

NORGES BANK PAPERS

Norges Bank's liquidity policy:
principles and design

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1. Norges Bank's liquidity policy

1.1 Background

In many countries, including Norway, the central bank's mission is to maintain low and stable inflation. The policy rate is the main instrument used to attain this objective. The central bank's policy rate decisions must be implemented to ensure that the policy rate passes through as intended to other interest rates in the economy. The central bank achieves this by setting the terms for banks' loans and deposits in the central bank and by controlling the quantity of central bank reserves in the banking system. How the central bank maintains control of central bank reserves and sets the terms and conditions for banks' loans and deposits is referred to as the *liquidity management system*. In addition to ensuring the effective implementation of monetary policy, the aim of liquidity policy is to promote an efficient payment system and financial stability. Liquidity policy plays an important role in times of financial stress in that the central bank can inject liquidity into the banking system or provide loans to individual banks on special terms. The central bank can offer liquidity insurance to banks and be lender of last resort.

This paper discusses principles for Norges Bank's liquidity policy. Such a discussion requires formulating what the primary objectives of liquidity policy should be, how the Bank's market operations should be conducted, which agents should have access to Norges Bank's lending and deposit facilities (account terms and conditions for counterparties), which instruments should be used and which securities should be considered eligible as collateral for loans from Norges Bank.

There are several reasons why an overall review of the Bank's liquidity policy should be conducted now. Norges Bank's current quota system for managing liquidity in the banking system has been in operation since 2011. The quota system has been evaluated previously (Norges Bank, 2014), but whether this system is still preferable should be regularly assessed. Furthermore, a new central bank act and a new lending regulation regulating the terms and conditions for holding an account at Norges Bank and access to central banking facilities entered into force on 1 January 2020. The new central bank act specifies that holding accounts with Norges Bank and access to Norges Bank's facilities should further the purpose of central banking activities.¹ Since the entry into force of the central bank act and the new lending regulation, Norges Bank has received a number of applications from new agents to hold accounts with Norges Bank. These applications are assessed based on whether the agent's account furthers the purpose of central banking activities.

The structure of this paper is as follows: The introduction considers the primary objectives of liquidity policy. Section 2 presents different types of liquidity management systems at central banks, including Norges Bank's quota system. Section 3 presents a discussion of whether the quota system meets the primary objectives of liquidity policy. Section 4 looks at the choice of counterparties and the terms and conditions for holding an account at Norges Bank. The final section, Section 5, summarises and concludes.

¹ The new central bank act and the lending regulation use "central banking activities" in many contexts and not "the central bank" to distinguish between traditional activities (monetary policy, financial stability and payment systems) and the Government Pension Fund Global.

1.2 Primary objectives of liquidity policy

Under the Central Bank Act that entered into force on 1 January 2020, the purpose of central banking activities is to “...*maintain monetary stability and to promote the stability of the financial system and an efficient and secure payment system...*”². Liquidity policy is the composition, design and execution of a set of operational instruments at the disposal of the central bank that are used to achieve these objectives. Norges Bank generally uses the following liquidity policy instruments:

- terms and conditions for deposits and loans
- market operations
- guidelines for pledging collateral for loans
- choice of counterparties
- liquidity support to individual banks

All of these instruments affect access to and the price of *central bank reserves*. Central bank reserves, or simply reserves, are banks' overnight sight deposits held with Norges Bank (also referred to as banking system liquidity).³ Reserves are the only generally accepted ultimate means of interbank settlement. A bank is willing to accept customer deposits from other banks (a liability) because a corresponding amount of central bank reserves (a claim on the central bank) is transferred at the same time to its account. This enables banks' customers to use their deposits as a means of payment to customers of other banks.

However, how liquidity policy should be oriented to best support the central bank's objectives is not self-evident. Formulating more precise policy objectives for liquidity policy is therefore appropriate.

Pass-through to market rates

The objective of monetary policy is to maintain monetary stability by keeping inflation low and stable, contribute to high and stable output and employment and to countering the build-up of financial imbalances.⁴ The most important instrument used to achieve this aim is *the policy rate* and signalling future policy rates. The policy rate is set to steer the general level of interest rates in the economy. Liquidity policy must therefore ensure that there is a high degree of pass-through from Norges Bank's policy rate to money market rates.

