Changes in the secured money market

Aggregate secured euro money market rates have repeatedly been below the Eurosystem's deposit facility rate in recent years. Key reasons for this are the increasing use of non-standard monetary policy measures and various alternative investment options for market participants. In the area of monetary policy, the Eurosystem's asset purchases and the high level of excess liquidity play particular roles. However, against this backdrop, another important factor is the increasing concentration of money market activity in transactions between market participants that have access to accounts at the central bank and those that do not.

Aggregate secured money market rates such as the German RepoFunds Rate and the STOXX GC Pooling EUR ON index have been persistently below the deposit facility rate since 2015 in particular, whereas, prior to that time, such occurrences had only been observable for shorter periods. As aggregate money market rates encompass transactions that vary in terms of the type and reusability of the collateral used or the composition of the market participants, they are also affected to differing degrees by the impact of non-standard monetary policy measures. There are therefore some considerable differences in the spreads between the various money market rates and the deposit facility rate.

When viewed in isolation, monetary policy asset purchase programmes reduce the supply of certain collateral in the money market. As a result, the interest rates of corresponding repo transactions may decline. This effect primarily impacts repo transactions that are conducted for the purpose of borrowing specific securities and having these at one's disposal for the term of the transaction. High excess liquidity, by contrast, has a particular impact on secured money market transactions that are conducted for liquidity management purposes, as banks have fewer incentives to redistribute liquidity among themselves. As a result, the relative share of transactions between market participants that have access to the central bank's balance sheet and those that do not rises, and thus so too does the significance of transactions for which the deposit facility does not represent a lower bound.

As stipulated in the European treaties, the Eurosystem acts in accordance with the principles of a market economy. Therefore, in addition to managing the general interest rate level, it is not fundamentally the task of the Eurosystem to also purposefully influence price formation in individual financial market segments. If interest rate spreads widen in the financial markets, this is desirable in principle and an expression of functioning markets.

However, in the event that interest rates for secured money market transactions are very low on account of the scarcity of collateral, the Eurosystem strives to counteract the monetary policy asset purchase programmes' undesirable consequences for the repo market. To this end, it allows market participants to borrow certain bonds through securities lending arrangements. The Eurosystem's securities lending is not, however, intended to be a tool for managing interest rate conditions in the secured money market, but merely to serve as a backstop to mitigate the scarcity of collateral in the repo market caused by the asset purchases.

Introduction

Temporary exchange of funds for collateral

In the secured money market, market participants trade funds in the form of credit balances, in exchange for which the lender receives collateral from the borrower. The collateral is provided in the form of securities, meaning that securities are temporarily exchanged for account balances in secured money market transactions. The contracting parties agree a rate of interest for the transfer of account balances, and this has typically been negative in recent years. One motive for conducting such a transaction may be to temporarily increase one's own stock of liquid assets in the form of account balances. Conversely, a transaction may also be conducted to obtain certain securities on a temporary basis. The secured money market can therefore be used both for liquidity management and collateral management.

Different motives for different market participants

Alongside banks, participants in the secured money market also include financial corporations and, to a lesser extent, non-financial corporations and public sector institutions. Motives for conducting secured money market transactions may vary depending on the type of market participant. Non-financial corporations and public sector institutions use the market primarily for liquidity management purposes and the secure investment of liquid assets. In addition, financial corporations frequently conduct securities-related transactions, for example if they are in the securities trading business. This makes it possible for specifically required securities, for example, to be borrowed. Investors such as pension funds or insurers that hold long-term securities portfolios can earn additional revenue by lending securities. At banks, all of the aforementioned motives can manifest themselves in individual combinations, depending on the business model. However, some banks additionally act as intermediaries, conducting their own asset and liability business in the secured money market.[1]

Since 2016, the Eurosystem's money market statistics have recorded the money market transactions of the 47 euro area banks that had the largest main balance sheet assets (total assets minus other assets) as at 31 December 2014.[2] In the context of money market statistics, the Bundesbank additionally records the transactions of a further 97 German institutions at present. Overall, the money market statistics for December 2020 show an outstanding volume of euro-denominated secured money market transactions of €1.8 trillion.[3] A conceptually comparable figure is provided by the International Capital Market Association (ICMA), which puts the euro-denominated outstanding volume at €4.5 trillion on the basis of a survey of 60 participating European institutions.[4] The difference to the money market statistics can likely be explained in part by the fact that the ICMA figures include money market actors in the United Kingdom as well as the largest clearing houses.[5] Data on the size and trading volumes of the secured money market usually vary considerably, as the measurement concepts differ with regard to the currency and type of collateral covered, as well as the domicile and the sectoral affiliation of the market participants.

Outstanding volume of secured money market at €1.8 trillion

1 These are often large, internationally active banks with market shares in the secured market that have increased from high levels in recent years.
2 The legal basis for the collection of data is provided by Regulation (EU) No 1333/2014 (ECB/2014/48) concerning statistics on the money markets as amended by Regulation (EU) No 1599/2015. The sample originally comprised 53 banks. Due to mergers, this figure has since fallen to 47. A monetary financial institution (MFI) is required to report data on money market transactions if its total main balance sheet assets as at 31 December 2014 exceeded 0.35% of the total main balance sheet assets of all euro area MFIs.
3 As at 9 December 2020. Borrowing plus lending. As a result, it is possible that transactions are counted multiple times. Also includes the larger German sample of money market statistics. Excluded are intra-group transactions, securities lending without cash collateral, and collateral swaps and transactions with terms exceeding 397 days. Multiple counting of "open repos" (i.e. secured money market transactions that are automatically extended until one counterparty ends the transaction) is treated as in Tischer (2021).
4 See International Capital Market Association (2021), calculated from the total volume of outstanding repo transactions (€8.3 trillion, p. 8) and the share of euro-denominated transactions (54.4%, p. 25). As at 9 December 2020.
5 In the ICMA figures, too, transactions are counted twice in some cases and, through the inclusion of the clearing houses, potentially also multiple times.

Increasing importance of secured money market transactions for banks' liquidity management since 2008

Prior to the introduction of money market statistics, the ESCB gathered data from European banks through the Euro Money Market Survey.[6] The data collected by this survey included quarterly trading volumes of secured and unsecured money market transactions in interbank trading. According to the survey results, turnover increased by 25% in the secured money market from 2008 to 2015, but fell by as much as 80% in the unsecured money market, which had become markedly less attractive for banks to use as a result of regulatory measures (Basel III) and changes in money market management.[7] In the money market statistics data, which also encompass banks' money market transactions with financial corporations, general government and large non-financial corporations, this trend continued between 2016 and 2021. While turnover in the secured segment increased by roughly 63%, turnover in the unsecured segment declined by about 4%. For interbank trading, these respective developments were markedly more pronounced still.

