (2025) *BoE's Contingent Non-Bank Financial Institution Repo Facility*, January.

14 See FRB (2021), *Statement Regarding Repurchase Agreement Arrangements*, July and ECB (2025), *Central bank liquidity lines*, February.

2. Mapping the repo markets

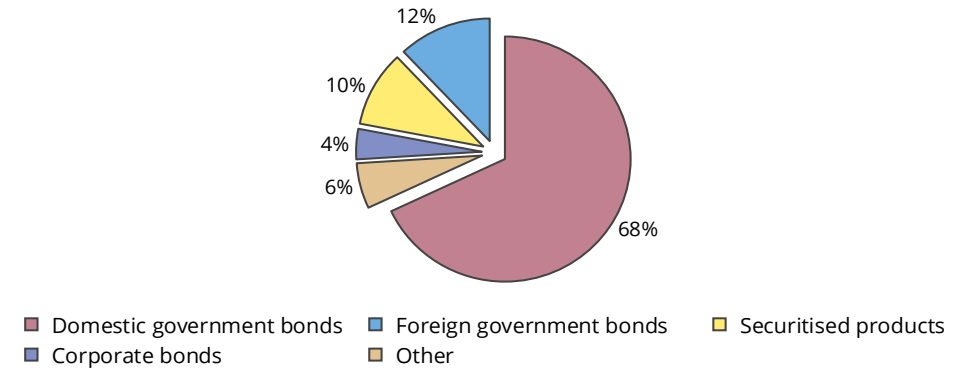
This section presents a series of key facts about the repo markets, including its size, key features and main participants. The analysis makes use of data collected by FSB members. Annex 1 sets out the technical details of the data sources used and key underlying assumptions.

2.1. Collateral and size of repo markets

FSB member data suggests that at end-2024 approximately 80% of the overall stock of repo transactions is backed by government bond collateral (Graph 1). Most government bond-backed repo uses domestic government bonds.[15] There is, however, notable activity using foreign government bonds, particularly in the euro area, Japan and United Kingdom. The use of foreign government bonds likely reflects these jurisdictions' role as international financial hubs, the presence of foreign-owned counterparties in these jurisdictions[16] and, particularly for euro area banks, a way to source dollar funding.[17]

The majority of repo transactions are backed by government bonds

Stock of repo outstanding, by type of collateral (2024), in per cent **Graph 1**



Source: FSB member data; FSB calculations.

The outstanding stock of government bond-backed repo in member jurisdictions is estimated to be approximately $16 trillion as of end-2024 (Graph 2, panel 1). The size of a repo market is obtained by summing the total amount of repo outstanding in each jurisdiction.[18] Approximately 60% of the market is located in the United States, with a further 15% or so each in the United Kingdom and euro area, and 10% in Japan (Graph 2, panel 2). While the aggregate size of the repo markets has increased by approximately 20% since 2022, the share of the markets in each jurisdiction has been fairly stable over the same period.

15 In Switzerland, a large amount of activity includes covered bonds (particularly "Swiss Pfandbriefe"), bonds issued by the domestic central and regional governments, and central bank bills, as well as, to a lesser extent, on bonds issued by foreign central and regional governments, public sector entities, and supranationals.

16 For example, for the euro area US dollar-denominated repo reflects European branches of US intermediaries, though there is also significant UK government bond repo activity carried out by EU domiciled funds.

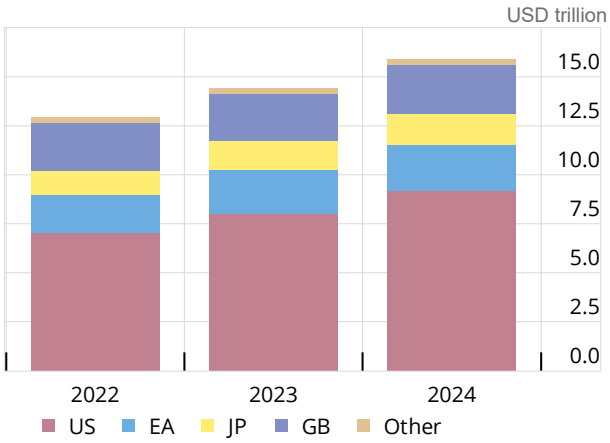
17 See ECB (2024), *Euro area banks as intermediators of US dollar liquidity via repo and FX swap markets*, November.

18 Aggregating only one side of a transaction (rather than both repo and reverse repo) avoids double counting cross-border repos when summing across jurisdictions.

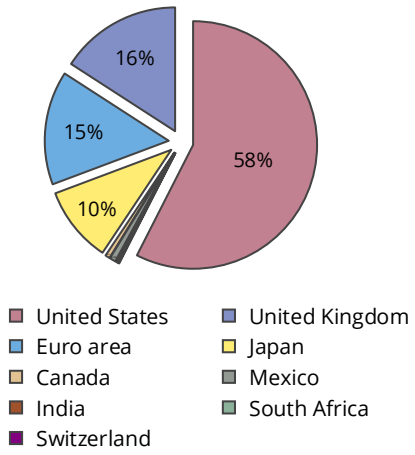
In mapping the repo markets across jurisdictions, efforts have been made to ensure comparability and consistency given the differing ways in which members collect data on repo activity. Members have adopted two broad approaches to gathering repo data. The first approach relies on transaction level information, reported into trade repositories, for example. In other cases, members collect data from institutions, such as regulated intermediaries, key parts of the market infrastructure (e.g. CCPs), or custodial service providers (Box 1). Information on the data sources and assumptions used in collecting the data used for this report is also available in Annex 1.

Outstanding amounts in the government bond-backed repo markets were approximately $16 trillion in 2024[1] **Graph 2**

1. Repo markets size



2. Repo markets by jurisdiction (2024)



1 The graph shows repo backed by domestic and foreign government bonds. For the purposes of the chart, in panel 1 local currency values are converted to US dollars using a fixed exchange rate over time to remove the impact of changes in exchange rates on the time series.

Sources: FSB member data; FSB calculations.

Box 1: Approach to estimating the repo markets size

Throughout this report data collected by FSB members are used to characterise the size and composition of repo markets in FSB member jurisdictions and to measure the stock of cross border repo activity. This box explains the approach used to defining geographic markets and cross border activity, and describes important challenges involved in aggregating transaction data across market segments and jurisdictions.

Approach to defining geographic markets and cross border activity

The size of a repo market can be defined as either the total amount of repo lending or the total amount of repo borrowing by firms in the market at a point in time. At a global level these two measures should be identical, but at the level of an individual jurisdiction they will differ as some repo takes place across borders where the cash borrower and cash lender are in different jurisdictions. In these cases, countries can be net cash lenders while others are net cash borrowers.

To define national repo markets, borrowers and lenders are assigned to jurisdictions according to the geographic location of the booking office or branch. For example, the branch of a UK bank located in the United States is treated as a US entity. This approach is consistent with that taken in the calculation of many international financial statistics but may differ from approaches taken in certain regulatory contexts.

There has also been an attempt to treat intra-group transactions identically to arms-length transactions. Thus, in principle, a repo between a US holding company and its EU subsidiary should show up in the numbers in the same way as would a repo between unaffiliated US and EU firms. While FSB members report that they are able to track intra-group transactions that cross national boundaries well, it is possible that differences in the treatment of intra-group transactions that occur within a jurisdiction may lead to some inconsistencies in measured market sizes.

Data models: transaction views and institution views

Authorities in member jurisdictions have adopted two broad approaches to gathering repo data which is summarised in Table 1.1. The first approach, a "transaction view," relies on transaction level information collected from a broad set of market participants. Such data may be reported into trade repositories or data may be collected directly by authorities. Often both end users and intermediaries must separately report information on the same transactions and analysts must match transaction records to avoid double counting. Notable examples of jurisdictions that use a transaction view approach to monitor repo markets are the European Union, which makes use of data reported into trade repositories under the EU Securities Financing Transactions Regulation (SFTR)[19], and the United Kingdom[20], which has adopted similar reporting requirements administered by the Bank of England and the Financial Conduct Authority (FCA). The Japanese Financial Services Agency (JFSA) and Bank of Japan jointly collect securities financing transaction data from about 50 financial institutions including branches and subsidiaries of foreign institutions resident in Japan with the largest amount of securities financing transactions outstanding.[21]

In other cases, authorities have found it more practical to adopt an "institution view". This approach leverages the fact that a large proportion of transactions in particular market segments flow through a small number of regulated intermediaries, service providers, or market utilities who must maintain detailed records for their own business purposes. Authorities with visibility into these key nodes can gain access to repo transaction data without imposing additional reporting requirements on other market participants.

In some jurisdictions gathering comprehensive repo market data involves a hybrid approach. For example, in the United States, some authorities have adopted an institution view approach to gather data on non-cleared tri-party and centrally cleared market segments where all transactions touch a couple of highly interconnected market participants. For the non-centrally cleared bilateral repo (NCCBR) market segment, US authorities have relied on information gathered from a few key market participants such as large intermediaries (dealers). However, in 2025, the Office of Financial Research (OFR) began a broader and more systematic data collection covering daily NCCBR transactions by certain US financial companies with at least $10 billion in NCCBR outstanding. Hence, going forward US authorities will likely rely on an institution view data model to monitor tri-party and centrally cleared market segments, and a transaction view data model to monitor the NCCBR segment.

Challenges in data aggregation and harmonization

Authorities' ability to profile global repo markets is constrained by data coverage gaps and lack of harmonized data across jurisdictions. Data challenges are perhaps best illustrated by considering the information needed to accurately measure cross border repo activity. Determining whether any particular transaction constitutes cross-border activity requires, at a minimum, information on the identity and domicile of the counterparties and any third parties involved. To measure cross border flows, authorities must be able to aggregate detailed transaction data in a consistent manner across market segments and jurisdictions.

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19 See ESMA *SFTR Reporting*.

20 See FCA (2020), *UK Securities Financing Transactions Regulation*, March.

21 See BoJ (2020), *Explanation of "Statistics on Securities Financing Transactions in Japan"*, October.

Gaps or inconsistencies in authorities' ability to draw like-for-like comparisons across markets or to track cross border activity can arise from differences in data reporting requirements, definitions, and aggregation methods. Institution views of market data may not capture transactions that do not touch key regulated intermediaries. For example, transactions data obtained from domestic repo markets dealers may not include transactions between domestic branches of foreign banks (though domestic subsidiaries of foreign banks would be captured) and domestic end users. Likewise, gaps in transaction view data may arise if not all market participants or transaction types are subject to trade reporting requirements. Where possible, for cross border transactions data from one jurisdiction have been used to address coverage gaps in another jurisdiction.

Data field definitions are not harmonized across jurisdictions and, even within jurisdictions, fields may differ across market segments. As a result, FSB members were not uniformly able to produce matching statistics on repo markets characteristics such as breakdowns by tenor, collateral type, or market participant type. In developing data for this report, an attempt has been made to apply consistent approaches across markets – such as avoiding double counting the same transaction when novated to a CCP and applying caps to remove likely erroneously reported trades – but in some cases approximations or imputations have been used. Where it was not possible to produce comparable numbers, possible discrepancies have been noted in the commentary in the report, and in annotations to charts and figures.

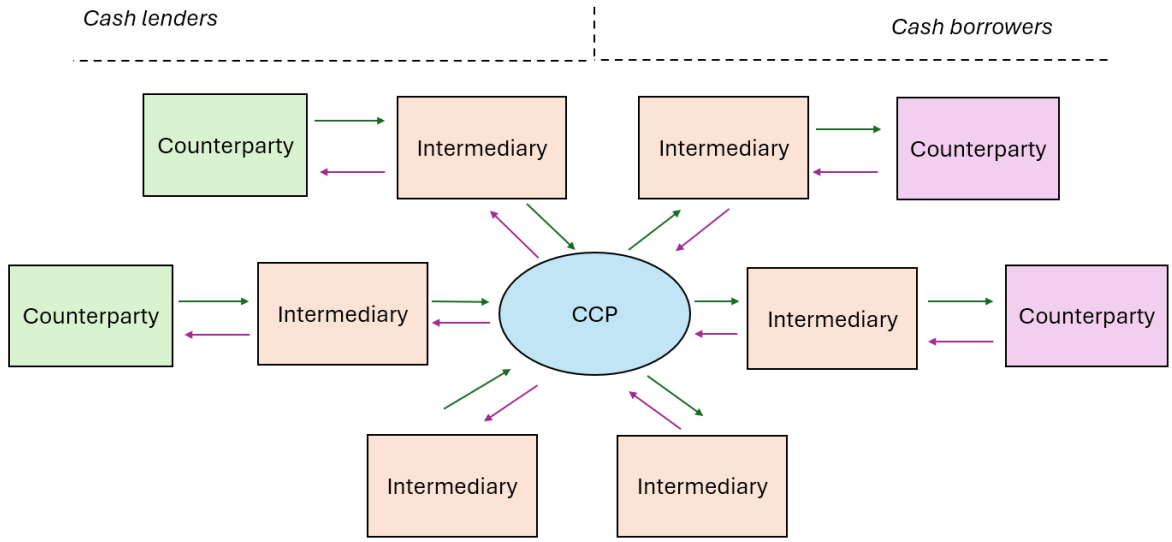
Table 1.1 – Summary of each jurisdiction's approach

Jurisdiction	Approach
Canada	Transaction
Euro area	Transaction
Japan	Transaction
India	Institution
Mexico	Institution
South Africa	Institution
Switzerland	Transaction
United Kingdom	Transaction
United States	Hybrid: transaction for NCCBR; institution for tri-party and centrally cleared

2.2. Structure of repo markets and types of market participants

Two key aspects of repo markets' structure are whether a transaction is centrally cleared and whether it is settled bilaterally between two counterparties or through a tri-party custodian. On the first, repo and reverse repo transactions may be cleared and settled through a CCP (Figure 2). In centrally cleared repos between full clearing members, the CCP takes on the credit risk of the two counterparties. These counterparties are typically intermediaries because end users are often not able to meet the strict requirements necessary to become a CCP clearing member. Some end users may have sponsored access through an intermediary. Central clearing can be more efficient for some market participants as it allows for some balance sheet and settlement netting benefits (see Section 2.3).

Illustration of a centrally cleared repo market[1] Figure 2



[1] For simplicity, the figure shows a one period movement of **cash** and **collateral**, and assumes intermediaries have a single client or are transacting with each other. In practice further variations take place, for example, intermediaries can have multiple clients, and custodians (such as a tri-party custodian) can also be used.

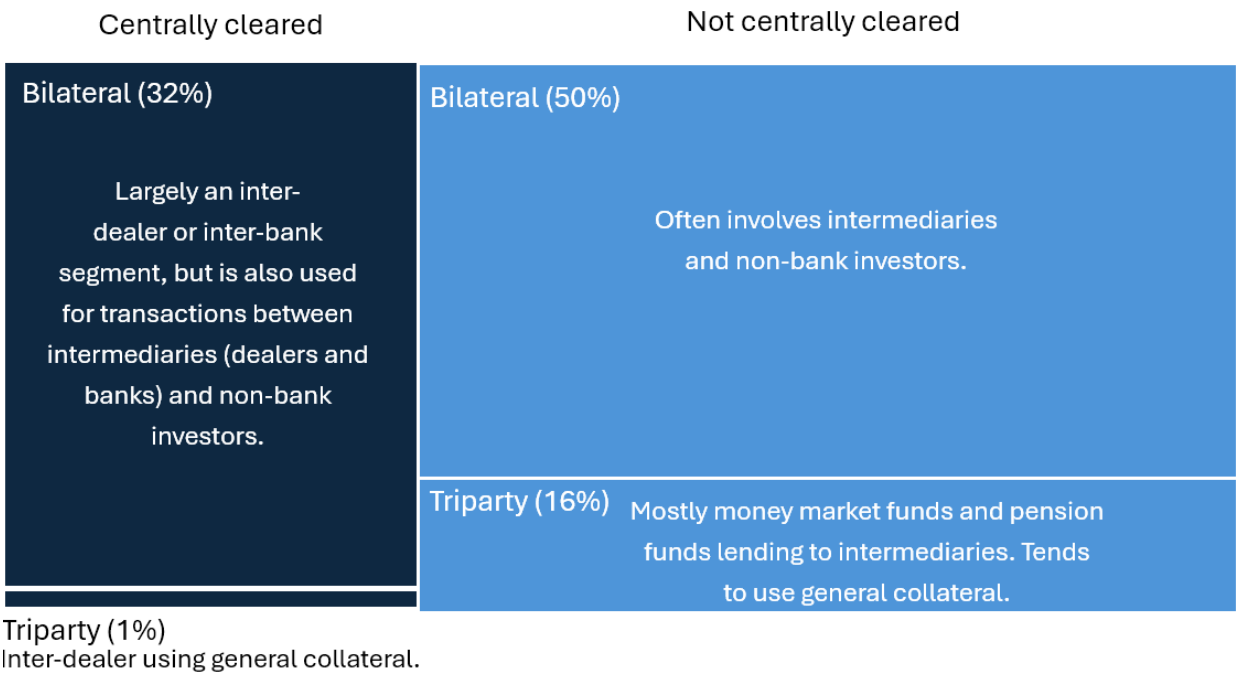
Source: FSB.

In some jurisdictions, there is a tri-party repo segment, where collateral is managed by a third-party custodian, typically for a fee, while counterparty risk remains bilateral between the cash lender and collateral provider (cash borrower). Tri-party repos allow for the outsourcing of collateral management thereby reducing some operational risk for the intermediary and end user cash lenders. The use of a centralised collateral pool in tri-party repo allows counterparties to rely on the tri-party agent to allocate, value, and substitute collateral within predefined eligibility criteria, rather than negotiating individual securities on a trade-by-trade basis.

Dividing the repo markets according to whether the trade is centrally-cleared, or not, and whether it is a bilateral or tri-party transaction, creates four segments (Figure 3).[22] Aggregating the data provided by FSB members on outstanding amounts of repo in 2024 shows that approximately one-third of the outstanding repo markets are cleared through a central counterparty, though this proportion varies across individual jurisdictions (as discussed in Section 2.3).

[22] See, for example, Hempel et al (2024), '*Repo market intermediation: dealer cash and collateral flow management across the US repo market*', OFR Brief Series, 24-07, November.

Aggregate breakdown of main repo markets segments across jurisdictions (2024)[1] **Figure 3**



[1] The figure is based on information provided by FSB members for outstanding amounts of repo in 2024. The area of the boxes in figure relates to the relative size of each segment.

Source: FSB member data; FSB.

The non-centrally cleared bilateral repo (NCCBR) market is the largest aggregate segment (about half of the total). Because this market is not centralised, it is also generally more opaque, and data on this market segment are particularly limited in some jurisdictions. This segment typically involves repos between intermediaries and non-bank participants. The NCCBR segment generally allows more flexibility in terms of the type of collateral used, repo maturity, repo volumes and the price and non-price terms of the transaction than the centrally cleared repo segment.[23] Furthermore, smaller counterparties that are not clearing members at a CCP can access this part of the repo markets.

The second largest aggregate segment (about 32% of the total) is the centrally cleared bilateral repo market (i.e. the portion of the centrally cleared market that is not settled on a tri-party platform). In many jurisdictions, this segment is largely an inter-dealer or inter-bank market. However, in some jurisdictions the segment also includes sponsored repo transactions (see further below for a discussion of sponsored clearing).

The third largest aggregate segment is non-centrally cleared tri-party repo (just over 15% of the total). This segment tends to involve MMFs, pension funds and other non-banks providing cash to intermediaries. Non-bank investors tend to outsource the processing and settlement of the transactions to a custodian. Although this segment of the market is available in Europe, the vast

[23] In the NCCBR segment the transaction cost is affected by the haircut charged by the intermediary, while the cost of the centrally cleared repo is impacted by the margins charged by the CCP.