Repo transactions are the most important instrument in the secured money market

The secured money market encompasses various instruments, of which the repo transaction (or repo for short) is the most important.[8] A repo consists of two transactions in which funds are exchanged for collateral. At the start of the transaction, the lender transfers the loan amount to the borrower and receives a security from the borrower as collateral. Haircuts may be applied, which means that the amount of funds may be lower than the value of the collateral. This provides the lender with some protection from possible fluctuations in the value of the collateral. In addition, the counterparties may agree an obligation to make additional payments in case the value of the collateral declines during the term of the repo transaction. Otherwise, the lender could incur losses if the borrower were to default and the recovered amounts from the collateral were insufficient to cover the credit losses. At the end of the term, the funds and the collateral are exchanged back. The borrower additionally pays interest on the borrowed funds.

General collateral and specific collateral transactions

Depending on the agreed collateral, there are two types of repo transaction. In general collateral (GC) transactions, the borrower can supply any collateral from a predefined basket of collateral, such as Federal bonds (Bunds) with residual maturities of up to ten years. While the lender does not know exactly which security it will receive, it can gauge the credit quality and potentially the market liquidity of the security in advance comparatively well. In specific collateral (SC) transactions, the lender receives a specific security previously stipulated on the basis of the securities identification number. The motives for concluding SC and GC transactions are usually different. GC transactions are used primarily for liquidity management, especially on the part of the lender. SC transactions are often conducted with the aim of borrowing a specific security, for example to fulfil a delivery obligation. However, borrowers may also use them for liquidity management purposes, for example if they try to use their available collateral for refinancing in a cost-effective manner, given different interest rates for SC and GC transactions.[9]

Developments in secured money market substantially influenced by monetary policy

Due to its size and its increased importance for banks' liquidity management compared to the unsecured market, the secured money market is relevant for the analysis of monetary policy transmission, particularly with regard to the transmission of key interest rates to banks' marginal liquidity and funding costs, and thus to the interest rate conditions in the financial and credit markets. In addition, many securities used as collateral are also acquired by the Eurosystem through the monetary policy asset pur-

6 See European Central Bank (2015). The quarterly turnover data of the Money Market Survey are not directly comparable with the outstanding volumes based on money market statistics or the ICMA figures.
7 The development of the unsecured money market is explored in more detail in Deutsche Bundesbank (2019).
8 "Repo" is shorthand for "sale and repurchase agreement". Other secured money market transactions, which, however, hardly differ from repos, include securities lending and securities swaps.
9 The growth in turnover in the secured money market is primarily attributable to SC transactions, while turnover in GC transactions has declined, partly in line with unsecured transactions.

chase programmes. As interest rate conditions for bonds in the repo market can influence the price formation of these instruments in the bond market, the repo market is of relevance for the implementation of the asset purchase programmes. At the same time, the interest rate conditions and the incentives to trade in the secured money market are influenced by the general conditions stipulated by the central bank for holding central bank reserves. It is therefore important for monetary policymakers to understand the conditions and developments in the secured money market and the interactions with monetary policy.

This article therefore outlines developments in the secured money market in recent years and explores the impact of the use of monetary policy instruments and the business activity of central banks on the secured money market. The secured money market is impacted in particular by changes in key interest rates, the monetary policy asset purchase programmes, and the resulting structural excess liquidity.

Central banks set key parameters for the secured money market

Secured money market is used, inter alia, for liquidity management

As part of liquidity management, market participants ensure their short-term solvency and manage their liquidity reserves. If a market participant has unneeded liquidity in the form of sight deposits at a commercial or central bank, they have various options for short-term investment. For example, the funds can be held as a time deposit at a commercial bank, invested in bonds with short residual maturities, money market paper or money market fund shares, or placed in the secured money market through a repo transaction.

Only certain participants of the secured money market have central bank access

Only some market participants are able to hold credit balances at Eurosystem central banks. Alongside commercial banks, these include, in particular, public administrations and private-law entities that perform duties of public administrations or process payments for public administrations. The central bank acts as a fiscal agent for these entities.[10] Then there are official institutions outside the euro area that have their euro reserves managed by a Eurosystem central bank within the framework of Eurosystem reserve management services (ERMS). Monetary policy counterparties and non-monetary policy counterparties that have central bank accounts are sometimes subject to different (interest) conditions, which set different general conditions for their respective money market activity.[11]

Interest rate conditions of the central bank crucial for liquidity-driven money market transactions of monetary policy counterparties …

The Eurosystem offers its monetary policy counterparties – i.e. credit institutions eligible to carry out monetary policy operations – liquidity via monetary policy refinancing operations or the marginal lending facility. The applicable conditions usually limit the interest rates at which monetary policy counterparties are prepared to absorb liquidity in the money market. If money market rates rise above those at which monetary policy counterparties can borrow from the central bank – assuming they can provide sufficient collateral – they will prefer to obtain funding from the central bank. Much the same applies for financial investment. If money market rates fall below the deposit facility rate, it is then more favourable for monetary policy counterparties to hold funds with the central bank than to place them in the money market. For short-term secured money market transactions conducted by Eurosystem monetary policy counterparties for liquidity management purposes, the agreed interest rate thus generally lies between the central bank's policy rates for the provision and absorption of liquidity.

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10 See General Terms and Conditions of the Deutsche Bundesbank in conjunction with Sections 19 to 22 of the Bundesbank Act *(Bundesbankgesetz)*.

11 See Guideline (EU) 2019/671 of the European Central Bank of 9 April 2019 on domestic asset and liability management operations by the national central banks (recast) (ECB/2019/7) and Guideline (EU) 2020/1284 amending Guideline (EU) 2018/797 on the Eurosystem's provision of reserve management services in euro to central banks and countries located outside the euro area and to international organisations (ECB/2020/34).

… and non-monetary policy counterparties

Non-monetary policy counterparties – such as domestic public administrations or foreign central banks – have no direct option for taking out loans at a Eurosystem national central bank. They may, however, hold credit balances in accounts at the respective central bank. Therefore, for these counterparties, the central bank's interest conditions for account balances, which may differ from the deposit rate applicable for monetary policy counterparties, are initially of particular relevance. This applies, for example, for central banks outside the euro area that want to hold official euro reserves. Eurosystem national central banks, such as the Bundesbank, allow such market participants to hold euro balances in a central bank account within the ERMS framework.[12] The interest rate on central bank accounts for ERMS participants is lower than the deposit facility rate.[13] Therefore, for these market participants, investment in the market already becomes attractive when net interest income is higher than the lower interest rate applicable for ERMS participants and not only once money market rates exceed the deposit facility rate (currently -0.5% per year).

Interest of large corporations in secured money market transactions

Market participants without any central bank access – such as large corporations – may make similar considerations. For them, however, it is not the conditions of the central bank that are relevant, but those of commercial banks. As deposit guarantees, depending on the applicable rules of the respective compensation scheme, do not apply to large deposits to an unlimited extent, risk considerations may also make investment in money market instruments appear advantageous even where the interest rate is lower than the conditions applicable to commercial banks. For the secure short-term investment of euro liquidity, these market participants may therefore potentially be prepared to accept rates lower than the deposit rate. This also applies in particular to investments in the secured money market, where it is fundamentally possible to invest even larger euro amounts very safely.

Reduced incentives for money market transactions between market participants with central bank access in the low-interest-rate environment …

Until the deposit facility rate was lowered to 0% in July 2012, different interest rate conditions applied to the deposit facility, which is only available to banks, and credit balances in current accounts at the central bank. For the most part, no interest was paid on credit balances in current accounts at the central bank. Non-banks with current accounts at the central bank therefore had an incentive to invest liquid funds in the money market even at positive rates lower than the deposit facility rate. As central bank accounts, including those held by the public sector in particular, have been remunerated at the deposit facility rate since July 2012, there is, from an earnings and risk perspective, now virtually no interest rate advantage for public sector central bank account holders to deposit liquid funds at commercial banks rather than the central bank. However, participants that do not have current accounts with the central bank may continue to have incentives to trade.[14]

… in combination with high levels of excess liquidity …

Alongside the interest rate conditions set by the central bank, excess liquidity in the banking system – i.e. the amount of central bank reserves in excess of the banking system's reserve requirement – also affects market participants' incentives to trade. A notable amount of excess liquidity can, on the one hand, be caused by demand from commercial banks if they request, and are allocated, more liquidity in the Eurosystem's refinancing operations on aggregate than is needed to meet the reserve requirement. This is particularly the case with the policy of full allotment for refinancing operations that has been employed by the Eurosystem since autumn 2008. On the other hand, excess liquidity may be generated independ-

12 Furthermore, euro credit balances can be placed in the money market for a small fee. See https://www.ecb.europa.eu/paym/erms/html/index.en.html
13 This interest rate applies to credit balances above an exemption limit, which is intended to ensure that Eurosystem central banks do not compete against commercial banks through the ERMS.
14 For more information in this regard and on the heterogeneity of interest rate conditions in the unsecured money market in general, see also the analyses in Abbassi et al. (2020).

ently of demand through asset purchases by the central bank. The more reserves that market participants – particularly banks, but increasingly also public sector entities and foreign central banks – hold, or are required to hold, with the central bank on aggregate, the lower their incentive is to proactively obtain additional funds on the money market. In particular, money market turnover – including secured money market transactions within the scope of liquidity management – between banks that hold substantial amounts of excess liquidity falls away.

… can cause interest rates in the money market to drop below the deposit facility rate

The various incentives for activity on the money market have two significant implications for the interest rates at which money market trading takes place. First, an increase in excess liquidity ensures a reduction in money market rates since the money supply grows and demand falls. Second, market activity shifts towards transactions for which incentives to trade still exist under certain interest rate conditions and in light of the excess liquidity. Most of these are transactions where the lender has no central bank access and is seeking an investment opportunity for euro balances, while the borrower has access to central bank funds and is compensated for borrowing additional liquidity by receiving an interest rate below the deposit facility rate. Thus, the deposit facility rate does not constitute a general lower bound for the interest rate conditions of liquidity-driven money market transactions.

Interest rate conditions on the secured money market are also determined by the supply of and demand for securities

In addition to the interest rates for deposits held at the central bank and the quantity of excess liquidity, the relative scarcity of securities used as collateral is significant for the interest rate conditions for secured money market transactions. Interest rate conditions in the secured money market are sometimes noticeably affected by shifts in the holder structure of the securities, such as those linked to the Eurosystem's monetary policy asset purchase programmes. A shortage of these securities can arise if securities purchasers do not lend their holdings on the repo market. This can cause the corresponding repo rates to be significantly below the deposit facility rate at times, too.[15] In order to limit potential scarcity-induced constraints on the functionality of repo and bond markets resulting from the Eurosystem's asset purchase programmes, the Eurosystem offers the bonds it has purchased to be borrowed against eligible collateral – including cash collateral.

Regulatory changes have a further impact on money market activity

In addition to the framework conditions set out by monetary policy, changes to the regulatory framework for credit institutions have had an impact on the secured money market over the past few years. The introduction of the leverage ratio (LR), the liquidity coverage ratio (LCR) and the buffer for global systemically important institutions (G-SII buffer) have proved particularly significant in this context.[16] These factors will not be discussed in further detail here since they have less of a bearing on the longer-term development of short-term interest rate conditions on the secured money market considered in this article.[17]

Development of secured money market rates from a monetary policy perspective

Interest rate spreads between aggregate money market rates also a result of measurement concepts

Over the past few years, activity on the secured money market has been influenced in a variety of ways by changed framework conditions and incentives. To external observers, market developments are visible in the form of aggregate secured money market rates that are each based on specific measurement concepts. Aggregate money market rates are often con-

15 At the same time, a purchase programme can also lead to rising demand for certain securities in the repo market if traders increasingly cover their delivery obligations for bonds via the repo market. See Infante and Huh (2021).
16 See Capital Requirements Regulation (CRR, Regulation (EU) No 575/2013), Capital Requirements Directive (CRD, Directive (EU) No 36/2013) and LCR delegated regulation (Commission Delegated Regulation (EU) No 2015/61).
17 Relevant information can be found, for example, in Committee on the Global Financial System (2017), Kotidis and van Horen (2018), Munyan (2015) and Ranaldo et al. (2019).

ceived as volume-weighted means of interest rates on transactions with specific maturities. These can include, for example, all transactions of a trading venue that feature a certain type of collateral. Furthermore, the measurement concepts can be based on the sectoral affiliation or domicile of the counterparties. Differences in shares of GC and SC transactions or of transactions with market participants with no access to the central bank can influence the result of the measurement to the same degree as differences in control over the received collateral or in the quality of the collateral. These aspects can often explain interest rate spreads between different aggregate secured money market rates.