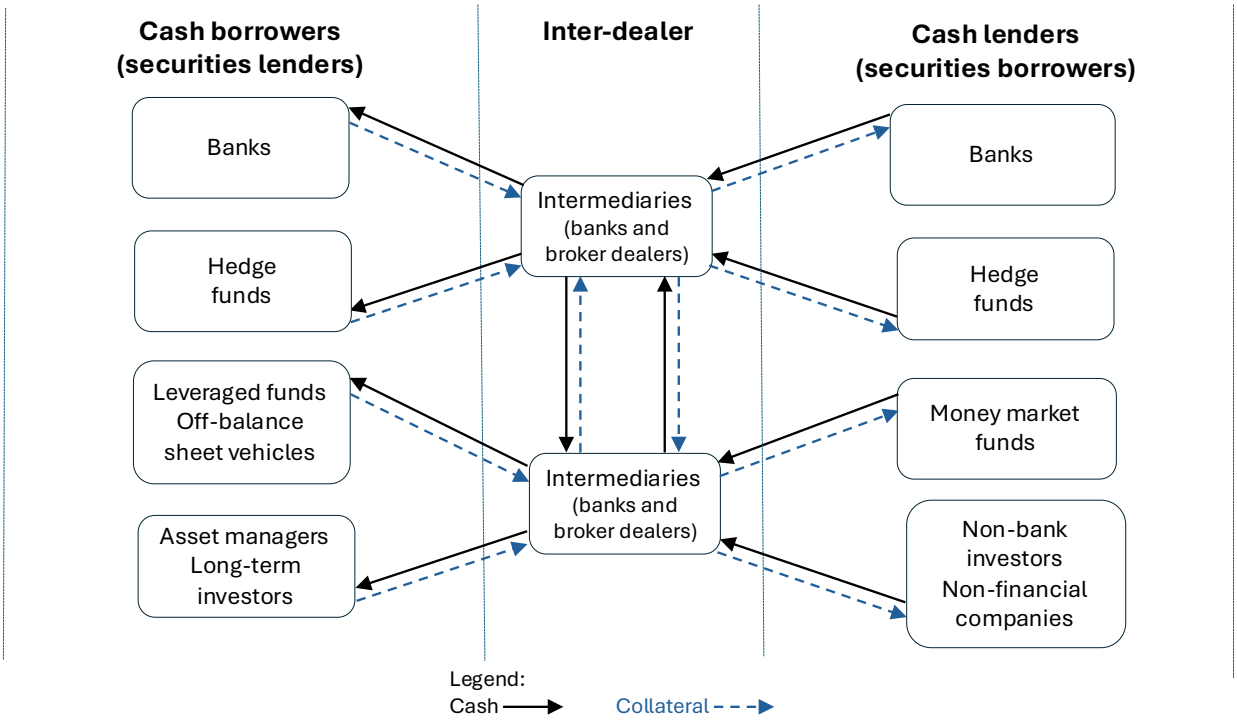
majority of this activity is in the United States. This segment of the market tends to use general collateral (further discussed below).

The centrally cleared tri-party segment largely occurs in the United States and the euro-area.[24] This segment is a variation of the main inter-dealer market, but that also uses general collateral (as in the other tri-party market).

Insights from the market participants' responses to surveys in the United States and euro area indicate the netting benefits are a primary driver of which segments participants choose to use (Box 2). In the United States, intermediaries reported a shift towards the centrally cleared segment over the past year, with the expectation this would continue. In the euro area, intermediaries reported the opposite with a shift towards the NCCBR segment including due to more favourable repo rates available to them.

Intermediaries (broker-dealers and banks) continue to have a crucial role in the repo markets (Figure 4, Graph 3) despite the growing role of non-bank financial institutions (NBFIs).[25] Intermediaries, particularly in the NCCBR segment, act as both cash borrowers (repo) and cash lenders (reverse repo) in the repo markets.

Stylised diagram of counterparties in repo markets **Figure 4**



Source: FSB.

[24] Such as in the *Eurex GC Pooling Market*.

[25] For example, see ECB (2025), *Central clearing and the growing presence of non-bank financial intermediation in euro area government bond repo markets*, January.

Data provided by some FSB members, showing bilateral repo positions between different types of counterparties, confirms that almost all repo trades have at least one intermediary. These data suggest that bilateral positions between two non-bank investors only represent about 10% of total repo positions overall, though this may not be representative for all jurisdictions.

Box 2: Insights from surveys of intermediaries

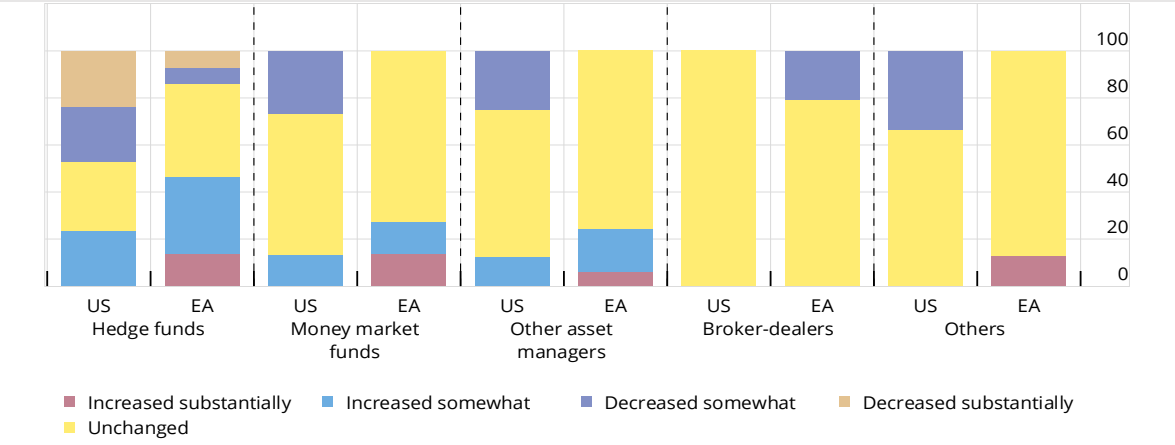
The Federal Reserve Board (FRB) and the European Central Bank (ECB) conduct quarterly surveys with banks and broker-dealers (intermediaries) on changes in credit conditions in the United States and euro area, respectively. This box summarises the results to special questions on government bond-backed repo markets from the March 2025 Senior Credit Officer Opinion Survey on Dealer Financing Terms (SCOOS)[26] and June 2025 Survey on credit terms and conditions in euro-denominated securities financing and OTC derivatives markets (SESFOD).[27]

Over the past year, intermediaries reported differing experiences across the US and euro area in their proportion of repo transactions in the non-centrally cleared bilateral repo (NCCBR) segment (Graph 2.1). In the United States, intermediaries experienced some modest shift away from NCCBR for their transactions with end users. Intermediaries reported varied experience with hedge funds, with a net change away from the NCCBR segment. Netting benefits associated with central clearing transactions were the primary reason for this change. In the euro area, intermediaries reported an increasing proportion of activity in the NCCBR segment except for transactions with other intermediaries which were slightly more in the centrally cleared segment. The benefits of netted packages[28] were also the primary reason followed by better repo rates available in this segment. Looking ahead to the next year, intermediaries in the US expected greater activity in the centrally cleared segment, consistent with the implementation of the SEC's US Treasury clearing mandate.[29]

Shares of Intermediaries reporting changes in their NCCBR repo activity since one-year ago, by client type

In per cent

Graph 2.1



Source: Federal Reserve; ECB; FSB calculations.

[26] See FRB (2025), *The Fed - Senior Credit Officer Opinion Survey*, March.

[27] See ECB (2025), *Results of the June 2025 SESFOD survey*, June.

[28] In a netted package, a counterparty and intermediary enter into a repo and reverse repo with the same tenor but different government bond securities. In effect these trades allow the counterparty to temporarily swap one government bond for another.

[29] See SEC (2024), *Standards for Covered Clearing Agencies for U.S. Treasury Securities and Application of the Broker-Dealer Customer Protection Rule With Respect to U.S. Treasury Securities*, January

In the United States, almost all intermediaries reported having clients that transacted with them in both Treasury repo and reverse repo (See Table 2.1). More than half of respondents also reported transactions involving Treasuries repo and Treasury futures as well as Treasury repo and other interest rate derivatives. In the euro area, a large majority of intermediaries confirmed that they had engaged in trades combining Euro government bond (EGB) repo and reverse repo transactions. However, other EGB repo trades were less common, such as those in combination with EGB futures or other interest rate derivatives.

Table 2.1 Percentage of respondents reporting that their clients used the following combinations of transactions

	US Treasuries	EGB
Domestic government bond repo and reverse repo	95	81
Domestic government bond repo (or reverse repo) and domestic government futures	55	31
Domestic government bond repo (or reverse repo) and interest rate derivatives other than domestic government futures-for example, interest rate swaps or options	64	42
Domestic government bond repo (or reverse repo) and product(s) not listed above	23	12

In both the United States and euro area, margin offsets[30] were used for repo and reverse repo transactions. US intermediaries reported cross product margin offsets were applicable in a small fraction of transactions involving repo and futures or interest rate derivatives. This was reported to be much less common in the euro area.

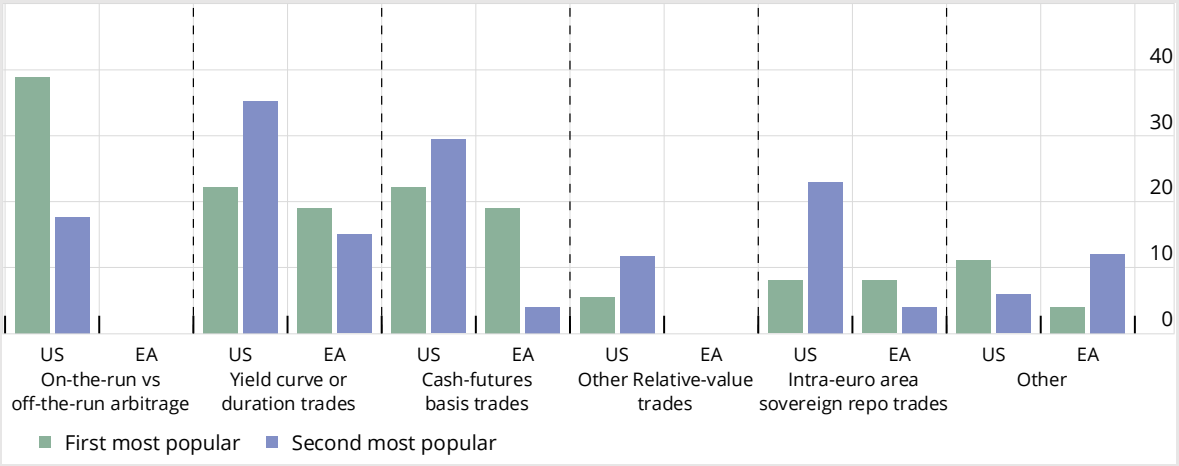
In the United States, intermediaries reported on-the-run vs off-the-run arbitrage, yield curve or duration trades and the cash-futures basis trades as the most popular trading strategies among client hedge funds (Graph 2.2). In the euro area, yield curve or duration trades were named the most popular trades among client hedge funds, although alternative strategies, including cash-futures basis trades and intra-euro area sovereign repo trades, were also prevalent.

[30] The practice of netting margin requirements across a dealer's repo and reverse repo transactions with the same counterparty, so that collateral is exchanged only on the net exposure rather than on each trade separately.

Popular trading strategies among intermediaries' hedge fund clients by % of respondents

In per cent

Graph 2.2



Note: The euro area bars to not add up to 100 as there were some responses marked as "N/A".

Source: Federal Reserve, ECB and FSB calculations.

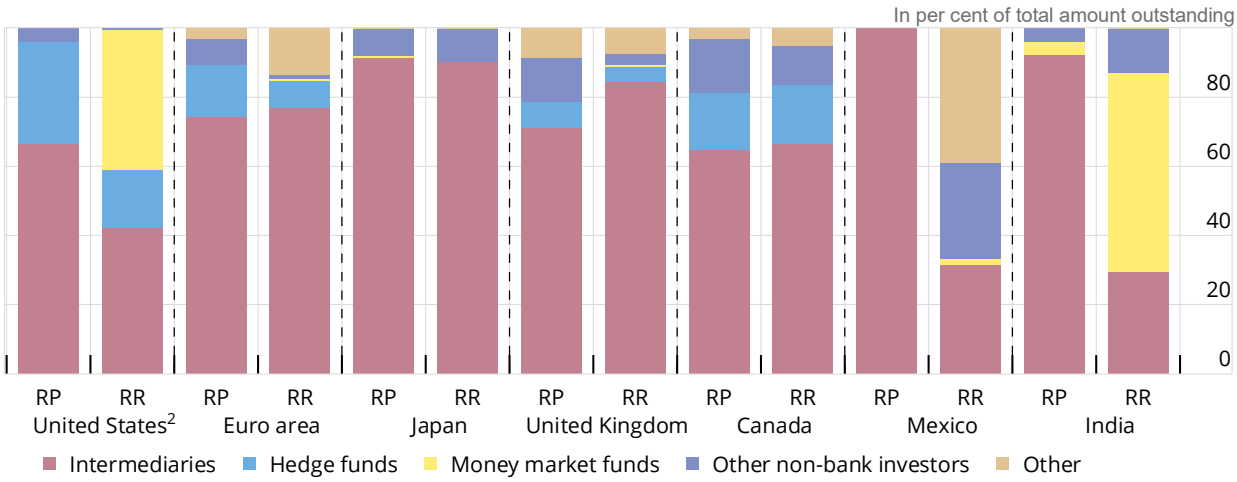
Finally, the SESFOD also specifically asked about cross-border activity and changes in margin calls. Euro area intermediaries reported some increase in cross-border repo transactions over the past year with a similar expectation for the future. They also reported the US tariff announcements on 2 April had a limited but slightly negative impact on clients' ability to meet margin calls. At the same time, the announcements did not significantly increase forced asset sales.

Several types of counterparties are primarily cash borrowers in repo markets. Hedge funds, borrow cash in order to leverage their trading strategies and earn a higher return on their equity (see the description of leveraged trading strategies in Section 3). However, hedge funds also operate as cash lenders (or securities borrowers) when this is part of their trading strategy. Graph 3 shows that hedge funds can have significant positions in both repo and reverse repo. Other cash borrowers are mainly different types of non-bank financial companies, including leveraged funds (e.g. real estate investment trusts) and off-balance sheet vehicles that use repo funding, including liability-driven investment LDI funds. Asset managers and long-term investors (e.g. pension funds, life insurers and some open-ended investment funds) are involved in the repo markets primarily in order to lend collateral in high demand from their securities portfolios and earn a return by investing the cash they receive.[31]

[31] Central bank' securities lending programs are excluded as per the scope of this deep dive.

Repo markets mainly involve intermediaries, but also a number of key counterparties

Counterparties in repo markets (2024)[1] **Graph 3**



RP = repo (cash borrower); RR = reverse repo (cash lender).

[1] The chart shows outstanding amounts of repo and reverse repo, backed by domestic and foreign government bonds, by the counterparty involved. The chart includes both domestic and cross-border repo (and reverse repo), but as it focuses on the counterparty involved, the domestic and cross-border segments are not separately identified. Intermediaries include banks and broker-dealers, other non-bank investors includes other non-bank financial institutions outside of hedge funds and money market funds. Other is largely non-financial entities, though in a few jurisdictions it is not possible to separate other financial and non-financial entities. Central banks are excluded from the chart. [2] The data for the US in this chart includes only a partial view of the NCCBR segment which tends to be concentrated between hedge funds and intermediaries.

Source: FSB member data; FSB calculations.

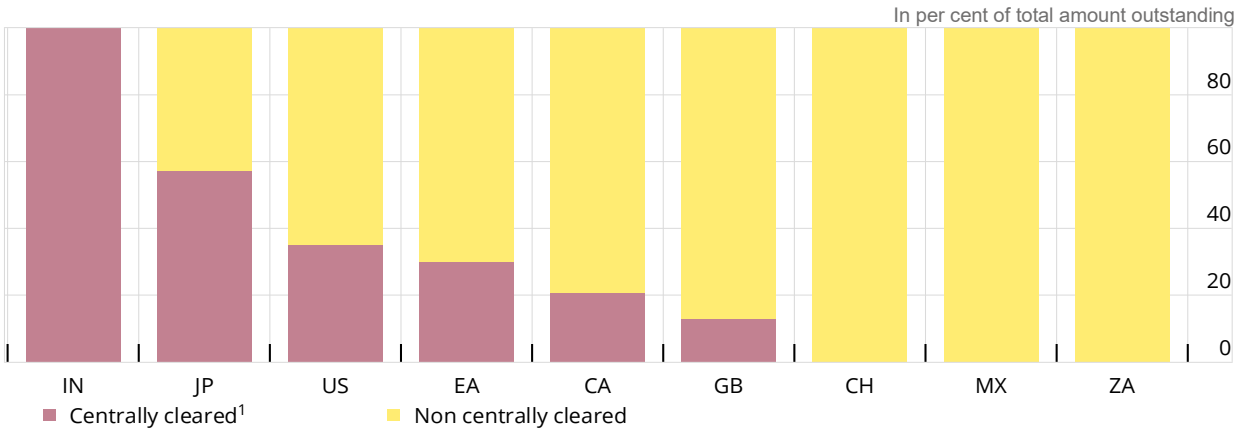
On the cash lending side of the repo markets, MMFs play an important role in some jurisdictions. Graph 3 shows this to be the case in the United States and India, though MMFs might not be separately identified in other jurisdictions' data and so may be included in the 'other financial' category. MMFs use repo to earn a yield on their cash by lending against collateral to reduce credit risk. Other cash lenders include non-bank investors with excess cash (including investment funds), non-financial companies again lending excess cash, and in some jurisdictions, official sector agencies (e.g. local government agencies) and government sponsored enterprises. Except in Mexico, non-financial counterparties are a relatively small part of the repo markets (Graph 3).

2.3. Centrally cleared repo activity

There are differences across jurisdictions regarding the share of centrally cleared repos (Graph 4). FSB members' data shows that all repo transactions in India are centrally cleared, the majority are centrally cleared in Japan, and there is no central clearing in some other jurisdictions (Mexico, South Africa and Switzerland).

The proportion of central clearing varies significantly across jurisdictions

Centrally cleared repo by jurisdiction (2024) **Graph 4**



[1] Includes sponsored cleared segment.
The graph is based on geographic location of the activity (booking office or branch) as set out in Box 1. The graph includes Q3:2025 data for one jurisdiction as the numbers are more reliable than the available data for 2024

Source: FSB member data; OFR.

There are different models for central clearing across jurisdictions (see Table 1). The membership arrangements available are as follows:

- Direct or netted membership: this is the most common membership. Direct CCP membership is typically limited to intermediaries. The direct member is required to post collateral to the CCP for margin and contribute to a mutualised default fund.

- Sponsored clearing: some client institutions not eligible for direct membership are able to clear trades at the CCP through sponsored membership. Sponsored members are typically large pension funds, MMFs, hedge funds, large insurers, government entities and credit institutions. In this model, a sponsoring direct clearing member posts margins to the CCP through an omnibus or segregated account. The sponsoring member may separately collect margin from the client, but this is not governed by the CCP.[32]

- Client clearing: a direct clearing member (usually with significant capital) can clear clients' trades on their behalf and is liable for settlement of the trade and payment of margins and default fund contributions of the client. Typically, the direct clearing member passes some of these costs to their clients via bilateral arrangements.

[32] See Copeland and Kahn (2024), *Repo Intermediation and Central Clearing: An Analysis of Sponsored Repo*, December.

Table 1: Clearing models in jurisdictions featuring central clearing

Clearing type	Canada	Euro area[1]	India	Japan	UK	US
Direct/netted membership	✓	✓	✓	✓	✓	✓
Sponsored membership		✓			✓	✓
Client clearing model		✓	✓			✓

In the euro area, client clearing is barely developed for repos, as it is particularly costly and balance-sheet intensive for clearing members, which pass the costs on to their clients and thus makes client clearing uncompetitive compared to the bilateral segment.

Source: FSB member data.

Researchers highlighted that access models for CCPs are crucial in balancing expanded market participation with effective risk management. On the one hand, broader access may promote, inter alia, market transparency and risk mutualisation. On the other hand, uncontrolled or poorly designed access may introduce new vulnerabilities (e.g. introducing into the clearing ecosystem participants with weaker liquidity profiles) or create new forms of concentration risk (e.g. overreliance on a few sponsors).[33]

Central clearing provides a number of benefits to market participants: it allows for substantial additional netting; it can enhance transparency; and it helps ensure that important risk management practices including initial margin requirements are broadly applied. All of this helps mitigate counterparty credit risks in the repo markets. In addition, the centralisation and transparency of default management within the CCP can reduce uncertainty during periods of market stress.