RepoFunds Rate measures interest rate conditions of repo transactions with government bonds

The RepoFunds Rate is the volume-weighted mean of one-day secured money market transactions concluded on the electronic trading platforms BrokerTec[18] and MTS.[19] A significant proportion of electronic trading with European government bonds – including centrally cleared repo transactions – takes place on these trading platforms. The RepoFunds Rate incorporates GC and filtered SC transactions. For the RepoFunds Rate, the 25% of SC transactions that deviate the most from the volume-weighted mean interest rate are removed in an iterative process to prevent outliers from distorting the result to an overly strong degree. The maturity of the transactions is one business day, although the transactions can be settled up to two business days after they have been concluded.[20] Alongside euro area banks, market participants also include non-banks and banks domiciled outside the euro area that have no access to the deposit facility or Eurosystem current accounts. The RepoFunds Rate is calculated and published for government bonds of different Member States of the euro area. In addition, a European RepoFunds Rate is calculated that does not distinguish between issuers of government bonds. In the next section of this article, we will focus on the German RepoFunds Rate, i.e. the variant of the RepoFunds Rate that covers repo transactions with a basket of German government bonds.[21]

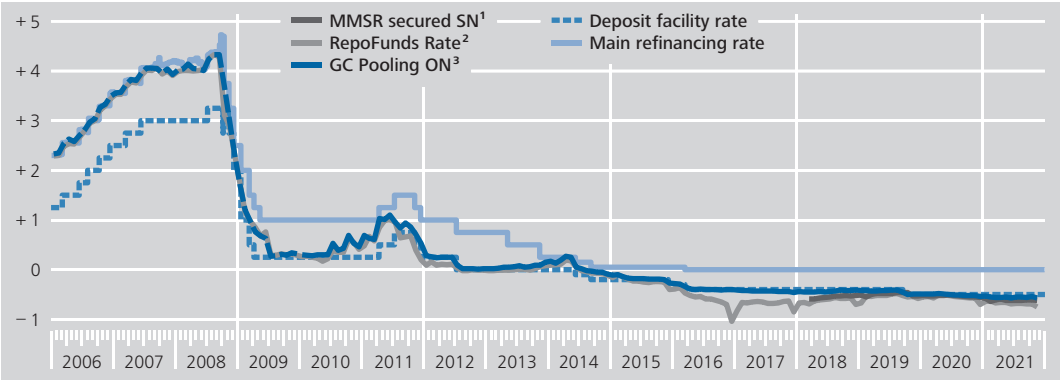
GC Pooling ON measures interest rate conditions for liquidity-driven secured money market loans

The secured money market rate STOXX GC Pooling EUR ON (hereinafter referred to as GC Pooling ON), which is based on overnight transactions concluded on the trading platform Eurex GC Pooling, is a second key interest rate metric for secured money market transactions.[22] Any securities in a collateral basket – i.e. a list of eligible securities – can be submitted as collateral for a participant's net money liability to the trading platform.[23] In contrast to the transactions on BrokerTec and MTS incorporated into the RepoFunds Rate, the securities posted as collateral are not actually transferred to the (economic) lender.[24,25] Strictly speaking, GC Pooling ON is thus not the rate of a real repo transaction, but a platform-specific interest rate for secured overnight credit. GC Pooling ON is calculated as a volume-weighted mean of all transactions for a given trading day with no adjustment for outliers. While turnover

18 BrokerTec is a trading platform operated by CME Amsterdam B. V. belonging to the US stock exchange group CME Group (CME – Chicago Mercantile Exchange).
19 MTS (originally standing for "Mercato generale di titoli di Stato", which roughly translates as "General market for government bonds") is a trading platform that is majority-owned by the stock exchange group Euronext N. V. with headquarters in Amsterdam.
20 Overnight (ON) transactions are settled on the day the transaction is concluded – tomorrow/next (TN) and spot/next (SN) transactions one day or two days after the transaction is concluded respectively – and each run until the following business day. The largest trading volume of SC transactions can usually be found in the SN segment, as a settlement period of two business days is also typical in the spot market for securities. If a repo transaction is concluded to fulfil the delivery obligation arising from a spot transaction in securities trading, both transactions are often concluded on the same day.
21 The basket covers fixed, variable-interest or inflation-linked German government bonds of any maturity that are dominated in euro.
22 The STOXX GC Pooling EUR ON index is available from 2010. For the preceding period, market activity on Eurex GC Pooling is depicted based on all ON transactions in the GC Pooling ECB Basket, for which a volume-weighted average interest rate is calculated, similar to the method used for the STOXX GC Pooling index.
23 In the case of GC Pooling ON used here, this is a portion of the collateral accepted by the Eurosystem for refinancing operations with a minimum rating of A-, referred to as the ECB basket.
24 From a legal perspective, Eurex Clearing AG is the contracting party in the case of GC Pooling ON; the economic counterparties on the other side of a transaction remain partly anonymous.
25 Therefore, it is precisely these securities – which, taken in isolation, are not scarce – that are likely to be submitted as collateral to GC Pooling in most cases.

Key interest rates and secured money market rates

% p.a.



Sources: Bloomberg, Eurex Repo GmbH, Qontigo, and Bundesbank calculations. **1** Volume-weighted quarterly average interest rate of secured money market transactions with spot/next maturity as captured in the Eurosystem's money market statistical reporting. **2** Repo transactions on BrokerTec or MTS with German government bonds as collateral. **3** Up to 2010: volume-weighted average of overnight transactions on Eurex GC Pooling in the ECB basket; from 2010: STOXX GC Pooling EUR ON index.

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has tended to decline in recent years, the number of GC Pooling participants has increased significantly over time, with non-banks – or market participants without access to Eurosystem central banks – also joining.

Factors influencing the interest rate spread between the RepoFunds Rate and GC Pooling ON

Usually, GC Pooling ON is slightly above the RepoFunds Rate (see the chart above). Since SC transactions are also included in the RepoFunds Rate, repos involving securities for which there is high demand – as measured by the available supply – are sometimes included. For example, this can be the case if market participants increasingly enter into short positions for a specific security and use a repo to cover the delivery obligation arising from the short sale. Likewise, increased demand can regularly occur at the maturity of interest rate futures if market participants have a larger amount of delivery obligations for certain bonds.[26] Greater demand for certain securities on the repo market can – if the supply is not fully elastic – lead to lower interest rates for repos collateralised by these securities than for transactions for which the security used as collateral is not scarce. Although a large share of transactions – the 25% with interest rates that deviate the most from the centre of market activity – is not included in the calculation of the RepoFunds Rate, this procedure is not necessarily designed to determine a representative interest rate for secured money market trading. Instead, it depicts conditions in the repo market secured by government bonds, which, depending on market conditions and market activity, can also reflect the scarcity of sought-after securities. Against this backdrop, an interest spread between the RepoFunds Rate and GC Pooling ON can reflect conceptual differences between both market segments, selection effects regarding the securities traded in those segments, as well as the framework conditions set out by monetary policy.

Episodes with significant interest rate spreads, particularly in 2008, 2011-12, and from 2015

Over the past 15 years, the RepoFunds Rate and GC Pooling ON have essentially followed the path of key interest rates (see the chart above). At times when liquidity conditions were balanced – e.g. up to October 2008 – these money market rates were close to the main refinancing rate. Since then, the interest rate spread between the secured money market rates and the relevant key interest rates (main refinancing and deposit facility rate, in particular) has regularly been influenced to a large extent by the excess liquidity in the banking system. Secured money market rates dropped to-

26 This refers to the "cheapest-to-deliver" bond, i.e. the bond that costs the least to deliver to cover a future short position. These bonds are often required for basis arbitrage transactions in which market participants take advantage of price differences between a bond and the associated future.

wards the deposit facility rate as the amount of excess liquidity grew – comparable with other short-term money market rates. However, individual episodes caused the secured money market rates to deviate from one another (see the upper adjacent chart). Although these deviations in 2008 and 2011 remained relatively limited in terms of duration and scale, more significant and persistent interest rate spreads between the two secured money market rates were observed from 2015.

Interest rate spreads in 2008 and 2011-12 caused indirectly by financial and sovereign debt crisis

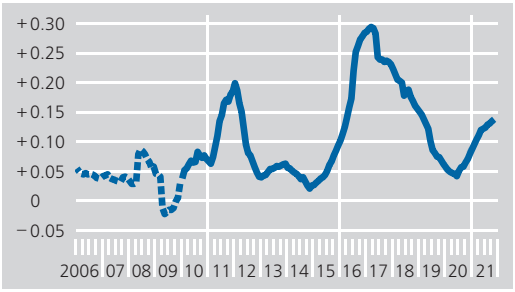
In October 2008, the RepoFunds Rate fell significantly below the deposit facility rate for a number of days, while GC Pooling ON remained within the interest rate corridor (see the lower adjacent chart). This was followed by another similar episode in 2011-12 (see the chart on p. 24). In this case, the interest rate spread between the deposit facility rate was mostly narrower than in 2008, but this phase lasted almost a year – thus considerably longer. Both of these periods lie within phases of crisis characterised by elevated counterparty risk in the banking and financial sector.[27] Such risks do not usually play an important role in the interest rates on secured money market transactions due to the collateral available and given their short maturities. Furthermore, wider interest rate spreads were often brought about by sharp falls in the RepoFunds Rate, whereas increased levels of counterparty risk are usually associated with a rise in money market rates. There is thus reason to believe that other factors were the main drivers behind the development of the interest rate spread between GC Pooling ON and the (German) RepoFunds Rate.

Increased demand for securities as a result of short positions?

In times of crisis, various factors can come together to potentially result in secured money market rates declining to a greater extent. This includes, in particular, increased demand for securities by market participants who, on account of elevated risks, shift their investments from the unsecured to the secured segment of the money market or into transactions involving securities with the highest credit quality. Furthermore, in a crisis situation, market

Interest rate spread between GC Pooling ON and the German RepoFunds Rate*

Percentage points, 11-month moving average



Sources: Bloomberg, Eurex Repo GmbH, Qontigo, and Bundesbank calculations. * Difference between GC Pooling ON (up to 2010: volume-weighted average of overnight transactions on Eurex GC Pooling in the ECB basket; from 2010: STOXX GC Pooling EUR ON index) and the German RepoFunds Rate (repo transactions on BrokerTec or MTS with German government bonds as collateral).

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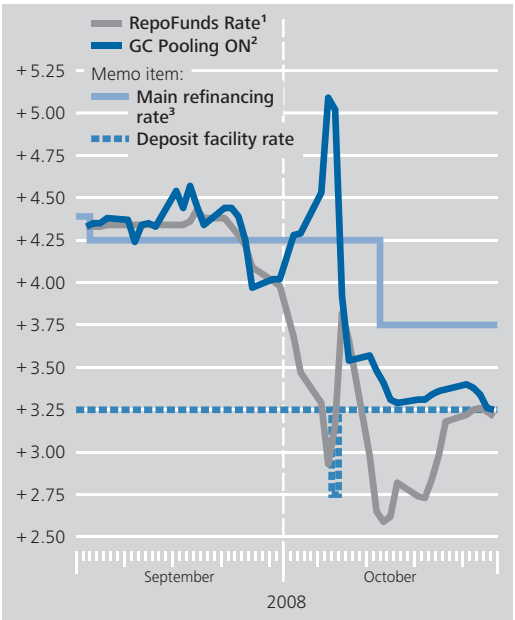
Secured money market rates during the financial crisis of 2008

% p.a., daily data



Sources: Bloomberg, Eurex Repo GmbH, and Bundesbank calculations. **1** Repo transactions on BrokerTec or MTS with German government bonds as collateral. **2** Volume-weighted average of overnight transactions on Eurex GC Pooling in the ECB basket. **3** Minimum bid rate for main financing operations until 14 October 2008.

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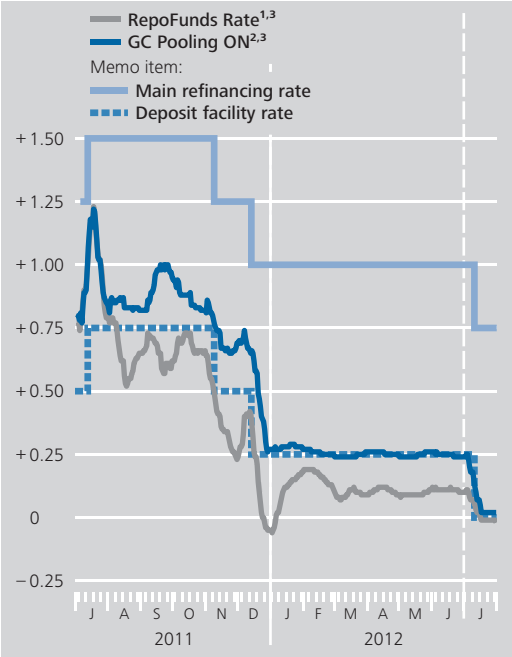
27 Counterparty risk is often measured using the three-month EURIBOR-OIS spread where a three-month interest rate for a credit operation with credit risk built in is compared with a three-month interest rate swap with considerably reduced counterparty risk. This measurement exhibited elevated levels in both 2008 and 2011. See Eisenschmidt et al. (2018).

Secured money market rates during the sovereign debt crisis 2011-12

% p.a., daily data



Sources: Bloomberg, Qontigo, and Bundesbank calculations. **1** Repo transactions on BrokerTec or MTS with German government bonds as collateral. **2** STOXX GC Pooling EUR ON index. **3** 13-day moving average.