Expanded central clearing may facilitate greater netting of repo positions, possibly helping to expand dealer balance sheet capacity, but the magnitude of such benefits is uncertain. Some analysis in Canada indicates sizeable benefits whereas other analysis in the United States finds that it may have relatively modest impacts in reducing regulatory costs for intermediaries subject to capital requirements.[34] As market participants have exposures to a CCP instead of direct exposures to each other this could also enhance operational efficiency and resilience against financial shocks. Researchers expressed views on the importance of interoperability between CCPs. This was seen as crucial to the functioning of the cleared segment in the Euro area. For example, interoperability between the French and Italian CCPs which allowed for cash borrowers and lenders in either jurisdiction to partake in a larger repo market and the smooth exchange of cash and collateral was viewed as beneficial in past stress episodes.

Expanded central clearing is being considered in some jurisdictions. In the United States, a new rule set to take effect in 2027 will require members of a registered CCP for US Treasury securities to clear all eligible US Treasury repo transactions.[35] Other jurisdictions, such as the euro area and the United Kingdom, have commenced discussion on adopting a similar approach.[36] In Japan, the shortening of

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33 See also, CPMI-IOSCO (2022), *Client clearing: access and portability*, September.

34 See Chen et al (2022), *Potential netting benefits from expanded central clearing in Canada's fixed-income market*, June; and Bowman et al (2024), *Balance-sheet netting in US Treasury markets and central clearing*, July.

35 See SEC (2025), *SEC Extends Compliance Dates and Provides Temporary Exemption for Rule Related to Clearing of U.S. Treasury Securities*, February.

36 See ESRB (2024), *Chapter 4: A system-wide approach to clearing of government bond cash and repo transactions*, November and BoE (2025), *Enhancing the resilience of the gilt repo market*, September.

the Japanese Government Bond settlement cycle to T+1 launched on May 2018, including the introduction of Subsequent Collateral Allocation repo (T+0), increased the CCP clearing ratio and encouraged the shift from securities lending transactions to repo transactions. Prior to this reform, repos were mainly used by bond dealers and foreign counterparties.

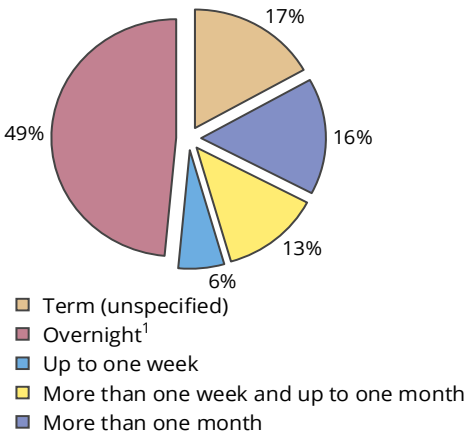
While central clearing is an important tool for improving financial system resilience, it also introduces some challenges. Some market participants may face higher costs (such as higher margin requirements and haircuts and/or higher default fund contributions), have reduced flexibility in repo transactions terms (such as in choice of collateral, maturity) and would need to go through an onboarding process. The centrally cleared segment may also include concentration of some risk and the potential for procyclicality in margin requirements which is further discussion in Section 3.

2.4. Tenor

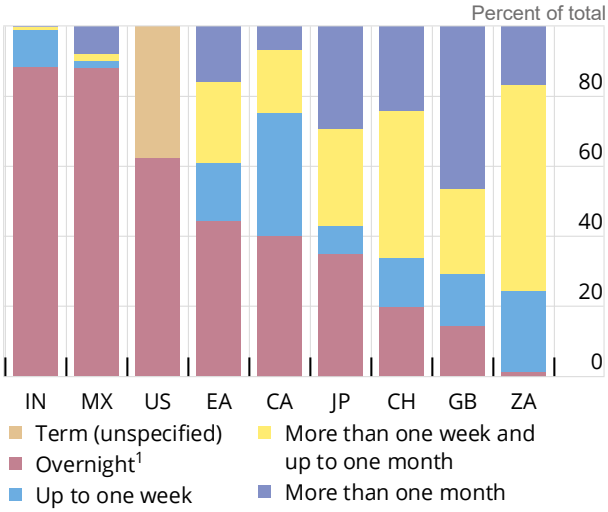
Transactions in the repo markets are predominantly short-term wholesale funding with approximately half of the stock having an overnight term (Graph 5, panel 1).[37] There is some heterogeneity across jurisdictions with overnight repo most prevalent in India, Mexico and the United States (Graph 5, panel 2). This may in part reflect the different market structures and level of activity by different types of market participants. Evidence from members suggests that longer maturity repos tend to be non-centrally cleared.[38] This could be due to portfolio trading strategies or higher margin requirements and service fees of CCPs at these maturities. It is also important to note that there is no information on the term of approximately 20% of repo amount outstanding.

Repo is typically a short-term wholesale funding source **Graph 5**

1. Stock of repo markets by tenor (2024)[1]



2. Stock of repo markets by tenor and jurisdiction (2024)



[1] Please note that there is no information on the term of approximately 20% of the repo stock. Overnight repo Includes open term repo.

Source: FSB member data.

[37] For some jurisdictions, overnight repos include 1-day term trades with most common maturity buckets being 'O/N' -Overnight, 'T/N- Tomorrow/Next and 'S/N'-Spot/Next, see Annex 1.

[38] See OFR (2023), *Why Is So Much Repo Not Centrally Cleared?*, May.

Market participants have differing preferences regarding the tenor of repo transactions. Insurance companies, pension funds and LDI funds tend to prefer longer term repo, in line with their long-dated liabilities. MMFs are active in shorter maturity repos in part to ensure adequate liquidity for redemptions. Discussions with market participants suggest that hedge funds prefer longer term maturities to limit rollover risk. However, term funding is not always available from some cash providers, given MMFs' preference at the short end. In the United Kingdom, hedge funds operate in repo transactions with maturities between 2 weeks and 1 month. In the United States the median repo (cash borrowing) term for hedge funds is approximately 9 days and the mean of approximately 25 days, while the median reverse repo (cash lending) term is approximately 4 days and a mean of approximately 12 days.[39]

Tokenised Repo and intraday tenor

Recently, some market participants, platform providers and authorities have started to explore intraday repo transactions, using tokenisation. The FSB has been monitoring developments in tokenised repo markets. Proponents of tokenised repo assert that distributed ledger technology (DLT) will bring greater automation, speed, and efficiency to traditional repo transactions, and focus in particular on enabling intraday transactions as the main value proposition.[40] Five case studies were reviewed, with two reportedly undertaking "live" repo transactions and others remain in pilot stages. Data reported in the live case studies suggests the current level of tokenised repo activity remains low.

Collateral for tokenised repos typically involves tokenised government securities, while the cash leg employs various digital assets, including wholesale central bank digital currencies, stablecoins, and tokenised deposits. The participants undertaking tokenised repo highlight several advantages of tokenised repo:

- Facilitate intraday repo such as through near-instantaneous settlement
- Significantly reduce transaction costs
- Improve collateral management
- Offer versatility and support for complex transactions which can span different currencies and asset types e.g. a repo combined with a forex transaction.

However there are challenges to scaling tokenised repo, including market participants' reliance on traditional systems, the costs of upgrading back-office infrastructure, and competing priorities, such as investments to comply with regulatory changes. While it appears that there is no immediate need for further assessment, the growing number of pilots and tests suggests that tokenised repos warrant continued monitoring as part of broader tokenisation market developments.[41]

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39 See Kruttli et al (2021), *Hedge Fund Treasury Trading and Funding Fragility: Evidence from the COVID-19 Crisis*, June.

40 Intraday repo has existed in bilateral and non-centrally cleared traditional repo, but they represent a small part of the market. There are efforts to increase intraday repo in the tri-party repo space – see *BNY (2025), Market Structure and Growth, January.*

41 See FSB (2024), *The Financial Stability Implications of Tokenisation*, October.

2.5. Haircuts and margins

Despite the collateralised nature of repo transactions, risks can arise due to the potential default of either counterparty and due to fluctuations in market prices of the collateral. The latter creates mismatches between the value of the cash amount lent or borrowed and the market value of the collateral. To protect counterparties against these risks, haircuts or margins are used.

Haircuts

Haircuts typically overcollateralize a repo transaction and are governed by a haircut ratio applied at the individual transaction level. For example, a positive haircut applies a discount to the market value of the collateral, while a margin ratio above 100% increases the value of the cash amount lent or borrowed. In either case, the effect is to require the cash borrower to post excess collateral to the cash lender. This protects the cash lender from potential losses if it needs to liquidate the collateral to recover the cash lent out. The level of haircuts is not set by regulatory requirements. Instead, market participants often rely on market practice and use their internal risk models to calibrate haircuts. Haircuts can also be set on packages of netted transactions that offset repo and reverse repo positions, or on portfolios of transactions that can have paired repo and futures positions, for example.

Member data suggests that about 70% of the non-centrally cleared segment operates with zero haircuts (Graph 6 panel 1).[42] This finding is consistent with other recent studies.[43] Where positive haircuts are applied, anecdotal evidence from the euro area suggests this is likely to be on repos in foreign currencies or involving foreign counterparties. Member data suggests the high share of zero haircuts is consistent across different tenors of repo activity (Graph 6 panel 2).

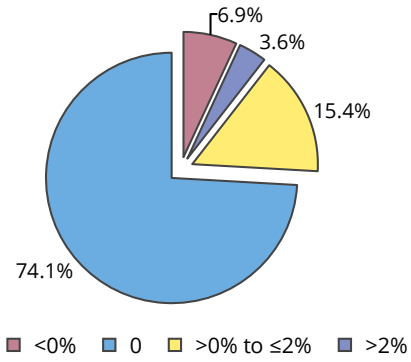
[42] This is largely in the bilateral non-centrally cleared segment as tri-party repo haircuts in some jurisdictions such as in the United States have hovered almost uniformly approximately 2%; see Kahn and McCormick (2025), FEDS Notes, *Proportionate margining for repo transactions*, February.

[43] See Hermes et al (2025), ECB Working Paper Series, *The international dimension of repo: five new facts*, June, Banegas and Monin (2023), *Hedge Fund Treasury Exposures, Repo*, and Margining, September and OFR (2023), *Why Is So Much Repo Not Centrally Cleared?*, OFR Brief Series, May.

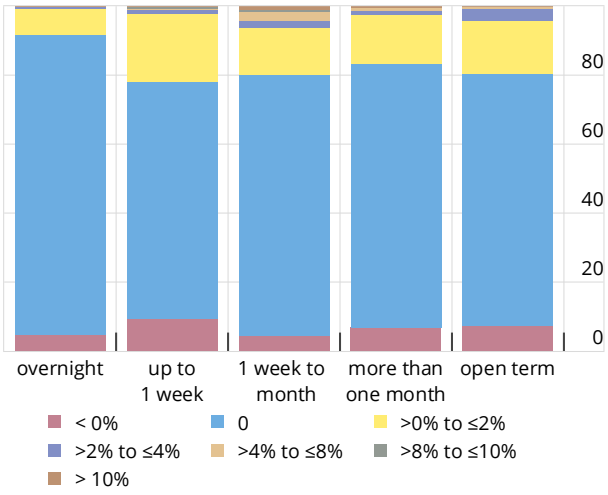
Non-centrally cleared repos often take place without haircuts

Per cent of total[1] **Graph 6**

1. Non-centrally cleared repo by level of haircut (2024)



2. Distribution of haircuts by tenor (2024)



[1] The graphs include Q4:2025 data for one jurisdiction as the numbers are more reliable than the available data for 2024.

Source: FSB member data.

There is also evidence of repos involving negative haircuts, where the cash borrower receives more cash than the value of the collateral they have 'sold'. Insights from market contacts and researchers revealed that this tends to occur when the cash borrower provides collateral that is particularly scarce (e.g. German Bund), where the borrower has bargaining power with the intermediary, where the borrower has a lower credit risk than the lender, or as a result of netting at the portfolio level. Section 3 further discusses the implications from the widespread use of zero haircuts.

Margins

Initial margins are collected from each counterparty to a transaction and are applied at the portfolio level, based on the overall exposures of each counterparty to the other across all transactions. Initial margin is commonly collected by CCPs that calculate margin requirements using their own risk models. Qualitative information provided by members suggests that initial margins are influenced by a range of factors.[44] These include portfolio characteristics such as collateral quality (e.g. asset type, asset price volatility, asset liquidity), counterparty risk, portfolio diversification and netting, and regulatory requirements. These also include margin characteristics such as add-ons for concentration risk margin and anti-procyclicality measures. Data was not readily available from members on initial margin rates applied by CCPs. Anecdotal evidence from the United Kingdom suggests initial margin could be as small as 1% or lower for highly netted portfolios but as high as 10% for directional portfolios collateralised with long maturity securities.

[44] In some cases this is published, for example, in the United States, the FICC-GSD rulebook outlines specific components of margin, see DTCC (2025), *Fixed income clearing corporation: Government securities division rulebook*, December.

CCPs accept cash and typically also accept high-quality securities as initial margin payments. Any securities posted as initial margin are also subject to haircuts.[45] These haircuts are separate to the risk management practices discussed above, are determined by the CCP following its own collateral eligibility assessment, and are subject to applicable regulatory requirements.

In principle, initial margins could also be applied in the bilateral repo market (as is already applied and a regulatory obligation in derivative markets). For example, in bilateral markets, the two counterparties to a repo could post initial margin at an insolvency-remote third party. The Federal Reserve's March 2025 Senior Credit Officer Opinion Survey on Dealer Financing Terms collected qualitative information on margin practices used in the NCCBR segment of the market.[46] Nearly two-thirds of intermediaries reported that most of their clients are under agreements that allow for margin offsets. In contrast, cross-margining Treasury repo with Treasury futures or with other interest rate derivatives or other products was limited, though other sources suggest this practice may instead be embedded within 'master netting' arrangements at the portfolio level.

The periodic exchange of cash or collateral to reflect changes in the value of open positions is often called variation margin. In repo markets, collateral is marked-to-market (revalued) at an agreed-upon frequency — often daily — and the current value of collateral is compared to the current value of the cash amount lent or borrowed. Variation margin payments are then made from the counterparty whose position has fallen in value to the counterparty whose position has appreciated. In centrally cleared markets, clearing members make payments to CCPs as required by CCP rules. If the clearing member is acting on behalf of a client counterparty, it may or may not ask the client for the CCP margin and execution fees, as agreed by the clearing member and its client. In bilateral markets, payments are usually made between the direct counterparties of the trade. Variation margin is backward-looking, as it responds to realised price movements. The primary purpose of variation margin is to prevent a build-up of credit exposure as positions change in value. It does not address the risk of future price movements between the time of a default and the closeout of the defaulting counterparty's positions. CCPs mitigate this risk through other means including initial margin requirements and required guarantee fund or liquidity facility commitments from clearing members.[47]

2.6. General and specific repos

Rules around the type of collateral that can be used in a repo transaction differ across market segments. For general collateral (GC) repo transactions, the cash borrower can choose among a basket of permissible securities to post as collateral. For specific repo transactions, the cash borrower must deliver a specific security (e.g. with a specific ISIN code). GC repo activity reflects the cash borrower's demand to obtain liquidity in a situation where the cash lender does not require specific securities. For this reason, the 'repo rate' in the market is often taken to mean the rate to borrow cash in a GC repo. In contrast, specific repo sometimes reflects the cash lender's need to source a specific security. For this reason, some specific repo transactions occur at a lower rate than comparable GC repo transactions. The lower rate reflects the fact that

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45 For example, see DTCC (2025), *FICC Government Securities Division Schedule of Haircuts for Eligible Clearing Fund Securities*, April.

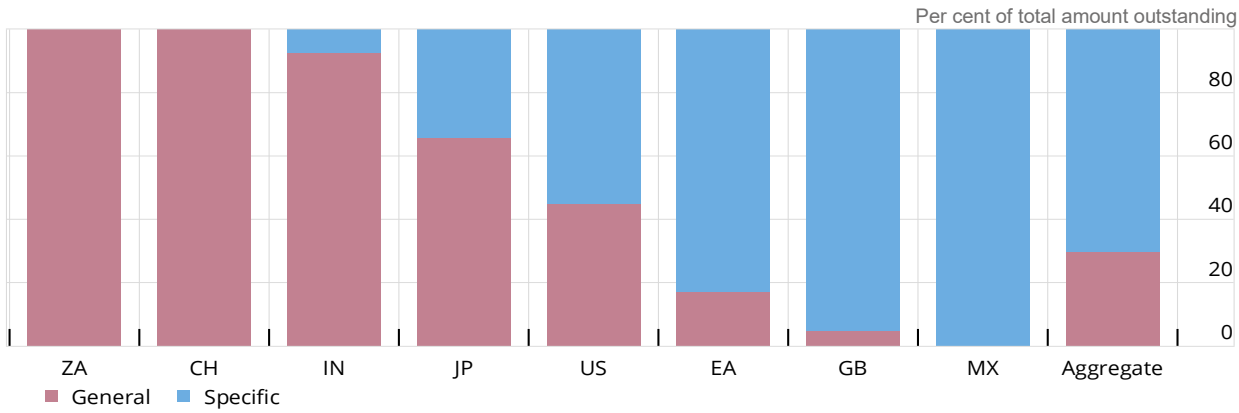
46 See FRB (2025), *The Fed - Senior Credit Officer Opinion Survey*, March.

47 For example, both FICC-GSD and CMESC maintain capped liquidity facilities.

cash lenders are willing to accept a discounted rate to acquire a specific security. In instances where a specific security is in high demand and this discount is large, specific repos are called 'special' repos.[48]

The use of general vs specific collateral is heterogenous across jurisdictions

Stock of general and specific repo across jurisdictions (2024) **Graph 7**



Source: FSB member data.

Member data indicates specific repos are common in three of the largest repo markets, the euro area, United Kingdom, United States as well as in Mexico (Graph 7). The prevalence of specific repos is partly explained by different jurisdictions having different service providers which may make general collateral more or less convenient and/or the fact that in an excess liquidity environment, market participants tend participate in repo markets to satisfy security-driven preferences rather than liquidity demand. In the context of balance sheet normalisation, cash-driven repos are expected to increase again.[49]

Transactions involving overnight general collateral repo appear to be concentrated at specific time intervals across the centrally cleared and NCCBR segments. Most of the activity in each repo market segment occurs during only a few hours in the morning.[50] Within each market segment, hourly repo rates typically vary by just a few basis points over the course of the day.

2.7. Trading venues

Repo transactions take place over three different types of trading venues.[51] Repos can be undertaken over the counter through a direct negotiation between two counterparties, either by telephone or electronic messaging. Alternatively, a voice broker can arrange repo transactions among its clients. Finally, repos can be undertaken on an electronic platform which matches cash borrowers and cash lenders semi- and fully- automatically. Interdealer markets are

48 Specific repos share characteristics to securities lending, which is excluded from the analysis and figures in this paper. Both activities reflect the need to obtain a specific security but are distinct types of transactions. As mentioned earlier a repo is a sale and repurchase agreement, while securities lending involves a loan agreement.

49 See Daskalova et al (2024), The ECB Blog, *Repo markets: Understanding the effects of a declining Eurosystem market footprint*, July.

50 See Kahn et al (2023), *Anatomy of the Repo Rate Spikes in September 2019*, OFR working paper, 23-4, April.

51 For example See ICMA (2022), *The European Market Factsheet*, September.

primarily electronic and centrally cleared, while dealer to counterparty transactions are a mixture of electronic and voice. Table 2 sets out the specific venues used by some jurisdictions.

Table 2: Repo markets trading venues

Jurisdiction	Trading venue
Euro area	Germany: electronic via platforms (Eurex/LCH, BrokerTec, MTS) Italy: MTS Repo main interdealer electronic platform France: high proportion of repo market is traded on BrokerTec and MTS or BBG Chat. Short dated repo traded through CLOB on MTS, BrokerTec, TpRepo.
India	Predominantly on Electronic Trading Platforms (TREPS and CROMS)
UK	Interdealer is mostly electronic (BrokerTec)
US	Interdealer: electronic IDB platform and GLMX

Source: FSB member data, FSB (2022), *Liquidity in Core Government Bond Markets*, October and ICMA.