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participants may strive to hedge themselves against falling securities prices. Building up uncovered short positions is one way of doing this. To this end, market participants usually borrow and sell securities in the repo market in order to buy them back at a later date at a cheaper price and reverse the repo transaction.[28] Market participants can make profits in this way if securities prices fall.[29]

Short positions not identifiable as the cause of sharp falls in the RepoFunds Rate

Data on short positions are not available for all potential market participants, meaning that it is not possible to carry out a full empirical review of this hypothesis. The volume of uncovered short sales can be derived using securities holdings statistics only for German banks. This reveals a considerable increase in short sales of German government bonds in 2010 and 2011, but these positions are also reduced again when repo rates fall – or when costs for holding short positions rise (see the chart on p. 25). The volume of uncovered short positions declined strongly in autumn 2008, too, when the (German) RepoFunds Rate hovered below the deposit facility rate. Therefore, the decline in the RepoFunds Rate during these phases is not likely to have been brought about by the rising volumes of uncovered short positions.[30]

Crisis-related increased liquidity supply as possible factor behind sharply falling RepoFunds Rate

Furthermore, a rise in counterparty risk in the banking sector ensures that investments in the unsecured money market become less attractive for risk-averse actors, in particular. They may favour investments in the repo market, which results in downward pressure on secured money market rates on account of the increased liquidity supply. This applies, above all, if transactions by actors without central bank access are significant for the money market rate.[31] The sharp downward movements in the GC rate for German government bonds traded on BrokerTec observed in both 2008 and 2011 are consistent with such a flight to safe-haven investments.[32] Since, for GC transactions on BrokerTec, as is the case for Eurex GC Pooling, the focus is usually on obtaining or investing liquidity, the rapid decline in interest rate conditions for GC transactions is indicative of an increased liquidity supply during these periods. This increased liquidity supply is likely to have stemmed, in particular, from market participants without central bank access, who, on account of the crisis, sought safe short-term financial investments.

28 Arbitrage on the pricing relationship between bonds and bond futures, for example, can cause similar shifts in supply and demand in the repo market. See Barth and Kahn (2020).
29 In the case of government bonds, short selling may potentially be attractive during crises particularly if there is an increase in government bond prices that is not caused by a general shift to safe-haven investments.
30 The securities holdings statistics data cannot provide comprehensive evidence since they are only available once per quarter for this period, cover only a small part of the total market, and only include uncovered short sales.
31 See European Central Bank (2012). A flight to safe-haven investments can have a similar effect if actors increasingly invest their liquidity in safe bonds or rebalance their portfolios towards these bonds and subsequently do not or only partially offer these in the repo market. The collateral supply available in the repo market falls, which, above all, can trigger downward pressure on those repo rates that include SC transactions.
32 See Ranaldo et al. (2019).

Differing composition of market participants requires differentiated response of money market rates, since …

The fact that the RepoFunds Rate fell more sharply than GC Pooling ON, which even rose in part in October 2008, is likely to be attributable to the differing composition of market participants. At that time, Eurex GC Pooling was used primarily by banks, which, especially in 2008, mostly wanted to obtain additional liquidity. The RepoFunds Rate, however, is likely to have included considerably more transactions involving market participants without central bank access, for whom safe liquidity investments may also be attractive if interest rates are below the deposit facility rate. Correspondingly, in cases of sharp rises in excess liquidity, the RepoFunds Rate is also likely to have fallen to a greater extent than GC Pooling ON because market activity saw a larger shift towards transactions between market participants with central bank access and those without central bank access.

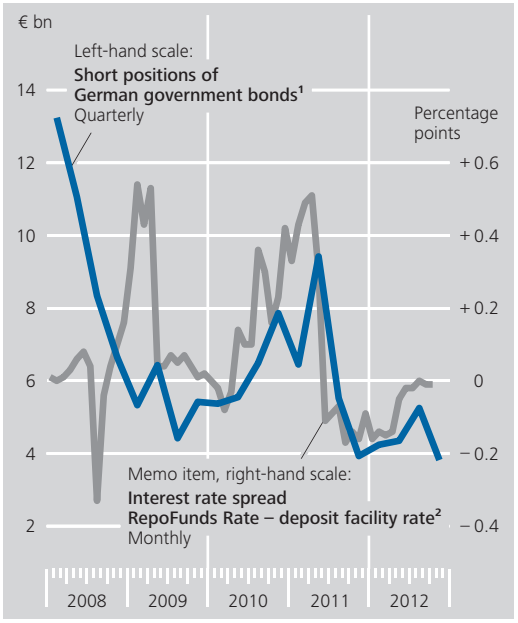
… market participants' money market activity depends on alternative investment options

The interaction between excess liquidity, interest rate conditions in the money market and the composition of money market participants can be illustrated for a later period of time using the central bank's balance sheet. Different interest rate conditions apply to government deposits and deposits of non-euro area residents (particularly foreign central banks) at the central bank. Government deposits had regularly been remunerated at the deposit facility rate since it became negative in 2014.[33] By contrast, for the deposits of non-euro area residents, the conditions of the ERMS apply. In this case, deposits above a customer-specific threshold are remunerated at an interest rate below the deposit facility rate (or can be invested in the money market for a small fee).

For public sector money market actors, the central bank's interest rate conditions are a crucial factor for money market activity

General government and foreign central banks used their central bank account in correspondingly different ways when the interest rates in the secured money market began to fall below the deposit facility rate in 2015. Government deposits already rose when the RepoFunds Rate stood below the deposit facility rate (see the chart on p. 26). From this point onwards, general government therefore increasingly chose the more favourable investment on its central bank account rather than investing its money at less favourable conditions in the money market. However, deposits stemming from non-euro area residents only began to increase at an accelerated pace during the course of 2016, when the RepoFunds Rate lowered the relevant credit balance remuneration below the deposit facility rate, and thus deposits at the central bank became more favourable than investments in the secured money market. In the same vein, deposits also declined again

Uncovered short positions during the financial and sovereign debt crisis



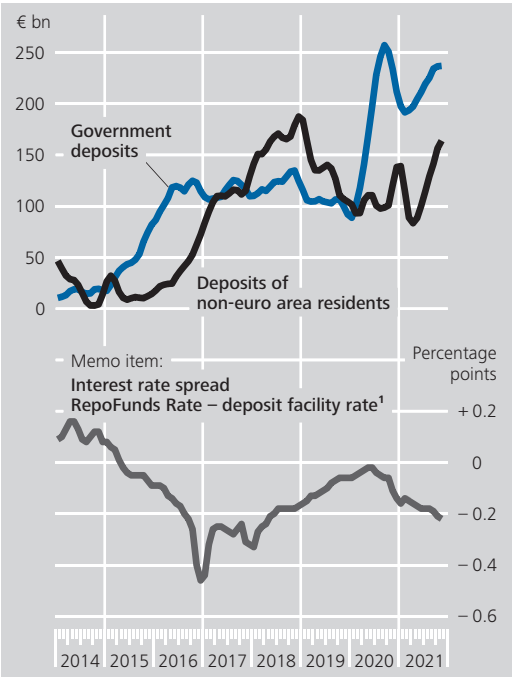
1 German banks' volume of uncovered short positions in German government bonds based on securities holdings statistics. **2** Difference between the German RepoFunds Rate (repo transactions on BrokerTec or MTS with German government bonds as collateral; source: Bloomberg) and the deposit facility rate.