Some types of trading venues may help mitigate certain shortcomings identified in this report. For example, electronic platforms offer greater transparency, greater efficiency as participation increases by reducing liquidity fragmentation and can facilitate a broader adoption of central clearing. Although bilateral repos are usually less transparent and can create a complex web of exposures, they enable trading with counterparties not connected to central platforms or with restricted electronic access, and are usually more flexible, allowing trades that may not be accepted by standard electronic systems.

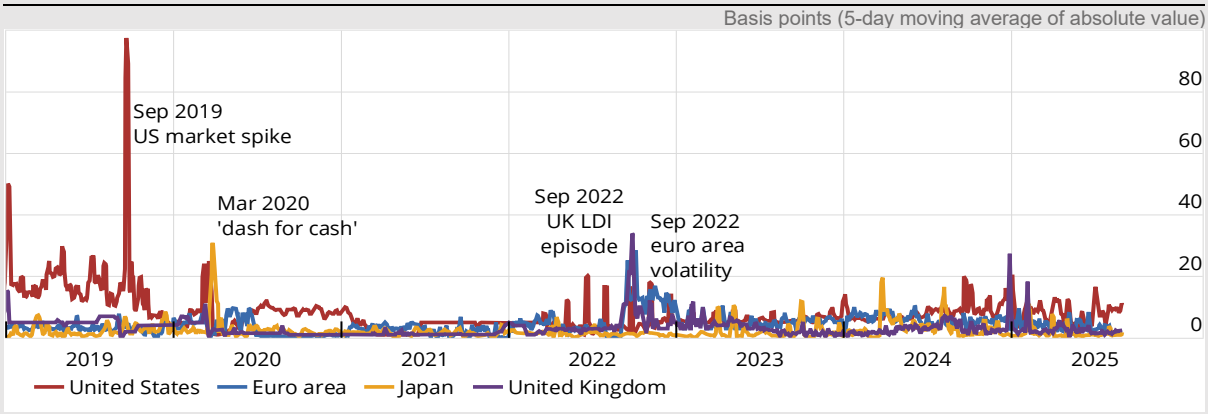
3. Vulnerabilities across repo markets

Repo markets have been involved in several recent episodes of stress, either as the source of market strains or as part of wider turmoil in the financial system (Box 3). This section discusses different types of vulnerabilities present in repo markets that could contribute to any future stress episodes. These vulnerabilities can either be the result of structural issues within repo markets (i.e. liquidity and funding, leverage and rehypothecation, and concentration) or related to interlinkages in the financial system (i.e. links with government bond markets, counterparty credit exposures, or international interconnectedness and spillovers).

Box 3: Repo markets and recent episodes of stress

Repo markets have played a role in several stress episodes in recent years. This box summarises the role of repo markets in four notable stress events: (1) the US repo rate spike in September 2019; (2) the March 2020 dash for cash; (3) the UK LDI episode in September 2022; and (4) volatility in the euro area repo market in September 2022 as a result of government bond market shortages (Graph 3.1).

Overnight repo market spreads[1] **Graph 3.1**



[1] The graph shows the 5-day moving average of the absolute value of the overnight repo rate in each jurisdiction less the relevant policy rate.

Sources: BIS; Bloomberg; ECB; FRBNY; Japan Securities Dealers Association; FSB calculations.

2019 US repo market spike

The US repo market unexpectedly experienced a severe spike in rates on 16 and 17 September 2019.[52] The episode seems to have been the result of a sudden, sharp demand-supply mismatch in the repo market. On the supply side, there was a pullback in funding by MMFs that appears to be partly related to withdrawals from those funds by corporates to meet a tax payment deadline. Bank reserves were also relatively low and had been further depleted by the settlement of newly issued Treasury securities and tax payments by banks' corporate depositors. Borrowing demand, however, remained strong, forcing cash borrowers to pay much higher rates to obtain funding. In addition some participants were not able to trade in all segments of the repo market (bilateral, tri-party, centrally cleared) and this may have added to the strains as participants could not offset the imbalances in supply and demand. Central bank liquidity support was important in restoring market functioning, with the Federal Reserve lending cash through its open market operations, adding to central bank reserves.

2020 dash for cash

The second recent episode of stress affecting repo markets was part of the broader 'dash for cash' in the global financial system following the onset of the COVID-19 pandemic in March 2020.[53] This manifested itself in repo markets as an acute demand for cash. Surges in CCP margin calls were one of the factors behind this spike in liquidity demand.

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52 See: Afonso et al (2021), The market events of mid-September 2019, *Federal Reserve Bank of New York Economic Policy Review*, Volume 27 Number 2, August; Anbil et al (2020), *What happened in money markets in September 2019?*, *FEDS Notes*, February; and Kahn et al (2023), Anatomy of the repo rate spikes in September 2019, *Office of Financial Research Working Paper*, April.

53 For a discussion of repo markets in the March 2020 market turmoil see relevant material in: FSB (2020), *Holistic Review of the March Market Turmoil*, November; FSB (2022), *Liquidity in core government bond markets*, October; Favara et al (2022), *Leverage regulations and Treasury market participation: evidence from credit line drawdowns*, American Finance Association, December; Duffie et al (2023), Dealer capacity and US Treasury market functionality, *Federal Reserve Bank of New York Staff Reports*, October; Krutti et al (2025), LTCM Redux? Hedge fund Treasury trading, funding fragility, and risk constraints, *Journal of Financial Economics*, Vol. 169, July; Vissing-Jorgensen (2021), The Treasury market in Spring 2020 and the response of the Federal Reserve, *Journal of Monetary Economics*, Volume 124, October.

In the United States, and to some extent the United Kingdom, participants turned to repo markets to obtain cash by pledging their securities, though this led to a deterioration in repo market functioning and significantly higher repo rates. In the euro area and Japan, the demand for liquidity led intermediaries to 'dash for collateral' that could be used to borrow US dollars from central bank facilities. A number of emerging market repo markets were also affected in the episode. In South Africa, for example, there was a 25% increase in repo trading.

Another way in which the repo markets were involved in this episode is through hedge funds that had used repo markets to fund leveraged positions in US Treasuries via the cash-futures basis trade. Increased haircuts and rates on repo borrowing, in combination with higher margin requirements from CCPs on US Treasury futures positions and a widening in the cash-futures spread, sparked an unwinding of the basis trades, with fire sales of US Treasuries adding to volatility in the market and leading to an unusual situation where there was an increase in Treasury yields in a period of stress. Research has found that hedge funds sold more than $200 billion of Treasury securities in that episode, with about half of that attributed to the unwinding of leveraged trading strategies. [54]

2022 UK LDI episode

This episode began in September, with unprecedented volatility in the UK government bond market in the wake of an announcement of an expansionary fiscal policy.[55] This volatility triggered margin calls and higher haircuts for LDI funds that increased their leverage by borrowing in gilt repo markets to finance long-dated gilt purchases. Some LDI funds had insufficient liquidity (or collateral) to pay these margin calls, and so were forced to sell gilts to raise liquidity and deleverage. This selling pressure amplified gilt market volatility and prolonged the stress. Spreads were volatile throughout the episode. Pressures eased after the Bank of England announced temporary and targeted purchases of gilts and temporarily expanded the range of eligible collateral for their repo facility.

2022 euro area repo market volatility

Euro area repo markets experienced a period of stress around the same time, though for different reasons. This episode was closely tied to the ECB's interest rate normalisation process, when policy rates moved back into positive territory after nearly eight years. The efficient functioning of repo markets was significantly challenged during this time, largely due to the pronounced mismatch between cash and collateral availability. This imbalance was primarily driven by the ECB's large-scale asset purchase programmes, which had led to a scarcity of highly rated euro area government bonds while leaving the financial system awash with liquidity.

Compounding this issue, pronounced volatility in government bond markets further increased the demand for highly rated government bonds to meet margin requirements at CCPs. Collateral lending activity on trading platforms dropped significantly, creating one-sided markets, deteriorating repo market liquidity and pushing repo spreads further into negative territory. The stress was particularly acute in short-tenor repo rates, which experienced the greatest disruption during this period. In response to mounting pressures, authorities took targeted actions, including measures to expand collateral availability, adjust monetary policy tools, and enhance the terms of lending programmes, with various public institutions also helping to ease market tensions.

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54 See Barth and Kahn (2021), *Hedge funds and the Treasury cash-futures disconnect*, Office of Financial Research Working Paper, April; Banegas and Monin (2023), '*Hedge Fund Treasury Exposures, Repo, and Margining*', September.

55 See *Letter from Sir John Cunliffe to the Chair of the House of Commons Treasury Committee*, 18 October 2022; Alexander et al (2023), *Financial stability buy/sell tools: a gilt market case study*, Bank of England Quarterly Bulletin, November; and Pinter (2023), An anatomy of the 2022 gilt market crisis, Bank of England, Bank of England Staff Working Paper, March.

3.1. Structural vulnerabilities in repo markets

This subsection discusses vulnerabilities identified within repo markets and that may be amplified in a stress, such as the way they are structured and function and the types of involvement of repo market participants.

3.1.1. *Liquidity and funding*

One key vulnerability associated with repo markets is liquidity. In periods of stress, there can be spikes in liquidity needs across the financial system and participants can often turn to repo markets to obtain cash. If there is insufficient capacity to supply that liquidity in repo markets, borrowers may be forced to sell assets at fire sale prices, or, in extremis, may default. Thus, an imbalance between the demand and supply of repo funding can propagate shocks to asset markets and increase credit risk. A second issue stems from the fact that repo is predominantly a short-term funding source; a cut back in liquidity supply in the repo markets can lead to fire sales of assets by investors using repo markets to fund trading strategies. Third, repo markets themselves can generate spikes in liquidity demand through sudden increases in margin for cleared repo transactions or sudden increases in the demand for collateral to meet collateral calls by intermediaries lending cash in repo markets. This section discusses different factors that impact the demand and supply of liquidity in repo markets and, hence, that have an effect on liquidity and funding vulnerabilities.

Liquidity demand

While a greater use of CCPs has many benefits, as discussed above, and margin is an important tool for mitigating counterparty and market risk, large CCP margin calls can exacerbate liquidity strains in the financial system. In periods of stress there can be spikes in the demand for liquidity and market participants can turn to repo markets to source that liquidity, adding to strains in repo markets. Indeed, studies have found that margins can be procyclical during periods of high volatility.[56] The academic literature suggests that these liquidity dynamics are not only episodic, but are structural in nature.[57] For example, one study describes how higher margins in response to shocks can trigger liquidity spirals.[58] In these spirals, tighter funding conditions lead to asset sales, depressing prices and prompting further margin calls. This mechanism can help to explain why margin shocks can quickly amplify into a system-wide demand for liquidity. The level of procyclicality in margin models depends on the design features which vary across CCPs. Analysis of margins on government bond futures contracts in one jurisdiction suggested that these margins are likely to closely track the volatility of these bonds, including in periods of volatility spikes, though in the latter case margins may not increase one-for-one with volatility.

Repo markets themselves can also lead to an increase in liquidity demand. This can occur if there is a significant increase in margins on centrally cleared repo, or if intermediaries suddenly

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56 See BCBS-CPMI-IOSCO (2022), *Review of margining practices*, September; and ESRB (2020), *Mitigating the procyclicality of margins and haircuts in derivatives markets and securities financing transactions*, January.

57 See Schrimpf et al (2020), Leverage and margin spirals in fixed income markets during the Covid-19 crisis, *BIS Bulletin*, April.

58 See King et al (2023), *Central Clearing and Systemic Liquidity Risk*, October and Brunnermeier and Pedersen (2009), Market liquidity and funding liquidity, *The Review of Financial Studies*, June.

increase haircuts on their repo lending. The March 2020 episode also provides evidence of this dynamic. Qualitative information reported by FSB members suggests that margins for centrally cleared repos increased during the episode, and that hedge funds had to meet increased haircuts on their repo borrowing. Haircuts, however, did not increase in all segments of the repo markets. Members have noted that haircuts in the tri-party repo market in the United States and the repo market in Japan did not increase significantly during the episode.

Increases in repo markets haircuts and margins also contributed to system stresses in other crises. Members report that haircuts on non-centrally cleared gilt repo rose sharply during the 2022 gilt market crisis as volatility soared.[59] The academic literature also documents a significant increase in haircuts in some jurisdictions' in the non-centrally cleared bilateral repo market during the 2007-08 global financial crisis, which contributed to a run in the repo markets.[60] The evidence again suggests that there was no such increase in haircuts in the tri-party repo market.[61] Research has also found a substantial rise in centrally cleared repo margins during the European government debt crisis.[62]

In response to margin procyclicality, international standard setters and the FSB have published policy proposals to improve the transparency of margin requirements, streamline margin processes, increase the predictability of margin requirements and improve the liquidity preparedness of non-bank market participants for margin calls.[63]

Liquidity supply

During stress, the supply of cash via the repo markets can diminish, adding to further strains in the repo markets and amplifying the shock as market participants struggle to raise much needed cash. Furthermore, the fact that repo often has a very short tenor means that this funding can be withdrawn very quickly. Given the importance of intermediaries in the repo markets, their inability to supply liquidity can create repo market strains. Research has focussed on the issue of dealer balance sheet constraints as a factor in the inability of intermediaries to supply liquidity. For example, studies have found that when dealer balance sheet utilisation is high, market liquidity is worse, consistent with occasionally binding constraints on intermediation capacity.[64] Another paper finds that shocks to banks' balance sheets reduce dealers' participation in repo and government bond markets.[65] Market participants have also suggested that dealer balance sheet capacity is impacted by wider demands on the balance sheet, such as the drawdowns of revolving credit facilities observed during the March 2020 dash for cash episode; these other liquidity shocks could dissuade dealers from providing cash in repo markets.

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59 See Pinter (2023), *An anatomy of the 2022 gilt market crisis, Bank of England Staff Working Paper*, March; and Pinter et al (2024), Fire sales of safe assets, *BIS Working Papers*, December.

60 Gorton and Metrick (2012), Securitized banking and the run on repo, *Journal of Financial Economics*.

61 Copeland et al (2014), Repo runs: evidence from the tri-party repo market, *Federal Reserve Bank of New York Staff Reports*, August.

62 Armakolla et al (2019), Repurchase agreements and the European sovereign debt crises: the role of European clearinghouses, *Handbook of Global Financial Markets*.

63 See BCBS-CPMI-IOSCO (2025), *Transparency and responsiveness of initial margin in centrally-cleared markets – review and policy proposals*, January; and FSB (2024), *Liquidity preparedness for margin and collateral calls: final report*, December.

64 See Duffie et al (2023), Dealer capacity and US Treasury market functionality, *NYFRB Staff Reports*, October; and Adrian et al (2025), US Treasury market functioning from the global financial crisis to the pandemic, *Annual Review of Financial Economics*, July.

65 Favara et al (2022), *Leverage regulations and Treasury market participation: evidence from credit line drawdowns*, *American Finance Association*, December.

Intermediaries, however, may also be unwilling to supply liquidity in periods of stress as part of the risk management of their balance sheets. Instead of being unable to supply cash in repo markets, intermediaries may curtail their credit to meet risk limits or due to a lack of risk appetite. For example, during the GFC, Bear Stearns and Lehman Brothers faced worsening access to repo financing as lenders reacted to a perceived increase in their credit risk, which ultimately contributed to their failure.[66] The Bank of England System Wide Exploratory Scenario (SWES) found that intermediaries were likely to have limited appetite in providing additional repo, again limiting the financing available in the market. [67] Discussion with researchers also highlighted risk appetite, with some arguing that at least in the euro area, risk appetite was a more important factor than regulatory requirements.

Another factor which has historically influenced the availability of repo funding supply is window dressing. This occurs when banks choose to manage their balance sheet to minimise the effects of a variety of accounting or regulatory considerations at quarter ends. For example, insights from researchers highlighted a practice by some banks to swap between repo markets and FX swaps in accessing foreign currencies as the latter was off-balance sheet. As intermediaries scale back part of their repo intermediation at quarter ends, this tends to lead to a decrease in repo volumes.[68] Efforts are being made to curb window dressing in some jurisdictions.[69]

Other market participants may also cut back the supply of liquidity in periods of stress. As is discussed in Section 2, MMFs play an important role as cash lenders in some jurisdictions. However, MMFs offer daily liquidity to their investors and there is a risk that significant redemptions could mean that MMFs need to reduce their supply of cash in repo markets in order to meet investor withdrawals.[70] The behaviour of MMFs in periods of market strains has also been studied in recent member work. For example, the SWES surmised that MMFs facing redemptions would likely react by allowing some of their reverse repo (cash lending) positions to mature and so cut back their cash lending in repo markets. [71] As is the case for intermediaries, MMFs may pullback from supplying cash in repo markets due to heightened risk aversion.[72] Moreover, even if MMFs are willing to supply cash, their defensive behaviour – such as concentrating on short-tenor repo and conserving liquidity assets – could limit their ability to fulfil repo market participants' demand for liquidity in periods of stress.

3.1.2. *Leverage*

Repo markets can add to vulnerabilities in the financial system as they allow a build-up of leverage. As has been discussed in previous FSB work, leverage can magnify losses and

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66 Adrian et al (2014), *Repo and securities lending. In Risk topography: Systemic risk and macro modelling*, August.

67 See BoE (2024), *The Bank of England's system-wide exploratory scenario exercise final report*, November.

68 See Bostrom (2025), FEDS Notes, *What Happens on Quarter-Ends in the Repo Market*, June and Bassi et al (2023), ECB working paper series, *Window dressing of regulatory metrics: evidence from repo markets*, February.

69 See Bassi (2024), *Closing the blinds on banks' window dressing*, May and BCBS (2018), *Statement on leverage ratio window-dressing behaviour*, October.

70 See FSB (2021), *Policy Proposals to Enhance Money Market Fund Resilience: Final report*, October; Bouveret et al. (2022). Money Market Fund Vulnerabilities: A Global Perspective. *Staff Reports 1009*, Federal Reserve Bank of New York; Baes et al. (2025), Money Market Funds vulnerabilities and systemic liquidity crises. *Journal of Banking & Finance*, 179.

71 See BoE (2024), *The Bank of England's system-wide exploratory scenario exercise final report*, November.

72 See Kahn et al. (2023), Anatomy of the repo rate spikes in September 2019, *Journal of Financial Crises*, 5(4).

propagate shocks through the financial system through two main channels.[73] In the position liquidation channel, leveraged investors may face liquidity demands that might lead then to sell assets to raise funds. These asset sales, if they take place when a market is already under stress, could add to market volatility and result in an adverse feedback loop. Investors aiming to maintain a target level of leverage or market risk on their balance sheets may sell assets if they face losses or higher volatility. In the counterparty channel, a leveraged entity may default and its counterparties may face losses if the collateral they hold does not have sufficient value.

Some researchers have suggested low haircuts may facilitate the buildup of leverage, though some have noted that low haircuts may be the result of dealers netting exposures in repo trades with other trades (e.g. in futures markets as part of the basis trade).

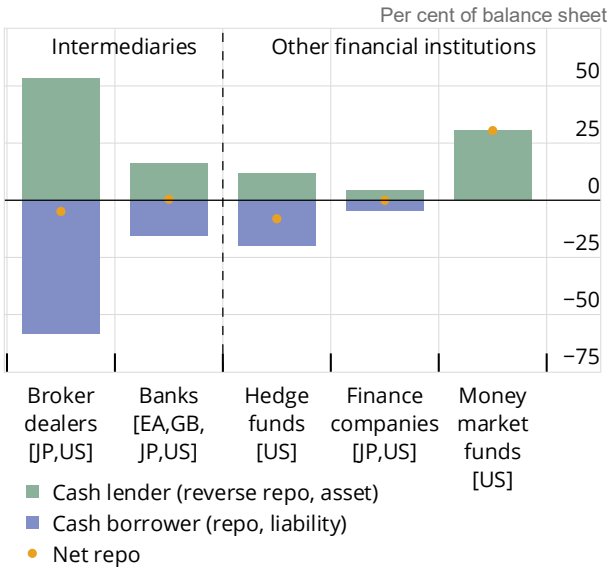
Some types of institutions have significant repo borrowing. Aggregate data for different types of entities from national flow of funds accounts can be used to show typical positions of repo markets counterparties and the importance of those positions relative to the size of their balance sheets (Graph 8, panel 1). Although the national flow of funds accounts show data for total repo markets – rather than just repo backed by domestic government bonds – the broad picture is similar to that from FSB members' data (discussed above). Intermediaries – especially broker-dealers – have significant repo and reverse positions as both cash lenders and borrowers, though their net repo position tends to be small (with a net borrowing position overall). MMFs operate exclusively as net lenders of cash, and this activity is a substantial proportion of their financial assets (some 30% in the United States). Finance companies have relatively small positions as cash lenders and borrowers, but with a small net lending position in aggregate. Although hedge funds are both borrowers and lenders, as discussed above, they have a net borrowing repo position overall. Their gross repo borrowing is significant (though less as a proportion of their balance sheet than broker-dealers) and has increased over the past few years, now amounting to almost $3 trillion, or 25% of their assets (Graph 8, panel 2).

[73] See FSB (2023), *The financial stability implications of leverage in non-bank financial intermediation*, September.

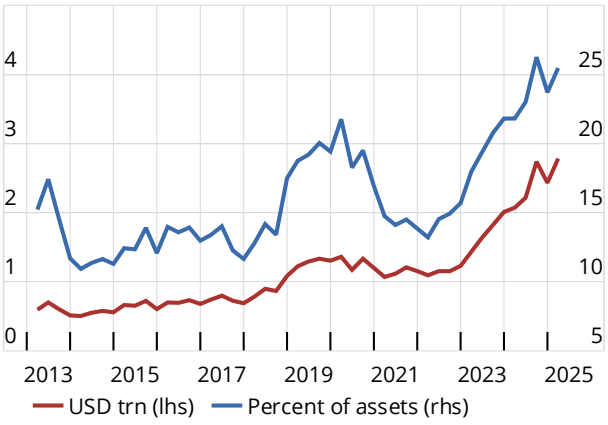
Some institutions have significant repo borrowing

Graph 8

1. Repo assets and liabilities, by entity (2024)[1]



2. Hedge fund gross repo cash borrowing



[1] Panel 1 shows liabilities as a negative on the vertical axis.

Sources: OFR; national flow of funds accounts; FSB calculations.

The low level of haircuts in bilateral repo markets enables such a build-up of leverage. This is because the amount of borrowing is the inverse of the haircut. A 10% haircut will enable an entity to borrow 90% of the value of the security, while a 0% haircut will allow borrowing up to 100% of the security's value. This means the effective constraint on leverage is either the internal risk management of the leveraged non-bank entity, or any margins that the entity needs to post on related trades (e.g. on futures positions in basis trades). Indeed, an analysis of US hedge funds active in US Treasury repo transactions in 2022 finds that the average hedge fund has a leverage ratio of approximately 2 (i.e. gross assets twice the size of net assets), while hedge funds in the study borrowing repo with zero haircuts have a leverage ratio of approximately 6, and those in the sample borrowing in repo markets with negative haircuts have a leverage ratio of approximately 9 times net assets.[74] An examination of repo transactions in the euro area finds that if haircut floors were implemented there would be a significant reduction in leverage, particularly among entities with higher initial leverage levels, again illustrating the link between haircuts and overall leverage in the financial system.[75]

3.1.3. *Rehypothecation*

The re-use of client government bond collateral in rehypothecation improves the efficiency of repo markets, but can also create vulnerabilities. In a typical rehypothecation transaction, client securities that serve as collateral for an initial repo transaction are used again by the collateral receiver to obtain financing with other market participants. This rehypothecation allows intermediaries to more efficiently use their balance sheet, which can be important when acting

[74] See Banegas and Monin (2023), Hedge fund Treasury exposures, repo and margining, *FEDS Notes*, September.

[75] See Grill et al (2025), Repo haircuts: market practices and the impact of minimum requirements on leverage, *Finance Research Letters*, January.

as dealers, allows intermediaries to source and distribute specific securities that may be in high demand, and may improve market liquidity.[76]

Studies indicate high levels of collateral reuse across the euro area and in the United States. Analysis of the Bundesbank's Securities Holdings Statistics indicate the re-use rate of euro area government bond collateral fluctuates between 50% and 90% overall.[77] Analysis of nine US intermediaries' balance sheets indicates that 65% of collateral received is rehypothecated, and separate work shows that roughly 85% of incoming US Treasuries at intermediaries are later used in outgoing transactions.[78] Rehypothecation activity, however, is limited in some other jurisdictions (e.g. India and Mexico).

Despite the benefits of rehypothecation, and a number of rules that govern its use in the repo markets, there are potential vulnerabilities associated with this activity.[79] For example, rehypothecation increases the risk that the collateral receiver fails to deliver the collateral on time. [80] Rehypothecation, by allowing several transactions based on the same collateral, can contribute towards the build-up of systemic leverage through repo borrowing.[81] Chains of transactions involving the re-use of collateral can increase interconnectedness, raising the potential for spillovers in the event of a shock.[82]

3.1.4. *Concentration*

There are a number of vulnerabilities derived from concentrations in certain parts of the repo markets – including in CCPs, custodians, intermediaries and hedge funds. As discussed earlier, central clearing is an important tool for improving financial system resilience. Clearing brings efficiency gains through economies of scale and scope which confer significant risk management benefits. At the same time, these economies of scale imply a concentration of activity in CCPs. Indeed, in jurisdictions with centrally cleared repo markets there is often only a single CCP (Table 3). This can create operational challenges as an outage could have a significant impact on the repo markets, which could spread beyond the centrally cleared segment, and also spillover to the financial system more broadly. There are some other potential vulnerabilities associated with the importance of CCPs in financial systems. First, CCPs may need to draw on the mutualised resources of their members to cover losses if one member defaults and the defaulter's own resources and CCP capital are insufficient. This may place additional strains on surviving CCP members when markets are under severe stress. Second, joint membership (i.e. market participants as members across several CCPs) could lead to spillovers across CCPs.

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76 See Andolfatto et al. (2017), Rehypothecation and liquidity, *European Economic Review*, September.

77 See Jank et al. (2022), *Safe asset shortage and collateral reuse*, July.

78 Hempel et al 2024), Repo Market Intermediation: Dealer Cash and Collateral Flow Management across the U.S. Repo Market, *OFR Policy Brief*, November; and Infante et al (2020), Understanding collateral re-use in the US financial system, *American Economic Association Papers and Proceedings*.

79 See FSB (2017) *Transforming Shadow Banking into Resilient Market-based Finance: Re-hypothecation and collateral re-use: Potential financial stability issues, market evolution and regulatory approaches*, January.

80 See Miruna-Daniela (2025), *Collateral re-use: unveiling the risk of delivery failures and higher volatility in the repo market*, May.

81 See Bottazzi et al (2012), Securities market theory: possession, repo and rehypothecation, *Journal of Economic Theory*, March; Singh and Aitken (2010), The (sizeable) role of rehypothecation in the shadow banking system, *IMF Working Paper*, July; and Capel and Levels (2014), Collateral optimisation, re-use and transformation: Developments in the Dutch financial sector, *DNB Occasional Studies*.

82 See Luu et al (2021), Collateral unchained: Rehypothecation networks, concentration and systemic effects, *Journal of Financial Stability*, February.

Table 3: Central counterparties and tri-party custodians in selected repo markets[83,84]

Jurisdiction	Central counterparty (CCP)	Tri-party custodian
Canada	Canadian Derivatives Clearing Corporation	Collateral Management Service
Euro area	Activity is concentrated in LCH SA, Eurex Clearing, Euronext Clearing, though there are three other CCPs	Clearstream Bank Luxembourg Euroclear Bank Bank of New York Mellon JPMorgan SIX SIS
India	Clearing Corporation of India	Clearing Corporation of India
Japan	Japan Securities Clearing Corporation	-
Switzerland	-	SIX SIS
UK	LCH RepoClear	Euroclear UK & International
US	Fixed Income Clearing Corporation's Government Securities Division CME Securities Clearing, Inc[3]	Bank of New York Mellon

Sources: FSB members; ICMA.

For jurisdictions with a tri-party repo segment there is also concentration in custodian agent services, again raising operational issues in the event of an outage or failure of the custodian (Table 3). In some jurisdictions there is only one tri-party custodian. In other cases the same tri-party custodian operates in several jurisdictions. In one jurisdiction the central counterparty and tri-party custodian are part of the same entity.

There is a concentration in the number of intermediaries servicing hedge funds. Analysis shows US hedge funds advised by registered advisers appear to rely primarily on four of the global systemically important banks, with the largest of these estimated to serve approximately 1,000 funds or more (Graph 9).[85] Similarly, in the euro area, five intermediaries account for 64% of repo borrowing from hedge funds.[86]

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83 South Africa is also considering adopting a tri-party agency model in its repo market, likely with one custodian at least initially. [2] On August 18, 2025 ICE Clear Credit LLC has filed a clearing agency application, see Federal Register (2025), *ICE Clear Credit LLC; Notice of Filing of an Application for Registration as a Clearing Agency Under Section 17A of the Securities Exchange Act of 1934*, August.

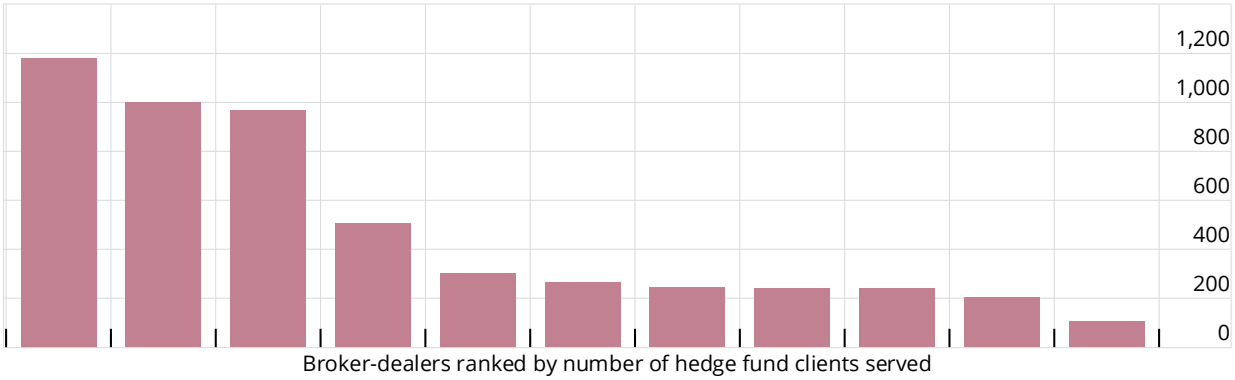
84 On 1 December 2025, the SEC approved the application of CME Securities Clearing Inc. to register as a clearing agency for US Treasury securities, see SEC (2025), *change Act Release. No. 34-104281, "CME Securities Clearing, Inc.; Order Granting an Application for Registration as a Clearing Agency under Section 17A of the Securities Exchange Act of 1934"*, December.

85 BIS (2024), *The prime broker–hedge fund nexus: recent evolution and implications for bank risks*, May.

86 See Ferrara et al (2024), *Hedge funds: good or bad for market functioning?*, September.

Hedge funds' repo activity is concentrated on few intermediaries

Number of hedge fund clients served by each prime broker[1] **Graph 9**



[1] The chart is an updated version of Graph C1, panel B in Box C of BIS (2024), Markets count on a smooth landing, BIS Quarterly Review, March. It is based on data from the SEC.

Sources: BIS; SEC.

This concentration means that there are few intermediaries that counterparties interact with in order to borrow cash or lend securities in the repo markets. Member analysis suggests the concentration of cash borrowers and cash lenders varies across jurisdictions. For example, in the United States the five largest cash lenders and cash borrowers account for approximately 40% of total activity, and the ten largest account for approximately 60% of activity.[87] In the euro area the top five entities account for approximately 50% of total repo exposures and the top ten also account for just over 60%.[88] In the United Kingdom, the 10 largest intermediaries represent approximately 40% of overnight repo and 70% of term reverse repo volumes. Canada's market is largely dominated by the largest six banks as intermediaries. In India, the top 5 and 10 borrowers account for approximately 40% and 55%, respectively. Mexico, South Africa and Switzerland also have high concentrations of activity with respect to the top 5-10 borrowers. Furthermore, some of the same intermediaries operate across several jurisdictions and so operational disruption in repo markets could spill over across borders. Researchers also highlighted concentration in intermediaries which could exacerbate supply issues if they all hit internal limits during a time of increased demand for high quality collateral.

There is also concentration in the hedge funds operating in repo markets. As hedge funds both borrow and lend cash in repo markets, the failure of a large hedge fund, or disruption to their operations, could impact overall repo markets activity. To illustrate this, OFR data shows that at the end of 2024, the top 10 hedge funds represented almost 40% of total hedge fund repo borrowing in the United States. Studies find that the top 50 hedge funds account for almost 90% of total repo borrowing and more than 80% of US treasury exposure at end 2022.[89]

Another aspect of concentration is in the individual government bond securities used for collateral in repo markets. Often repo transactions are focused on collateral of certain tenors. Participants using the repo markets to source securities can also look for specific types of bonds.

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87 See Copeland et al (2021), How Competitive are U.S. Treasury Repo Markets?, F*ederal Reserve Bank of New York Liberty Street Economics*, February.

88 See ESMA (2024), *EU Securities Financing Transactions markets 2024*, April.

89 Banegas and Monin (2023), Hedge fund Treasury exposures, repo and margining, *FEDS Notes*, September.

Any disruption to repo markets can then spill over to particular maturities in the government bond cash market and this could have a greater impact on the functioning of certain segments of sovereign markets. Conversely, problems with the functioning of cash bond markets in tenors that are often used in repo transactions could have an especially pronounced impact on repo markets.

3.2. Interlinkages and contagion

This subsection discusses potential vulnerabilities that may spillover from other parts of the financial system to the repo markets and vice versa.

3.2.1. *Links with government bond markets*

As discussed in Section 1, there are strong links between government bond and repo markets. The ability to monetise holdings of government securities to raise cash is an important function of the repo markets. These links also help promote the efficiency, functioning and liquidity of government bond markets. However, in periods of market stress, the links between the two markets could provide a potential channel of contagion. Strains in repo markets may indicate some market participants are unable to use repo markets to borrow funds to purchase government bonds in the primary and secondary markets. Additionally, this may make it difficult for other counterparties to obtain sovereign securities in the repo markets to sell in the secondary government bond markets. More generally, if market participants are unable to obtain liquidity in repo markets, they may need to sell liquid assets, including government securities, to raise cash. In addition, disruption to government bond markets could also create strains in repo markets, potentially leading to higher repo rates, margin calls, higher haircuts and liquidity shortages. There is also the possibility for an adverse feedback loop to develop between the two markets, where strains in the repo markets impact the government bond markets, which feeds back to the repo markets, and so on. Discussions with researchers also confirmed the linkages between repo markets and government bond markets.

The relative size of repo and government bond markets illustrates the potential for these spillovers. This ratio, however, does not fully capture the risk of spillovers and does not take into account a number of other important features of repo and government bond markets, such as their depth, underlying liquidity and the amount of leverage in the system. The size of repo markets varies significantly, from 30 to 40% of government bond markets in some large jurisdictions to less than 5% in some others. While in normal times this relative scale supports banks' balance sheets and enhances the liquidity of government bond markets, it could potentially lead to contagion between the two markets during periods of market stress.

Empirical studies provide more evidence that repo markets can act as a conduit for the transmission of shocks to sovereign debt markets. [90] Research has shown that periods of tighter repo markets conditions – marked by rising haircuts and widening repo spreads – are correlated

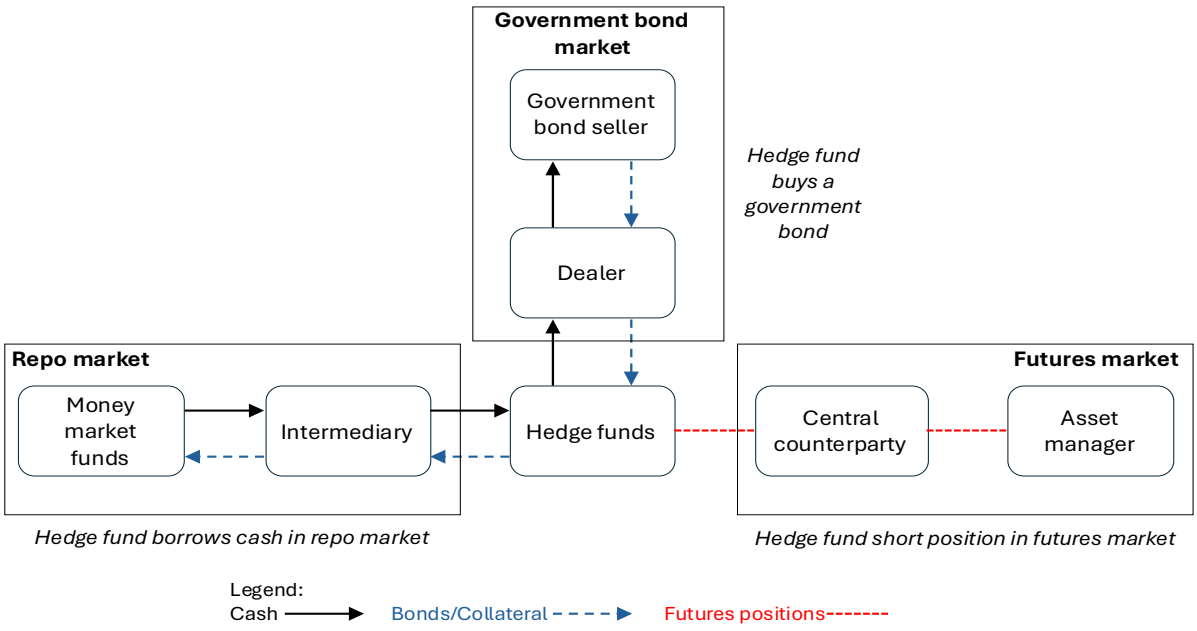
[90] See Accornero (2020), Repo markets, collateral re-use and systemic fragility. A literature review, *Dipartimento di Scienze Sociali ed Economiche Working Paper Series*; He et al (2022), Treasury inconvenience yields during the COVID-19 crisis, *Journal of Financial Economics*, January; and Coen et al (2024), Collateral demand in wholesale funding markets, *Bank of England Working Paper*, July.

with deteriorating liquidity conditions in government bond markets. This is because more expensive repo funding leads dealers to curtail their inventories of government bonds, leading to thinner trading volumes and wider bid-ask spreads in sovereign markets.

Leveraged trading strategies involving government bonds also link repo and government bond markets. These trades are typically employed by hedge funds looking to profit from arbitrage opportunities in relative prices of government bonds and associated derivatives. The trades usually rely on repo markets to provide funding for at least one leg of the strategy. Such trades, which occur across a range of jurisdictions, can improve price efficiency, shrink government borrowing costs and foster the efficient transmission of monetary policy. Nonetheless, these trades employ leverage on both the long and short legs of the transaction, with borrowing in repo markets (financial leverage) combined with synthetic leverage via positions in derivatives markets. If the strategies face rises in repo rates, higher haircuts or increased margins on futures positions, they could be unwound quickly and this may be destabilizing during periods of stress, as happened in March 2020.[91] The most common government bond market arbitrage strategies are outlined in Box 4, which also assesses the size of some of the most important trades.

These trades involve an interlinked ecosystem of market participants and any disruption to the chain of transactions could create strains in repo and government bond markets. This can be illustrated using the example of a cash-futures basis trade, a longstanding and popular arbitrage strategy among fixed income relative value hedge funds. The strategy links hedge funds together with intermediaries, MMFs, government bond dealers and asset managers (Figure 5). If there are problems in any of these connected transactions, the whole position may have to be unwound and could spill over to repo, government bond and futures markets.

Stylised structure of the basis trade **Figure 5**



Source: Based on a diagram published in Barth and Kahn (2023).

[91] See Barth et al (2023), Recent developments in hedge funds' treasury futures and repo positions: is the basis trade back?, *FEDS notes*; and Schrimpf et al (2020), Leverage and margin spirals in fixed income markets during the Covid-19 crisis, *BIS Bulletin*, April.

Box 4: Leveraged trading strategies linking repo and government bond markets

This box describes some of the most common leveraged trading strategies, often undertaken by hedge funds, that create links between repo and government bond markets. It also provides some estimates of the size of this activity.

Treasury cash-futures basis trades

The cash-futures basis trade seeks to profit from price differences between related government bonds and futures contracts. The trade connects government bond, futures and repo markets through – typically – repo borrowing, a long position in government bonds and short position in government bond futures (though the opposite position can also be taken). As the repo financing supporting these trades is typically short-term, and futures margins can change, hedge funds are exposed to the margin risk and rollover risk inherent in maintaining the trade.