Deutsche Bundesbank

33 The deposit facility rate applies to government deposits above a threshold that corresponds to the higher amount of €200 million or 0.04% of national gross domestic product. When the interest rate on the deposit facility was positive, government deposits above the threshold were remunerated at 0%. Since the euro overnight index average rate (EONIA) was replaced by the euro short-term rate (€STR) as the unsecured reference rate on 3 January 2022, these deposits have been remunerated at €STR, provided it is below the deposit facility rate. See Guideline (EU) 2019/671 of the European Central Bank of 9 April 2019 on domestic asset and liability management operations by the national central banks (recast) (ECB/2019/7).

Credit balance of non-monetary policy counterparties at the Bundesbank

Three-month moving averages



1 Difference between the German RepoFunds Rate (repo transactions on BrokerTec or MTS with German government bonds as collateral; source: Bloomberg) and the deposit facility rate.

Deutsche Bundesbank

when the RepoFunds Rate stood above this threshold once more in 2019.

From 2015 onwards, persistent interest rate spreads that were not brought about by a crisis

The episode beginning in 2015 that saw money market rates deviate markedly from the deposit facility rate coincided with a period in which strains on the banking system were not as pronounced as they had been in the preceding years. Counterparty risk played a smaller role and there was virtually no crisis-related demand for securities or short selling. Even so, during this episode, both the RepoFunds Rate and GC Pooling ON were observed to deviate persistently from the deposit facility rate over a long period of time (see the chart on p. 27). Both interest rates left the interest rate corridor, moving downwards. In this context, not only does the fact that the secured rates left the interest rate corridor require explanation, but so does the magnitude of the interest rate spread between these rates and the deposit facility rate. For the German RepoFunds Rate, the spread stood at around 29 basis points on average for 2017, while GC Pooling ON was just around 3 basis points below the deposit facility rate. Since 2021, too, interest rate spreads – considerable spreads in some cases – between these two rates and the deposit facility rate have been observed once more.

Monetary policy asset purchase programmes reduce collateral supply in the repo market

The persistent significant deviations of the RepoFunds Rate from the deposit facility rate are largely attributable to the Eurosystem's government bond purchases since 2015, which amounted to almost €500 billion in 2015 alone.[34] The bonds acquired by the Eurosystem were no longer directly available to market participants as collateral for repo transactions. This resulted in the ongoing purchases reducing the supply of bonds in the repo market. As a consequence, it became more expensive for market participants to obtain certain securities in the repo market.[35] This effect has since been amplified by the purchases being limited to bonds with yields above the deposit facility rate. In doing so, the Eurosystem focused its purchases, in part, on bonds with longer residual maturities, which were observed to generally exhibit lower repo rates as a result. Subsequently, the (German) RepoFunds Rate saw a considerable decline. The interest rate spread between the RepoFunds Rate and GC Pooling ON, which is fairly large at times, should therefore also be interpreted as an indicator of the relative scarcity of the bonds usable as collateral. Government bonds of other euro area Member States were less severely impacted by these effects, probably also owing to lower demand in the repo market relative to outstanding volume. The clearly declining repo rates impacted German banks as well. These effects are described in more detail in the box on p. 29.

34 By contrast, significant movements in the secured money market rates at year-end are more likely to be attributable to regulatory factors.

35 See Arrata et al. (2020) and Jank and Mönch (2018). Similar developments already occurred during the securities markets programme (SMP) in the context of the sovereign debt crisis (see Corradin and Maddaloni (2020)), when the Eurosystem did not offer any securities for lending, and during the asset purchase programmes in the United States (see D'Amico et al. (2015)).

Expanded securities lending led to decline in interest rate spreads for secured money market rates

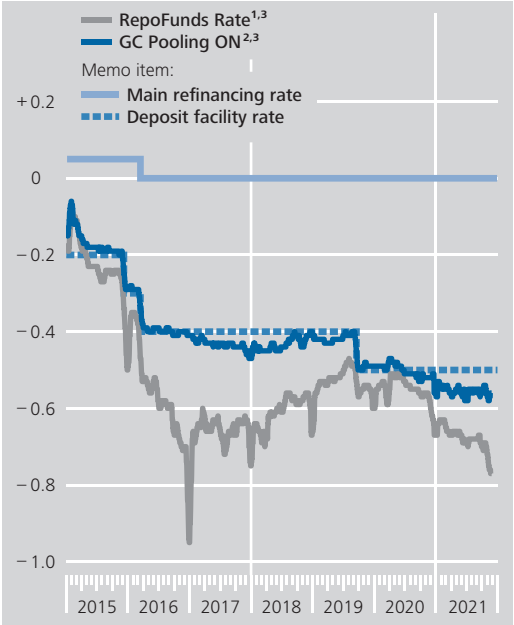
Towards the end of 2016, the interest rate spread between the RepoFunds Rate and the deposit facility rate reached its greatest extent. Changed conditions for purchase programmes and securities lending by the Eurosystem ultimately caused the interest rate spread to gradually narrow: from January 2017 on, the Eurosystem also acquired shorter-term government bonds with yields below the deposit facility rate. Consequently, the purchases were able to be distributed across a broader spectrum of maturities. In addition, the Eurosystem also accepted cash collateral for securities lending, within certain limits, as of December 2016.[36] On the one hand, this made securities lending more easily accessible, as a comparable security no longer needed to be provided as collateral in order to borrow a certain security. On the other hand, owing to the acceptance of cash collateral, the volume of scarce securities available to the market overall was expanded. As a consequence, increasing use was made of the Eurosystem's securities lending and the scarcity premiums in the repo market declined (see the chart on p. 28).[37] With the increase in asset purchases by the Eurosystem from March 2020 onwards, both the scarcity premiums and the use of securities lending picked up again. Following a change in the price conditions of securities lending in November 2020, the volumes can only be compared with earlier values to a limited extent.[38]

Decline in GC Pooling ON below deposit facility rate in line with interest rate developments for liquidity-driven money market transactions

GC Pooling ON also stood below the deposit facility rate between 2017 and 2019 and from 2020 onwards, but with a considerably narrower spread than the RepoFunds Rate. In the case of Eurex GC Pooling, the collateral is no longer usable for the collateral taker.[39] In addition, a significantly wider range of collateral – potentially with lower credit quality, too – can be used than for transactions included in the German RepoFunds Rate. A mere decrease in the holdings of German government bonds available to the repo market is therefore not a decisive factor behind the decline in GC Pooling ON below the deposit facility rate. One explanation is, however, provided by the very high excess liquidity in the banking system arising from various monetary policy measures and the associated lower demand for liquidity in the face of increased supply in the money market. As interbank transactions were barely

Secured money market rates during the Eurosystem's government bond purchases

% p.a., daily data



Sources: Bloomberg, Qontigo, and Bundesbank calculations. **1** Repo transactions on BrokerTec or MTS with German government bonds as collateral. **2** STOXX GC Pooling EUR ON index. **3** 13-day moving average.