Basis trade activity has been observed across various countries and has notably increased in recent years. However, significant gaps remain in accurately measuring its extent. Nonetheless, a set of proxies have been proposed to estimate hedge funds' government bond cash-futures basis activity.[92] The most common proxies for basis trades rely on two measures: short positions in government bond futures that capture the futures leg of the trade, and aggregate net repo borrowing positions that reflect the financing component. In the United States, basis trade positions can be estimated because futures positions by investor type are reported by exchanges on an aggregated basis and information is collected on repo borrowing and lending, along with long and short Treasury exposures, at the level of the hedge fund (Graph 4.1, panel 1).[93]

In Canada and the euro area, measures of basis trade activity also rely on government bond futures positions and repo positions. For example, in the euro area, activity can be measured by combining data on futures and repo positions. In Canada, measurement can only be indirect due to data limitations.[94] In the United Kingdom, one of the exchanges (ICE) has commenced reporting on gilt futures positioning.

In Canada, the basis trading activity has seen substantial growth over recent years. From 2016 to 2024, the estimated share of total trading volume involved in basis trades increased from 1% to 8% for the government bond market and from 1% to 2% for the repo market.[95] In Canada, negative basis trades have also dominated the market.

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92 For details on measures of cash-futures basis trades, see Banegas et al (2021), Sizing hedge funds' treasury market activities and holdings, *FEDS notes*, October; Barth et al (2023), Recent developments in hedge funds' treasury futures and repo positions: is the basis trade back?, FEDS notes, August; Glicoes et al (2024), Quantifying treasury cash-futures basis trades, FEDS notes, March; Kruttli et al (2021), Hedge Fund Treasury Trading and Funding Fragility: Evidence from the COVID-19 Crisis, *FEDS notes*, June.

93 In the US, the key source for data on Treasury futures are from the Commodity Futures Trading Commission (CFTC). Note that this proxy may overestimate hedge fund basis trade activity for two reasons: first, leveraged funds include not only hedge funds but also commodity trading advisors (CTAs) and commodity pool operators (CPOs); and second, even hedge funds may hold such positions for purposes other than basis trading.

94 For example, in Canada futures positions of hedge funds are proxied rather than directly observed. See Uthemann and Vala (2024), How big is cash-futures basis trading in Canada's government bond market?, *Bank of Canada staff analytical notes*, 2024-16.

95 See Uthemann and Vala (2024), *How big is cash-futures basis trading in Canada's government bond market?*, June.

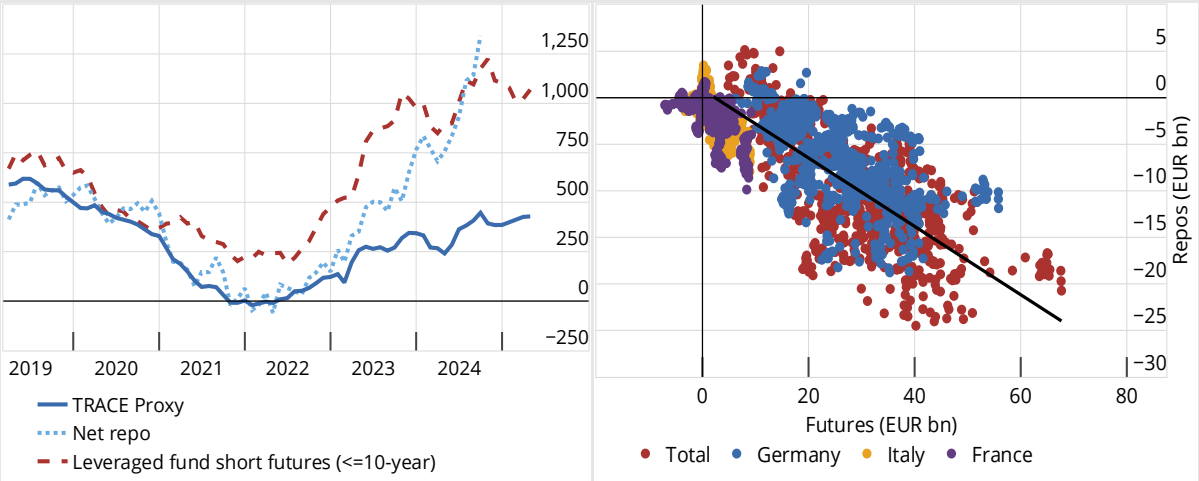
Estimating the basis trade

In denominated currency billions

Graph 4.1

1. UST cash-futures basis trade activity

2. Basis trade in selected euro area markets



Sources: ECB; CFTC Traders in Financial Futures; FINRA TRACE; Federal Reserve; SEC; FSB calculations.

Hedge funds have also increasingly engaged in basis trades also in the euro area.[96] However, the scale of these trades remains smaller compared to the United States, partly reflecting the greater depth and liquidity of the US Treasury market (Graph 4.1, panel 2). Another distinction between the two jurisdictions is that the euro area until recently has experienced a negative basis spread, that is, the direction of the basis trade is the opposite compared to the United States.[97]

Swap spread trades

Another common trade is the swap-spread arbitrage trade.[98] The swap spread is the difference between the fixed rate on an interest rate swap and the yield on an equivalent-maturity Treasury. If hedge funds bet on a widening (less negative) swap spread, they enter an interest rate swap, paying the fixed rate and receiving the floating rate. The hedge fund then buys a government bond with the same maturity, receiving the coupon and borrowing against the bond in the repo market, paying the repo rate.[99] As this trade combines positions in government bond and derivatives markets, financed by repo borrowing, it creates links between all of these markets. It appears as though the unwinding of this trade may have played a role in the rise in US government bond yields during the April 2025 market strains.

The size of the hedge fund swap-spread trade is difficult to estimate because unlike Treasury futures positions, interest rate swap data are not always available by type of trader. However public data in the United States indicates the net interest rate derivatives positions of large hedge funds do vary substantially, suggesting scope for this type of arbitrage may be large (Graph 4.2 panel 1).

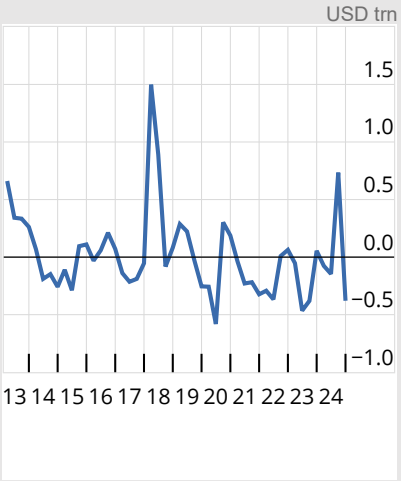
Relative value cash-cash trades

While many arbitrage trades using government bonds include one leg with a cash bond position and the other with a derivative position, other trades use cash bonds for both long and short legs. These cash-cash “relative value” trades generally attempt to profit from deviations of bond prices from each other (e.g. “steepener” yield curve arbitrage trade with a long position on short maturity bonds and a short position on long maturity bonds) or from some benchmark model (e.g. long position on bonds deemed to be ‘cheap’ relative to the interest rate swap curve and a short position on ‘expensive’ bonds).

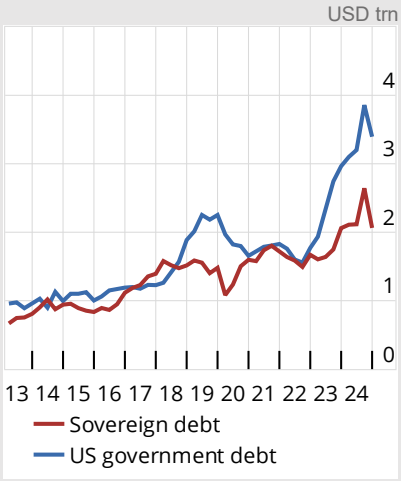
Size of other repo financed trades undertaken by hedge funds

In USD trillions **Graph 4.2**

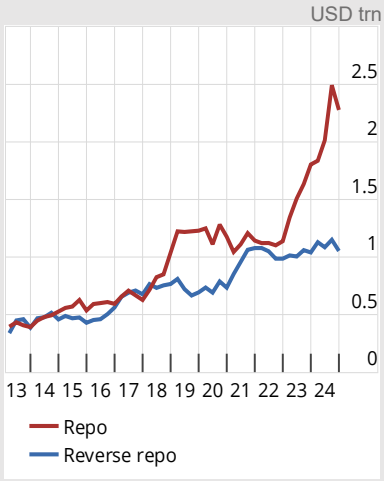
1. Net Notional Interest Rate Derivatives



2. Gross Notional exposure by asset class



3. Long and short repo exposures



Sources: OFR; FSB.

Aggregated data on hedge fund exposures to sovereign debt provide some evidence of cash-cash trades (as proxied by exposures) being popular during periods when basis trade activity is lower (Graph 4.2 panel 2). Repo borrowing also outpaced lending during the build-up of the basis trade positions in 2018-2019 and 2022-onward, but not in other periods, again suggesting cash-cash trades were likely more popular during periods when the cash-futures basis trade was less popular (Graph 4.2 panel 3).

On-the-run versus off-the-run arbitrage trades

Another cash-cash trading strategy involves arbitraging the differences in the yields of the more liquid on-the-run and less liquid off-the-run government bonds that have higher yields. The strategy involves a long position in the off-the-run bond and shorting the on-the-run bond, betting on the convergence in prices as the current on-the-run bond transitions to being off-the-run, and the bonds approach maturity. The hedge fund would use a repo borrowing position to finance the purchase of the long bond position, and a repo lending position to source the bond the hedge fund then shorts.

Auction cycle trades

Some participants use a third type of cash-cash strategy where they seek to profit from auction cycles where secondary market prices of on-the-run bonds drop in anticipation of a debt auction and rise thereafter.[100]

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96 See Bassi et al (2024), *Financial stability risks from basis trades in the US treasury and euro area government bond markets*, ECB (2024) Financial Stability Review, May.

97 See FSB (2022), *Liquidity in core government bond markets*, October and ECB (2024), *Financial stability risks from basis trades in the US Treasury and euro area government bond markets*, Financial Stability Review, May.

98 According to a variety of market coverage, the swap spread trade became popular among hedge funds in the U.S. after the presidential election in November 2024 in anticipation of possible changes to the supplementary leverage ratio, which would lessen dealer balance sheet constraints and result in a less negative swap spread.

99 In this trade, the hedge fund's cash flows are: (C – *CMS*) – (*R* – *L*), where *CMS* is the constant maturity fixed rate in the interest rate swap, *C* is the fixed coupon on the government bond, *L* is the floating rate in the interest rate swap, and *R* is the repo rate. It is important to note that this strategy could be traded directionally (i.e. bet on widening spreads) or as an arbitrage position (i.e. bet that spreads will return to their long-run mean).

100 Systematic trading hedge funds employ strategies that are rooted in predefined sets of rules and algorithmic trading. Their processes are typically highly automated and are designed to exploit even small inefficiencies in the market, often at a very high frequency and with significant leverage. See Ferrara (2024), Central bank asset purchases and auction cycles revisited: new evidence from the euro area, ECB working paper series, April.

3.2.2. Counterparty credit-related vulnerabilities

As a repo transaction involves a promise to exchange of cash and collateral, in the future there are vulnerabilities associated with counterparty credit exposures. Conceptually market participants may use haircuts on individual transactions in the non-centrally cleared segment or initial margins, mostly in the centrally cleared segment, to manage some of these risks.[101]

However, there is a crucial difference between the two. Haircuts protect only one counterparty, while increasing the risk to the other. For instance, by requiring the cash borrower to transfer excess collateral to the cash lender, a positive haircut creates an uncollateralised exposure of the cash borrower towards the cash lender. In effect, this amounts to a transfer of cash directly from the borrower to the lender. In contrast, since initial margins are posted by the two counterparties to the CCP, or another insolvency-remote third-party, both counterparties are protected against potential losses arising from future price movements over the liquidation period.

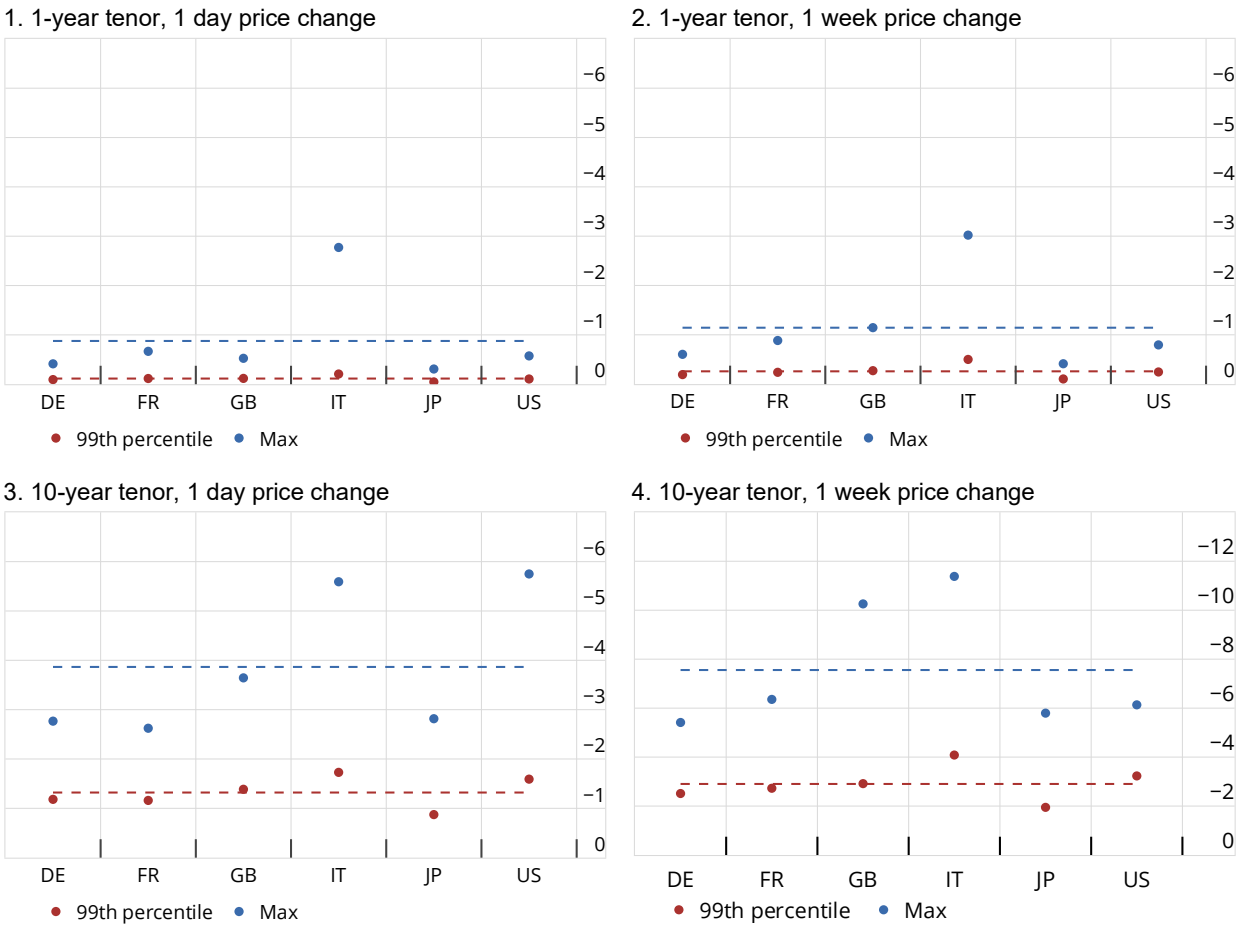
The wide use of zero haircuts likely reflects a variety of causes including market structure, competitive dynamics, and the use of other risk mitigants, such as initial margining and netting. For example, as discussed further below, MMFs generally impose haircuts due to regulatory requirements and in some markets larger borrowers receive lower haircuts. To the extent that transactions with zero haircuts are not adequately covered by other types of risk mitigants, repo collateral may not fully protect lenders in the NCCBR market segment from credit risk.

For example, while government bonds are regarded as having little or no credit risk, they can still be subject to market risk, or short sharp declines in price. A simple analysis of left-tail movements in government bond prices since 1995, shown in Graph 10, indicates that severe (99^{th} percentile) price declines would be in the region of 0.1-0.3% over a day and 1.4-3.0% over a week, depending on the tenor (price falls for longer tenor bonds tend to be larger due to duration risk). The maximum price falls recorded in each jurisdiction are significantly larger in magnitude and overlap with some of the episodes of stress in repo markets outlined in Box 3 (e.g. the dash for cash in 2020 and stresses in the United Kingdom and euro area markets in 2022, but other severe events in the data include the 2008 GFC and the euro area crisis in 2011).

[101] Haircuts tend to be used to cover potential loss in the value of collateral in case the securities need to be liquidated if the repo market borrower defaults.

Government bond price falls can be significant in the tails

In percent **Graph 10**



From 1995 to 2025. Dashed lines show means across jurisdictions.

Sources: Bloomberg; FSB calculations

Discussions with stakeholders and from the market insight surveys (see also Box 2) reveal the importance of netting among counterparties in determining haircuts. Repo transactions with zero haircuts may be included in netted packages that involve offsetting repo and reverse repo positions. Such packages may be covered by portfolio margin that is not assigned to specific transactions. In other cases, transactions may be part of larger trades in which the repo leg is not covered by haircuts or margin, but margin is posted on other legs of the trade. However, there is a lack of specific data to ascertain the importance of these practices.

Box 5 uses euro area repo data to illustrate the links between netted transactions and haircuts. The box also notes that netted transactions do not eliminate all risks and counterparty credit concerns can arise due to wrong way risk. Wrong-way risk arises when there is a correlation between a NBFI's probability of default and the valuation of the bond used as collateral.

There is evidence to suggest that there are large parts of the repo markets where netting does not take place. One study on the US Treasury market suggests that approximately 30% of repo transactions involving hedge funds are not netted, noting that some cross-product or initial

margining may still take place.[102] Furthermore, MMFs, in part due to regulatory requirements in some jurisdictions, often use haircuts of approximately 2% on their reverse repos backed by government bonds (slightly higher for other collateral).

An empirical study on the UK repo market found that the type of counterparty affects the level of haircuts. For example, large borrowers, and borrowers with repeated relationships, tend to receive lower haircuts.[103] Analysis by the Treasury Market Practices Group identified a lack of consistency in current counterparty credit risk management practices in the US NCCBR segment as a vulnerability.[104] The Treasury Market Practices Group concluded this inconsistency, along with the competitive forces in this segment, is driving risk management to become a commercially negotiated term. Such a development is likely to drive market participants away from risk management best practices and could potentially increase counterparty risks in aggregate.

Box 5: The role of netting in haircuts and how wrong way risk could occur

To illustrate the impact of netting on repo haircuts, euro area SFTR repo transaction data are used to identify outstanding repo volumes that are fully nettable. In this context, fully nettable refers to transactions where the same two counterparties conduct a repo and a reverse repo that mature on the same date. For this analysis, the dataset is restricted to trades where either the cash borrower or the cash lender is a NBFI, while the other counterparty is a dealer bank. Comparing exposures between a dealer bank and a NBFI that are fully nettable with other similar exposures that are less than 50% nettable allows an estimation of the effects of netting. However, as cross-product netting cannot be observed, even in the control group sample, netting likely still plays a role.

Simple descriptive statistics suggest that netting is a major factor in reducing haircuts. It is therefore crucial to understand the types of risks that are mitigated by netting and – even more importantly – the risks that remain unaddressed. Analysis shows full netting significantly increases the proportion of trades conducted with zero haircuts (Graph 5.1). For example, in USD repos, the fraction of zero-haircut trades rises from 63% in the control group to 82% for fully nettable repos. Furthermore, for trades with positive or negative haircuts, the estimated netting practice appears to substantially reduce the average (absolute) haircut.

However, in practice netting does not eliminate all risks. Even bonds issued by the same entity with similar characteristics are not perfectly correlated. This is particularly relevant when wrong-way risk is involved. Wrong-way risk arises when there is a correlation between a NBFI's probability of default and the valuation of the bond used as collateral. For example, consider a yield curve strategy where a NBFI identifies the 10-year government bond as overpriced relative to the 9-year government bond. To exploit this perceived mispricing, the NBFI purchases the 9-year bond and uses it as collateral to conduct a one-month repo with its intermediary to obtain cash. The cash is then used in a reverse repo transaction with the same intermediary, with the same maturity (one month), to acquire the 10-year bond. The NBFI subsequently sells the 10-year bond and could use the proceeds to purchase another 9-year bond.

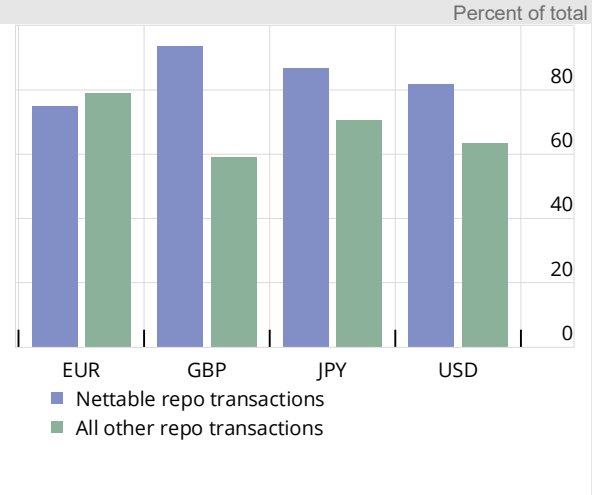
[102] See Hempel et al (2023), Why is so much repo not centrally cleared, *OFR brief series*, May.

[103] See Julliard et al (2025), *What drives repo haircuts? Evidence from the UK market*, January.

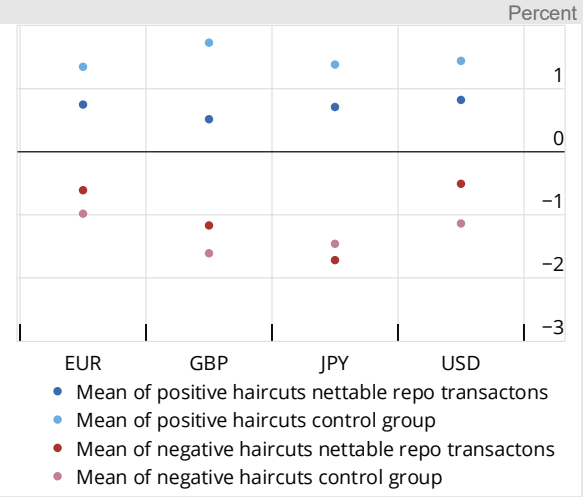
[104] See TMPG (2025), *Treasury Market Practices Group Finalizes its Recommended Best Practices for Treasury Repo Risk Management*, June.

Netting is a notable factor in reducing haircuts in euro area repo markets[1] **Graph 5.1**

1. Changes in the fraction of zero haircut transactions



2. Changes in the magnitude of haircuts



[1] Note that the graphs are based on repo reported in the euro area but denominated in different currencies.

Source: FSB member data and calculations.

Losses could arise from an unexpected event that reduces the price of the 9-year bond relative to the 10-year bond. This would not only diminish the collateral value from the intermediary's perspective but could also threaten the NBFI's solvency, especially if it is highly leveraged. Furthermore, a defaulting NBFI with a large long position in the 9-year bond could exacerbate the price differential between the 9-year and 10-year bonds. The larger this price differential becomes, the greater the losses borne by the intermediary. While losses stemming from price differences between the 9-year and 10-year bonds may appear limited at the level of a single repo transaction, they can become substantial if the NBFI is highly leveraged and the intermediary is heavily exposed.

3.2.3. *International spillovers*

Repo markets operate internationally and while this helps to make the international financial system more efficient, the links between repo markets create the potential for spillovers between jurisdictions and markets.[105] There are four key ways in which there are international links in repo markets: (1) foreign currency repos; (2) use of foreign government bond collateral; (3) cross-border repo transactions where counterparties are in two different jurisdictions; and (4) repo involving local branches and subsidiaries of foreign banks but where the counterparties are in the same jurisdiction.

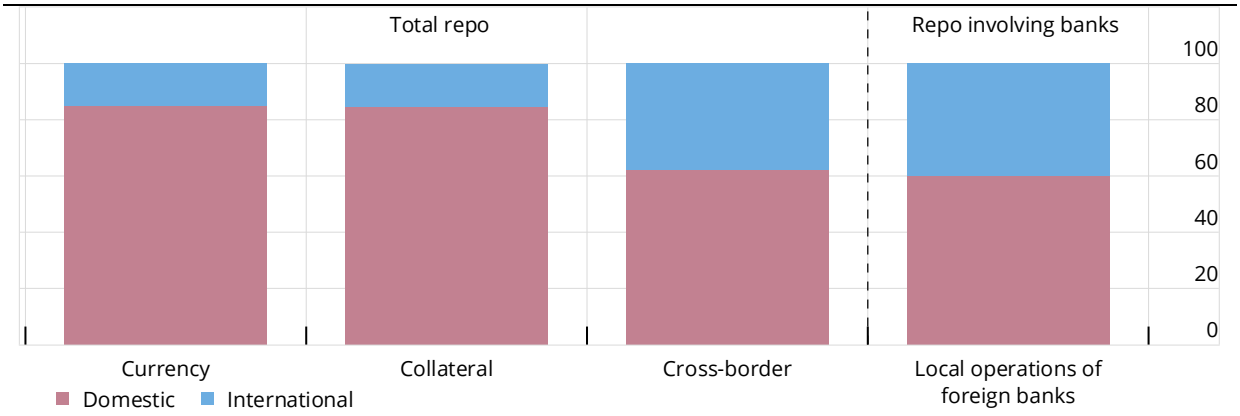
Looking at the data collected by FSB members in aggregate, the first two forms of international links each represent approximately 15% of total repo (Graph 11). Discussions with market participants have confirmed that these two forms of international repo are closely connected as the currency denomination of the collateral security tends to be the same as the denomination of the repo cash leg. Cross-border activity is significant, at almost 40% of total repo. There is also an overlap between cross-border and foreign currency repo, as the greater proportion of

[105] For other discussions on international aspects of repo markets, see Bassi et al (2024), Enhancing repo market transparency: the EU Securities Financing Transactions Regulation, *ECB Occasional Paper Series*; and Hermes et al (2025), The international dimension of repo: five new facts, *ECB working paper series*, August.

foreign currency repo takes place across borders than repo backed by domestic government bonds. Local operations of foreign banks represent approximately 40% of repo involving banks.

International repo activity is substantial[1]

Percent of total **Graph 11**



[1] The first three columns in the graph show the proportion of total repo activity that is domestic and international, using the data collected from members. The fourth column shows the proportion of repo involving banks only that involves domestic and international banks. Note that repo within the euro area is treated as domestic for the purposes of this graph.

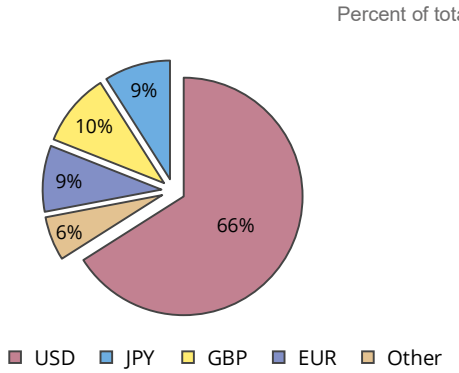
Sources: FSB member data; FSB calculations.

There is considerable home bias on the currency denomination of repo activity. Data collected by FSB members shows that approximately 66% of repo is denominated in US dollars, with approximately 10% each is denominated in British pounds, euro and Japanese yen (Graph 12, panel 1). However the vast majority of activity in each currency occurs in the domestic jurisdiction, with only 15% or so of US dollar and British pound repo occurring elsewhere, 10% of Japanese yen repo taking place abroad and 5% of euro repo activity outside the euro area (Graph 12, panel 2).

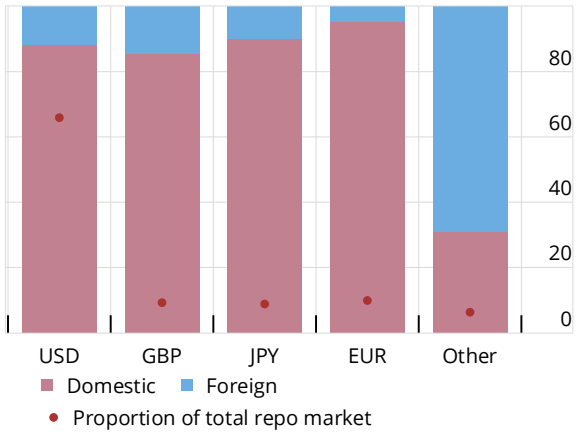
There is home bias in the currency used for repo transactions[1]

Graph 12

1. Repo markets by currency (2024)



2. Repo markets by currency and location (2024)



[1] The graph is based on repo backed by both domestic and foreign government bonds.
Sources: FSB member data; FSB calculations.

Foreign currency repo creates the potential for spillovers to and from the FX swap markets. Markets contacts have indicated that some participants use repo markets as a source of FX funding, and so can act as an alternative to FX swap markets. However, the fact that the two markets can be substitutes means that market strains could spill over between the two markets.

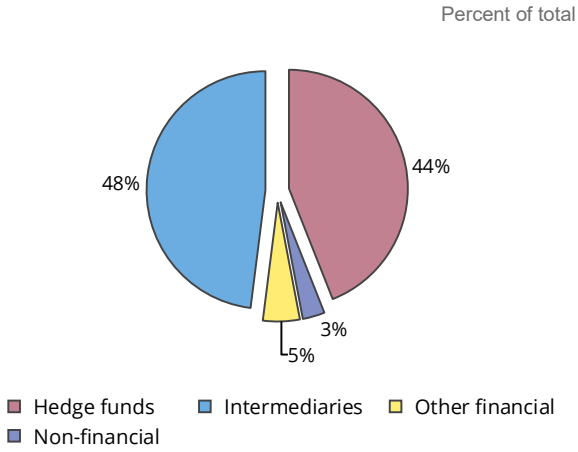
Use of foreign currency collateral in repo could lead to spillovers from repo markets in one jurisdiction to government bond markets elsewhere. Any strains among repo counterparties using a foreign government bond to collateralise the borrowing could lead to sales of that bond and hence a transmission of shocks from a repo market in one jurisdiction to a government bond market in another jurisdiction.

Cross-border repo transactions could transmit shocks in one repo market to a repo market in another jurisdiction. Although, as mentioned above, these cross-border positions can represent one-third or more of outstanding repo positions in some jurisdictions, there are some jurisdictions where cross-border transactions are negligible or do not take place at all. In some other jurisdictions, data sources make it difficult to identify cross-border positions.

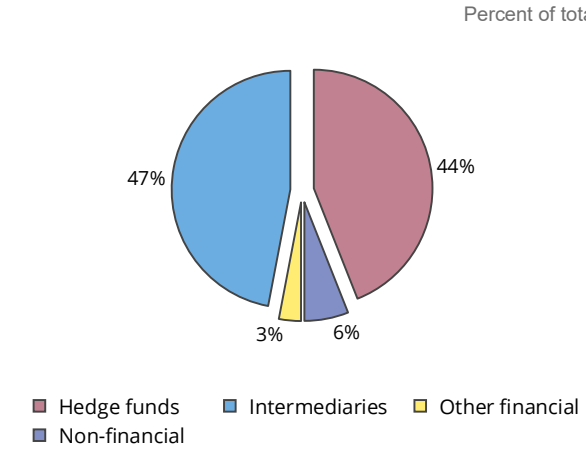
The vast majority of cross-border repo positions in major advanced economies are either with intermediaries or hedge funds located in other jurisdictions (Graph 13). The data collected by FSB members suggests that just under half of cross-border repo and reverse repo is with intermediaries, and about 45% is with hedge funds. Market contacts have noted that a small number of large hedge funds, which are often located in offshore financial centres, operate in a number of different repo markets.[106] Such hedge funds enter basis trades in multiple countries, and, in case the direction of trade is opposite, they can use the same intermediary to net out the repo parts of the trade. This suggests that problems in those hedge funds could spill over to several repo markets simultaneously. Evidence in the literature suggests that a significant part of the cross-border repo between intermediaries could be intra-group activity in international banks and dealers.[107] These entities also tend to be large banks that operate in many different repo markets and so if they were to face any challenges, they could also impact a number of repo markets at the same time.

Cross-border repo activity is largely with intermediaries and hedge funds **Graph 13**

1. Repo non-resident counterparties (2024)



2. Reverse repo non-resident counterparties (2024)



Sources: FSB member data; FSB calculations.

[106] Market participants suggest this is case, also see FSB (2023), *The financial stability implications of leverage in non-bank financial intermediation*, September.

[107] See Hermes et al (2025), The international dimension of repo: five new facts, *ECB working paper series*, August.

The presence of foreign banks in domestic repo markets could lead to international spillovers. As mentioned above, just over 40% of repo involving banks takes place through local operations of foreign-owned banks. These banks are active in foreign markets for several reasons. First, banks may use these markets to source foreign currency financing and collateral, and then distribute this within their banking groups using intra-group repos (discussed above). Second, banks may operate in foreign repo markets to serve clients that also operate in that jurisdiction. Third, banks may use foreign repo markets to channel foreign currency funding to clients operating in other jurisdictions. One important example of this is the role played by European-owned banks in US repo markets. Members suggests these banks act as a hub to direct dollar liquidity from US MMFs to offshore investment funds.[108] While these banks aid the efficiency of repo markets, they can also spread strains between jurisdictions.

4. Monitoring vulnerabilities in repo markets

This report identifies a set of metrics that could be used by FSB members and other authorities to measure the build-up of vulnerabilities in the repo markets. The aim is to provide a forward-looking and comprehensive view of potential vulnerabilities. These metrics are presented as a guide to indicators that could be developed, rather than a definitive list. The selection of these metrics reflects the vulnerabilities outlined in the report, while also considering feasibility, data availability and practical implementation. The selection draws on both a review of research literature and individual FSB member's inhouse monitoring experience. However, it is recognised that some metrics may not be practical in some jurisdictions due to data availability. Surveillance capabilities could be enhanced by implementation of FSB recommendations concerning the global collection of granular securities financing transactions data and aggregation.[109]

4.1. Vulnerability metrics

This report identifies four broad categories of metrics that can be used for surveillance pertaining to the vulnerabilities described in Section 3.

- **Market activity** metrics relate to the real time functioning and efficiency of repo markets. This allows an assessment of the development of funding pressures and leverage dynamics. Such metrics may include tracking repo borrowing and lending volumes (across sectors, maturities, and collateral types), pricing dynamics and settlement frictions or bottlenecks. These metrics would allow surveillance of liquidity demand and supply, leverage, concentration and international spillovers related vulnerabilities.

- **Market structure** metrics capture the architecture and systemic linkages of repo markets, for example from the involvement of key counterparty types as well as cross-

[108] See Klaus, B, and Mingarelli, L. (2024). Euro area banks as intermediators of US dollar liquidity via repo and FX swap markets, *ECB Financial Stability Review*, November 2024.

[109] See FSB (2015), *Standards and processes for global securities financing data collection and aggregation*, November, and BIS website for reporting guidelines. As of September 2025, Australia, Canada, Japan, Mexico and the United Kingdom report data for repo markets to the FSB and BIS under this data collection exercise.

border and inter-affiliate transactions. As such these types of metrics allow for surveillance of vulnerabilities related to concentration (such as specific entities or trading pairs), leverage (leveraged trades by entities), interlinkages and contagion.

- **Resilience** metrics allow an understanding of how market participants manage risk which, at the aggregate level can indicate the level of resilience in the repo markets. Relevant metrics include the assessment of liquidity mismatches and rollover risks resulting from the misalignment between repo tenors and collateral quality. Other examples of resilience metrics include information on risk mitigation measures such as collateral haircuts and margin requirements. These indicators allow an understanding of repo markets resilience around liquidity and funding, leverage and credit vulnerabilities.

- **Intermediation capacity** metrics relate to the capacity and willingness of intermediaries to supply liquidity, under normal and stress conditions. Metrics include regulatory related capacity indicators, as well as balance sheet usage measures and headroom above internal risk limits to proxy for the willingness of intermediaries to supply cash. This would allow for surveillance of liquidity supply vulnerabilities.

Annex 2 provides a fuller list of metrics that was considered in this work and shows how each metric relates to the vulnerabilities identified in this report. Table 4 lists a subset of the metrics from Annex 2 that FSB members believe would provide a high-level overview of repo market vulnerabilities and would likely be practical to compute with limited additional investment in data collection and analytic resources in most jurisdictions. Note that the inclusion or exclusion of any particular metric from Table 4 or Annex 2 does not imply a prioritisation of some vulnerabilities over others, though the recommended metrics are those that would be both informative and reasonably practical to develop in many or most jurisdictions.

Table 4: Metrics for surveillance of repo market vulnerabilities

Metric Description	Example metric formula	Relevant vulnerabilities
Concentration in entities (including counterparties, CCPs, custodians, intermediaries)	Herfindal Index, Entity's volume total or in specific collateral/tenor ÷ Total volume in that category	Concentration
Volume of repo funding by leveraged investors	Sum of repo borrowing volume by leveraged investor group (such as hedge funds, LDI funds and other leveraged investment funds which may be identified with the help of regulatory reporting such as AIFMD in the EU)	Leverage, Interlinkages and contagion, concentration
Repo borrowing and lending volumes by Maturity, Collateral type, jurisdiction, entity type	Volume of trades by maturity or collateral or jurisdiction or entity type ÷ Total repo volume	Leverage, International Spillovers, Concentration, Interlinkages and contagion
General Collateral Repo Rates and Spreads for different maturities repo	Average GC repo rate, GC rate – Benchmark rate (e.g., OIS or policy rate), GC rate - bilateral rate, for maturity m in segment s	Liquidity and funding

market segments and counterparties		
Share of cleared repo	Sum of total cleared repo and reverse repo ÷ Sum of total repo and reverse repo	Concentration, Leverage, Liquidity and Funding, Interlinkages and Contagion, and Counterparty Risk.
Weighted average repo maturity of cash borrowing and lending by investor type, jurisdiction	Sum of (repo maturity × trade volume) for investor type ÷ Total trade volume for investor type	Liquidity and Funding, Concentration, International Spillovers
Average haircut levels across collateral types	Weighted average transaction haircut across respective trades	Leverage, Liquidity and Funding, Interlinkages and contagion, Counterparty risk
Intermediaries/dealer constraints (relative to internal limits)	Maximum volume of activity permitted under internal risk limits – actual volumes outstanding (or actual share of balance sheet).[110]	Liquidity supply, Leverage, Interlinkages and contagion

4.2. Data challenges

There are several data challenges that can affect authorities' ability to monitor vulnerabilities. Although this report has included a range of information on repo markets across jurisdictions – such as the size of the market, main counterparties, key features and so on – there are a number of data obstacles that had to be overcome when writing the report. Where there are data challenges, these can be grouped into four main categories: (1) consistency, (2) partial information, (3) lagged information and (4) missing information.

- **Consistency:** One important challenge is to obtain a consistent figure on the size of the repo markets across jurisdictions, as is discussed in Box 2. There are fundamental differences in the information available to authorities in different jurisdictions. Some authorities have transaction-by-transaction data and so the size of the global market can be obtained by summing all of the repo amounts outstanding. Those authorities collecting information from key institutions such as CCPs or custodians may need to adjust their data or include estimates to make it as consistent as possible with transaction data. Even where comparable data are available, there can be differences in the definitions used to collect data that can make it hard to compare some features of repo markets. When drawing comparisons across jurisdictions or considering cross-border activity, it is particularly important to ensure that all jurisdictions use consistent data filters – efforts were made in this report particularly where jurisdictions used similar data collection (i.e. trade repository).

- **Partial information:** There are differences in the level of detail and granularity of available data. For example, it is difficult for some jurisdictions to identify certain types

[110] For proxies of internal risk limits, see balance sheet constraint metrics and VaR measures, see Duffie et al (2023), *Dealer Capacity and U.S. Treasury Market Functionality*, October and Adrian et al (2025), *US Treasury Market Functioning from the Global Financial Crisis to the Pandemic*, April.

of repo market counterparties (e.g. hedge funds or MMFs) from their data sources. Cross-border activity cannot be fully captured in some jurisdictions as information on the location of the counterparty may not be collected. In addition, some jurisdictions are only able to collect a limited amount of historical data (i.e. back to 2022) as this is the extent of available transaction level data. This limits analysis of long-term trends and the evolution of markets.