Deutsche Bundesbank

36 From September 2016 on, bilateral lending transactions against securities collateral were possible as well. Previously, the Bundesbank used only Clearstream Banking Luxembourg (CBL) platforms for securities lending: it has used Automated Securities Lending (ASL), which ensures that borrowers' trades do not fail, since April 2015, and ASLplus, where securities can be borrowed for purposes other than just avoiding settlement failures, since October 2015. The Bundesbank has also settled securities lending via the Eurex Repo trading platform since December 2020.
37 See also Jank and Mönch (2018).
38 The Eurosystem central banks are geared towards pricing that ensures that the Eurosystem's securities lending facilities serve as an effective backstop, i.e. they should support bond and repo market liquidity without excessively influencing usual market activity. The minimum fee for lending transactions against cash collateral was lowered in November 2020 from 30 basis points to 20 basis points below the deposit facility rate. The minimum interest rate spread for repo transactions against securities collateral was reduced from 10 basis points to 5 basis points. This caused the volume of borrowed securities to rise.
39 Except for the collateralisation of open market operations with the Bundesbank and within Eurex Repo.

The Bundesbank's bilateral securities lending to credit institutions from the euro area

Three-month moving averages

1 "Other liabilities to euro area credit institutions denominated in euro": Balance sheet item that primarily comprises the volume of securities acquired under the asset purchase programmes and lent to credit institutions in the euro area as part of the Bundesbank's bilateral securities lending. **2** Difference between the German RepoFunds Rate (repo transactions on BrokerTec or MTS with German government bonds as collateral; source: Bloomberg) and the deposit facility rate.

Deutsche Bundesbank

needed any longer for short-term redistributions of liquidity, liquidity-driven money market transactions were primarily concluded by banks as liquidity takers and non-banks as liquidity providers. As many non-banks do not have any access to central bank accounts, interest rates in the unsecured money market also trade below the deposit facility rate, such as the overnight interest rate €STR, which is based on data from the money market statistics.[40] The moderate decline in GC Pooling ON below the deposit facility rate should therefore be seen as consistent with the general development of interest rate conditions for liquidity-driven transactions in the money market.

Summary and discussion

Considerable and persistent interest rate spreads between aggregate money market rates can materialise as a result of monetary policy framework conditions for the money market, but also due to determinants outside of monetary policy. Over the past few years, this has held especially true for the secured money market, as, alongside the composition of market participants and the supply of and demand for liquidity, securities-related effects can also play a role. The Eurosystem has exerted considerable influence on the availability of liquidity and securities through the high excess liquidity and its monetary policy asset purchase programmes (including the corresponding securities lending). Against this backdrop, setting the conditions for the monetary policy and non-monetary policy counterparties of the national central banks is a key determinant of the remuneration of secured money market transactions. Secured money market transactions are affected unevenly by these changes, depending on the choice of security, alternative investment options for counterparties, and trading venue. At times, secured money market rates that differ on account of these aspects thus also provide vastly different measurement results for the interest rate conditions in the secured money market.

This means that changes in certain interest rate spreads often do not reflect changes in the monetary policy stance. They can, however, be triggered indirectly by monetary policy, for example if asset purchases reduce the availability of securities for the repo market. Such indirect effects can, however, be limited by adjustments in the implementation of monetary policy, such as through securities lending. For this reason, an understanding of the conditions in the money market as a whole can only be obtained by looking at different money market rates simultaneously, taking into account the respective monetary policy context.

40 See also Deutsche Bundesbank (2020). The €STR has been published officially since October 2019. The Bundesbank has published data on earlier rates (pre-€STR) from March 2017 onwards, see https://www.bundesbank.de/de/statistiken/geld-und-kapitalmaerkte/zinssaetze-und-renditen/pre-str-daten-785158

The impact of collateral scarcity on bank lending

Interest rates on secured money market transactions with German government bonds have fallen significantly since 2015, and this has had two direct effects. For market participants looking to invest in these government bonds, it has become more expensive to borrow the securities in the secured money market. The holders of these government bonds, meanwhile, have been able to obtain funding in the secured money market at lower costs if they use the bonds as collateral. This box explains how these lower funding costs have impacted German banks and their lending.[1]

Since banks hold different bonds in their portfolios, the change in interest rates in the secured money market has not affected them all in the same way. This is because, as revealed by analyses of a dataset that merges money market statistics with securities holdings statistics, banks often use their existing bond portfolios as collateral when raising capital. At the same time, banks respond to changes in secured money market rates by borrowing more against collateral that allows them to do so at particularly low interest rates. The combined effect is that, depending on their securities portfolios, banks are affected differently by scarcity-induced interest rate fluctuations in the secured money market, which is likely to cause banks' funding costs to diverge.

In fact, data from the money market statistics can be used to show that banks holding relatively scarce bonds on their balance sheet have lower funding costs in the secured money market. At the same time, there is an increase in those banks' profits from secured money market transactions.

Assuming that these banks pass on the reduced funding costs to their customers in the form of lower lending rates, it is generally conceivable that they will also expand their lending. Using the Bundesbank's balance sheet statistics, it can be shown that a decline in the funding costs for a bank's securities portfolio does indeed lead to stronger credit growth, all other things being equal. The fact that this phenomenon is observable only for banks that were active in the secured repo market supports the hypothesis that the reduced funding costs probably did prompt the stronger credit growth.

This finding can also be obtained on the basis of data from the Bundesbank's credit register for loans of €1 million or more, in which credit growth can be traced at the individual borrower level. By comparing credit growth of the same borrower at banks with different levels of funding costs, one can rule out the possibility that the effect on credit growth is being driven by stronger credit demand.[2]

In addition, the Bundesbank's interest rate statistics also offer further insight into the transmission channel. The lending rates that a bank charges for short-term loans to enterprises correlate significantly with the funding costs of its securities portfolio, with the result that lower interest rates in the secured money market were accompanied by lower lending rates for short-term loans to enterprises at those banks that had holdings of scarce bonds. The lower lending rates, in turn, led to stronger growth in short-term loans to enterprises at banks that saw the funding costs for their securities portfolios decline.

Overall, the findings show that collateral scarcity in the repo market had an expansionary impact on credit growth at banks with holdings of these securities.

1 See Tischer (2021).
2 See Khwaja and Mian (2008). If the credit growth were triggered by increased demand, a given borrower's credit growth would not be expected to differ systematically from one lender to the next because demand affects all lenders in equal measure. In that case, it would no longer be possible to identify any effect of funding costs on credit growth.

On the basis of the European treaties, the Eurosystem acts in accordance with market economy principles. It is therefore fundamentally not the task of the Eurosystem, alongside managing the general interest rate level, to also purposefully influence price formation in individual financial market segments. If interest rate spreads widen in the financial markets, then this is in principle welcome and an expression of functioning markets. In this context, the Eurosystem's securities lending does not have the function of managing interest rate conditions in the repo market, but instead merely mitigates the undesirable consequences of monetary policy asset purchase programmes for the repo market.

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