- **Lagged information:** In some instances, data is available on a significantly delayed basis which limits the effectiveness of monitoring vulnerabilities in repo markets. This notably relates to sectoral information derived from balance sheet data, which helps contextualise repo activity within broader financial operations. Similarly, metrics related to intermediation capacity such as dealer balance sheet usage and headroom to regulatory ratios, can suffer from reporting lags and low frequencies, reducing their usefulness for timely surveillance.

- **Missing information:** Data challenges also arise from the fact that some data on the repo markets are not available in certain jurisdictions. Across jurisdictions, there are significant data limitations in understanding haircut and margin practices in repo markets. For example, in bilateral markets, it is unclear whether reported haircuts apply to individual transactions or are calculated on a portfolio basis, which may explain the prevalence of zero or negative haircuts. There is also limited visibility into whether haircuts are shaped by netting arrangements or offsetting exposures across products, such as futures positions. It has been difficult to collect data on CCP margins on repo transactions in all jurisdictions. Overcoming this aspect would allow members to undertake robust monitoring of the level of resilience in the repo markets particularly around credit related vulnerabilities and procyclical effects. Finally, while a lot of information can be timely and granular for certain authorities, aggregate, publicly available measures of repo data to construct the suggested metrics are inconsistently reported across countries. Disseminating relevant data to support broader policy and research communities are particularly important in turbulent times and for subsequent policy making.

The metrics discussed above reflect data availability and challenges. Given the current reporting standards in place, most market activity related metrics are broadly accessible in major jurisdictions. These metrics benefit from established trade repositories and regulatory reporting, allowing for timely and granular monitoring of market functioning and liquidity conditions by the authorities with access to the data. Aggregated measures of market activity data are also usually publicly available in most jurisdictions. However, data underpinning market structure and intermediary capacity metrics varies considerably in granularity, while, as discussed, most data limitations relate to metrics that monitor the resilience of the repo markets. Additionally, while granular data might be available, there still may be considerable efforts needed to process and interpret possible risks stemming from the data.

5. Conclusions

At a size of approximately $16 trillion, repo markets backed by government bonds are an important segment in the global financial system. Well-functioning repo markets play an important role in facilitating the flow of cash and securities throughout the financial system. They

facilitate risk hedging and help provide market participants with a source of funding and give institutions a low-risk avenue for lending excess cash. Repo markets also support government bond markets, allowing firms to easily transform sovereign debt holdings into cash, or vice versa, and to lend and borrow specific securities. This helps intermediaries fund bids at government bond auctions and improves the liquidity in the secondary market. Many central banks also use repo markets to fulfil their monetary policy and financial stability mandates.

Repo market activities are associated with several important vulnerabilities. Demand and supply imbalances can arise quickly in stress periods if repo lenders are unwilling or unable to provide funds to meet spikes in the demand for liquidity. Repo markets can facilitate the build-up of leverage in the financial system, especially as approximately 70% of activity in the non-centrally cleared segment operates with zero haircuts and as there are high levels of collateral rehypothecation. There can also be concentrations at different parts of the transaction chain in repo markets that could lead to disruptions in the event of failures. Interlinkages in repo markets can also act as a conduit for contagion in several different ways. Strains in repo and government bond markets could spill over to each other. The international nature of repo markets creates the potential for strains to be propagated between jurisdictions. Repo market lenders are exposed to their leveraged counterparties, especially if haircuts are insufficient.

This report is part of the FSB's broader NBFI work programme.[111] A number of policy recommendations have already been published as part of this programme that are relevant for the vulnerabilities identified in this report. For example, a focus of the programme has been to enhance the resilience of the financial system to liquidity imbalances by reducing excessive spikes in the demand for liquidity. This has included published recommendations on the liquidity preparedness of nonbanks for margin and collateral calls, as well as on enhancing margining practices in centrally cleared markets, both of which would help mitigate liquidity strains in repo markets.[112] In addition, previous FSB work included recommendations to enhance the resilience of government bond markets, which would also help the functioning of government bond-backed repo markets.[113]

The build-up of leverage by market participants continues to warrant further attention. Recommendations have recently been published to address vulnerabilities around the build-up of leverage as part of the FSB's NBFI programme. These recommendations include a number of measures that are relevant for repo markets and that authorities should consider, as appropriate, for the risks they identify. For example, the recently published recommendations on leverage in NBFI include measures on minimum haircuts for non-centrally cleared government bond repos, concentration add-ons for margins and haircuts in securities financing transactions (SFTs) and increasing the use of central clearing in SFTs. [114] This report has also discussed counterparty risk, and the published recommendations call for authorities to review the adequacy of existing counterparty disclosure practices between leveraged nonbanks and leverage providers. Where such practices are assessed to be inadequate, it is recommended to consider establishing a public-private partnership with the industry to develop standards and/or

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[111] See FSB (2025), *Enhancing the resilience of nonbank financial intermediation: Progress report*, July.

[112] See FSB (2024), *Liquidity preparedness for margin and collateral calls: final report*, December; and BCBS-CPMI-IOSCO (2025), *Transparency and responsiveness of initial margin in centrally-cleared markets – review and policy proposals*, January.

[113] FSB (2022), *Liquidity in core government bond markets*, October.

[114] See FSB (2025), *Leverage in Nonbank Financial Intermediation Final Report*, July.

guidelines. This report has also highlighted that repo markets can enable the build-up of leverage in the financial system, and the published recommendations include direct or indirect constrains on entities' leverage.

Given the vulnerabilities identified in this report, and time needed to implement any measures to address them, authorities may consider enhancing their surveillance and monitoring of repo markets. As part of this effort, members are encouraged to collect and share data under the FSB's Global Securities Financing Transactions exercise.[115] This report has also identified a number of metrics for repo markets surveillance and members could consider using these and developing them further, subject to data availability. Several data challenges have also been highlighted, including around consistency, incompleteness and lagged information. Members are encouraged to address these challenges as part of the FSB's ongoing work on nonbank data.[116] Finally, the growing number of initiatives in repo markets, such as intraday transactions and the use of tokenisation, warrant continued monitoring.

[115] See FSB (2024), *Promoting global financial stability*, Annual Report (Box 7), November and FSB (2015), *Transforming shadow banking into resilient market-based finance: standards and processes for global securities financing data collection and aggregation*; FSB (2015), *Standards and Processes for Global Securities Financing Data Collection and Aggregation*, November and *Bank for International Settlement's website* for reporting guidelines.

[116] See FSB (2025), *FSB workplan to address nonbank data challenges*, July.

Annex 1: Data sources and assumptions

This annex summarises the key data sources used to collect data for this report, and outlines some of the key assumptions used when gathering the data.

Jurisdiction	Data sources	General assumptions on estimating market size	Assumptions on cross-border activity	Assumptions on market participants	Assumptions on repo term	Caps on nominal repo transaction value? [117]	Considered outstanding contracts? [118]
Canada	Dealers' self-regulatory organisation	Data are reported by dealers and so are provided from an intermediary's perspective	Foreign currency repo is assumed to be conducted by the foreign-domiciled dealer arm of a Canadian bank			No	N/A
Euro-area	Trade repository data under the Securities Financing Transactions Regulation (SFTR) See: SFTR Reporting	CCPs as reporting counterparties are excluded to avoid double counting unless activity on own behalf. Caps applied on nominal value of a repo transactions are included to remove incorrectly reported trades. Includes repos backed by EA government securities and by specified collateral baskets	Foreign entities included when trading with a euro-area entity.	Unable to specify broker-dealers separately.	Overnight repos include 1-day term trades with most common maturity buckets being 'O/N' - Overnight, 'T/N- Tomorrow/Next and 'S/N'- Spot/Next.	Yes	Yes

[117] In order to remove incorrectly reported trades.

[118] i.e. repos with a start date at or before the reference date and maturity after the reference date.

Jurisdiction	Data sources	General assumptions on estimating market size	Assumptions on cross-border activity	Assumptions on market participants	Assumptions on repo term	Caps on nominal repo transaction value? [117]	Considered outstanding contracts? [118]
		traded on EU venues (e.g. Eurex GC pooling). Considered outstanding contracts, i.e. repos with a start date at or before the reference date and maturity after the reference date.					
Japan	Trade repository data See: Statistics on Securities Financing Transactions in Japan	CCPs are excluded to avoid double counting unless activity on own behalf. The reporting financial institutions comprise about 50 financial institutions located in Japan with the largest amount outstanding of securities financing transactions. Considered outstanding contracts, i.e. repos with a start date at or before the reference date and maturity after the reference date.	Foreign entities included provided at least on leg of the transaction is with a Japanese entity.	Unable to specify hedge funds separately	Overnight including 1-day term trades or longer that mature the next business day	No	Yes
India	Trade repository data	Data provided from an intermediary's perspective. Outstanding data of central government securities and T-Bills data is of quarterly frequency, at quarter end, and that data for any date		Unable to specify broker-dealers separately.		N/A	Yes

Jurisdiction	Data sources	General assumptions on estimating market size	Assumptions on cross-border activity	Assumptions on market participants	Assumptions on repo term	Caps on nominal repo transaction value? [117]	Considered outstanding contracts? [118]
		falling between two quarter ends is the data of the previous quarter.					
Mexico	Bank supervisory data (Central Bank)	Data provided from an intermediary's perspective The Central Bank cross-checks and validates the data for the trades among intermediaries.	Intermediaries identify trades with foreign counterparties, providing information by their type (banks, other financial intermediaries, natural persons, fiscal persons). Only foreign banks must be identified by name, and there is a catalogue of country domiciled).	The information is gathered from banks and broker-dealers, which must report their counterparties	The information reported contains the agreed initial and final date of the operation.	N/A	Yes
South Africa	Other data	This data is provided by the Johannesburg Securities Exchange, which requires all trades to be reported by its clearing members, i.e. the banks				No	Yes
Switzerland	Other - transaction	For most transactions, the repo collateral is a basket			Overnight repos include all repo	N/A	Yes

Jurisdiction	Data sources	General assumptions on estimating market size	Assumptions on cross-border activity	Assumptions on market participants	Assumptions on repo term	Caps on nominal repo transaction value? [117]	Considered outstanding contracts? [118]
	data from the SIX Repo AG trading platform. See 5.3.4 SIX Repo	rather than a single ISIN. Up to 33 different ISINs can be delivered in a single transaction. The market size of the government bond repo market is estimated by the total market value of domestic central government bonds delivered as repo collateral. Domestic central government bonds are defined to include federal bond issues as well as money market debt register claims issued by the Swiss Confederation.			transactions lasting one business day, in particular Overnight, Tomorrow/Next, and Spot/Next transactions.		
United Kingdom	Trade repository data under the UK Securities Financing Transactions Regulation See: Trade Repository (TR) Data Collections |	CCPs as reporting counterparties are excluded to avoid double counting unless activity on own behalf. £5 billion cap applied on nominal value of a repo transactions are included to remove incorrectly reported trades. Includes UK government securities from specified collateral baskets based on	Foreign entities included provided at least on leg of the transaction is with a UK entity.	Broker-dealers identified separately from banks, outside of the trade repository database.	Overnight repos include overnight, Tomorrow/Next and Spot/Next.	Yes	Yes

Jurisdiction	Data sources	General assumptions on estimating market size	Assumptions on cross-border activity	Assumptions on market participants	Assumptions on repo term	Caps on nominal repo transaction value? [117]	Considered outstanding contracts? [118]
	Bank of England	UK government collateral trading on UK venues Amounts outstanding are based on the market value of the collateral adjusted by the haircut. Considered as 'outstanding' those transactions where the first leg settled before or on the date of reporting, and the second leg has not yet settled as of the date of reporting. This implies: i) the exclusion of forward repos (where forward = first leg of the repo has not been settled yet) and ii) the exclusion of 'Maturing' repos – trades with second leg settling on the reporting date					
United States	See: OFR Hedge Fund Monitor OFR U.S. Repo Markets Data Release	Sizing estimates use total NCCBR volume from Hempel et al. (2025) and assume a similar share of total NCCBR is collateralized by Treasuries for both non-primary dealers and primary dealers. Other market sizes are obtained	Foreign entities included provided at least on leg of the transaction is with a US entity.	Market participants are mapped using the Z1 accounts, with data for hedge funds substituted from the OFR's	Data assumes that all GCF Treasury repo transactions are overnight, likely overstating total	No	Yes

Jurisdiction	Data sources	General assumptions on estimating market size	Assumptions on cross-border activity	Assumptions on market participants	Assumptions on repo term	Caps on nominal repo transaction value? [117]	Considered outstanding contracts? [118]
	FRBNY published Tri-party/GCF repo data Primary Dealer Statistics Federal Reserve Z1 Release Research papers.[119]	from the FRBNY's Tri-party statistics and U.S. Repo Markets Data Release.	Any existing gaps identified (e.g. NCCBR), populated based on other jurisdictions' data.	Hedge Fund Monitor.	overnight volumes.		

[119] See Hempel et al (2025), The $12 trillion US repo market: evidence from a novel panel of intermediaries, *FEDS Notes*, July; Hempel et al (2023), Why is so much repo not centrally cleared, *OFR brief series*, May; Cenicola et al (2025), Are zero-haircut repos as common as advertised?, *The OFR blog*, August.

Annex 2: Metrics for surveillance of vulnerabilities in government backed repo markets

Metric description	Example Metric formula	Relevant vulnerability areas
Market activity		
Repo borrowing and lending volumes total and by sectoral share, by jurisdiction	Sum of all repo transactions in jurisdiction j, Sector's repo volume ÷ Total repo volume in jurisdiction j	Leverage, International Spillovers, Concentration, Interlinkages and contagion
Repo borrowing and lending volumes by Maturity, Collateral type, jurisdiction, entity type	Volume of trades by maturity or collateral or jurisdiction or entity type ÷ Total repo volume	Leverage, International Spillovers, Concentration, Interlinkages and contagion
Borrowing pricing in specific collateral for different maturities and counterparty types	Average repo rate for trades in special ISINs with maturity m and counterparty type t	Liquidity and funding
Share of trades above the central bank deposit rate	Percentage of trades by volume above the central bank deposit interest rate	Liquidity and funding
General Collateral Repo Rates and Spreads for different maturities repo market segments and counterparties	Average GC repo rate, GC rate – Benchmark rate (e.g., OIS or policy rate), GC rate - bilateral rate, for maturity m in segment s	Liquidity and funding
Spreads between different repo segments reflecting dealer funding costs vs client funding costs	US: Bilateral – tri-party repo[120] EU: spread between cleared and non-cleared[121]	Liquidity supply, Interlinkages and contagion
Settlement fails in repo transactions by counterparty type, collateral type, GC vs Specials	Number of failed repo settlements ÷ Total repo transactions	Liquidity and funding

[120] For example see Chabot et al (2024), Dealer Balance Sheet Constraints Evidence from Dealer-Level Data across Repo Market Segments, *FEDS Notes*, September.

[121] For example, see Besugo et al (2025), *Dealers' costs of intermediation in fixed income markets: Empirical results for the euro area*, July.

Metric description	Example Metric formula	Relevant vulnerability areas
Collateral reuse metrics (a cut by domestic and foreign cross-border collateral reuse could be considered within these metrics)	Collateral reuse ratio: [Collateral received, eligible for reuse ÷ (Collateral received, eligible for reuse + Own assets)] × Collateral posted	Liquidity and funding, Leverage, Concentration, Interlinkages and contagion
	Collateral reuse rate: Collateral reused ÷ Collateral received, eligible for reuse[122]	
	Collateral reuse share: Collateral reused ÷ Total assets (or ÷ Collateral posted)	
Market Structure		
Country level mapping of counterparties	Volumes and flows of repo and reverse repo by counterparty type and location[123]	Liquidity demand and supply, international spillovers
Share of cross border vs domestic repo positions by counterparty, jurisdiction	Cross-border repo ÷ Domestic repo[124]	International spillovers
Volume / Share of inter-affiliate trades in total repo activity by jurisdiction	Sum of inter-affiliate trade volumes in jurisdiction j, Inter-affiliate volume in j ÷ Total repo volume in j[125]	International spillovers, Concentration
Directionality of inter-affiliate flows by jurisdiction	Sum of trade volumes where counterparty is subsidiary (parent) in jurisdiction j	International spillovers
Concentration in trading pairs and trading relationships with intermediaries	Herfindal Index, Sum of trades between top X lenders and top X borrowers ÷ Total repo volume[126]	Concentration

[122] See Fuhrer (2016), Re-use of collateral in the repo market, *Journal of Money*, Credit and Banking, August, Accornero (2020), *Repo Markets, Collateral Re-use and Systemic Fragility. A Literature Review*, July and Jank et al (2022), *Safe asset shortage and collateral reuse*, August.

[123] For example see Hermes et al (2025), *The International Dimension of Repo: Five New Facts*, April.

[124] ibid

[125] ibid

[126] Hang et al (2022), *Trading relationships in secured markets: Evidence from triparty repos*, June.

Metric description	Example Metric formula	Relevant vulnerability areas
	Number of links or relative volume of trades with intermediaries, from an end user counterparty's perspective[127]	
Concentration in entities (including counterparties, CCPs, custodians, intermediaries)	Herfindal Index, Entity's volume total or in specific collateral/tenor ÷ Total volume in that category	Concentration
Indicates whether a trade was part of a transaction series that included a futures leg.	1 if trade is part of a transaction series that included a futures leg, else 0[128]	Leverage, Interlinkages and contagion
Volume of repo funding by leveraged investors	Sum of repo borrowing volume by leveraged investor group (such as hedge funds, LDI funds and other leveraged investment funds which may be identified with the help of regulatory reporting such as AIFMD in the EU)	Leverage, Interlinkages and contagion, concentration
Resilience		
Share of cleared repo	Sum of total cleared repo and reverse repo / Sum of total repo and reverse repo	Concentration, Leverage, Liquidity and Funding, Interlinkages and Contagion, and Counterparty Risk.
Collateral swaps	Sum of matched repo and reverse repo trades involving different collateral types between the same counterparties	Liquidity and Funding, Concentration
Weighted average repo maturity of cash borrowing and lending by investor type, jurisdiction	Sum of (repo maturity × trade volume) for investor type ÷ Total trade volume for investor type	Liquidity and Funding, Concentration, International Spillovers

[127] For example see Andreeva et al (2025), *Leverage actually: the impact on banks' borrowing costs in euro area money markets*, ECB working paper series, February and Eisenschmidt et al (2023), *Monetary policy transmission in segmented markets*, October.

[128] For example see Glicoes et al (2024), *Quantifying Treasury Cash-Futures Basis Trades*, FEDS Notes, March.

Metric description	Example Metric formula	Relevant vulnerability areas
Share of trading volume traded with different haircut signs (e.g. positive or negative)	Volume of trades with haircut sign s ÷ Total repo volume	Leverage, Concentration, Counterparty risk
Average haircut levels across collateral types	Weighted average transaction haircut across respective trades	Leverage, Liquidity and Funding, Interlinkages and contagion, Counterparty risk
CCP initial margin requirements	Formula for calculation, e.g.: Initial margin = f(portfolio volatility of collateral for trade/basket, haircut level, counterparty risk)	Leverage, Liquidity and Funding, Interlinkages and contagion, Counterparty risk
Intermediation capacity		
Liquidity Coverage Ratio Net Stable Funding Ratio compared to regulatory requirements	Actual ratio ÷ Required ratio	Liquidity supply
CET1 ratio utilisation distance to the required ratio in percentage points	Total CET1 capital ratio – required total CET1 ratio (including GSIB surcharge)	Liquidity supply, leverage
Leverage ratio utilisation distance to the required ratio in percentage points	Total leverage ratio – required leverage ratio	Liquidity supply, Leverage
Intermediaries/Dealers constraints (relative to internal limits)	Maximum volume of activity permitted under internal risk limits – actual volumes outstanding (or actual share of balance sheet).[129]	Liquidity supply, Leverage, Interlinkages and contagion

[129] For proxies of internal risk limits, see balance sheet constraint metrics and VaR measures, see Duffie et al (2023), *Dealer Capacity and U.S. Treasury Market Functionality*, October and Adrian et al (2025), *US Treasury Market Functioning from the Global Financial Crisis to the Pandemic*, April.