In the first part of the transmission mechanism, Norges Bank ensures that the shortest money market rates, particularly the overnight rate, are kept close to the policy rate. The Bank is able to do this because of banks' need for central bank reserves. To conduct interbank settlement using central bank reserves, banks have accounts with Norges Bank and the reserves are deposited or borrowed overnight according to specific rules at a rate decided by Norges

² Cf. Section 1-2, first paragraph of the Central Bank Act <https://www.norges-bank.no/en/topics/about/Mission-core-responsibilities/Legislation/Central-Bank-Act/>

³ The standard definition of “central bank reserves” is banks' unrestricted (sight) overnight deposits at the central bank. Banks can also have time deposits at the central bank, which are F-deposits at Norges Bank, but these are not defined as central bank reserves. However, the wording used in this context varies. Sometimes all deposits, including time deposits, are referred to as central bank reserves. The term “central bank reserves” is also often used to refer to banks' intraday deposits. As long as one is aware of these distinctions, this does not usually create problems.

⁴ Cf. the description of the monetary policy objective in Norges Bank's monetary policy reports.

Bank. This provides the basis for the overnight marginal price of reserves and thus the overnight interbank rate. Expected overnight money market rates provide a basis for longer-term interest rates and are the first step in the implementation of monetary policy.

Efficient payment system

In a well-functioning payment system, payment transactions are carried out swiftly, at low cost and without counterparty risk for the payer and payee. This is crucial to the efficient allocation of financial assets and a high level of confidence in the financial system. Liquidity policy aims to facilitate a secure and efficient payment system.

To ensure efficient settlement between banks and their customers, Norges Bank (like many other central banks) offers an intraday facility, which settlement participants can draw on if necessary. This ensures that settlements are not delayed or disrupted owing to a lack of, or inefficient allocation of, central bank reserves through the day. In recent years, a number of central banks have also started to facilitate instant – or real-time – payments, which ensure payment settlement without counterparty risk, also outside the central bank's ordinary opening hours.⁵

Lender of last resort/Liquidity insurance

One of the central bank's core tasks is to provide liquidity insurance to the financial system, ie to be so-called lender of last resort. The purpose of such liquidity insurance is to reduce the economic costs of severe disruptions in financial services. The central bank's role as lender of last resort is important for safeguarding financial stability.

Banks offer long-term loans to the general public. These long-term loans are partially funded by shorter-term deposits. This maturity transformation facilitates economic activity by giving the general public access to liquidity, but entails at the same time a risk that banks will be unable to refinance maturing debt (liquidity risk). Some of the deposits are covered by liquidity insurance through the deposit guarantee scheme that guarantees deposits up to a certain amount. The scheme reduces the likelihood that many depositors will withdraw their deposits at the same time, which would cause liquidity problems for banks.

In some cases, however, individual banks or the banking system as a whole can nevertheless face liquidity difficulties related to the maturity mismatch between liabilities and assets on the balance sheet. Central bank reserves are the most liquid asset a bank can have. The central bank is therefore uniquely placed to provide liquidity insurance to banks (and other agents with accounts at the central bank). Liquidity is made available by providing reserves in the form of loans against less liquid collateral.

In the Norwegian financial system, banks in particular should be offered liquidity insurance from the central bank. Banks are exposed to considerable liquidity risk, owing to their role in payment and credit intermediation. A severe disruption in banking activities can impose costs on society. Other financial agents can also be faced with liquidity risk, for example central counterparties. In general, agents that are given access to liquidity insurance from the central

⁵ Work on instant payments in Norway, or real-time settlement, is described in Norges Bank (2020).

bank should be exposed to considerable liquidity risk and perform financial services that, if disrupted, would entail substantial economic losses.

Allocation of risk

Today's monetary systems leave the provision of deposit money to deposit-taking banks. Banks create their own funding – bank deposits – when they grant new loans.⁶ The credit supplied by a bank is limited by the risk of a borrower defaulting (credit risk) and of deposits/wholesale funding being moved to another bank (liquidity risk). How much risk a bank can take on is also limited by regulatory liquidity and capital requirements set by the authorities.

Government regulation is to a large extent motivated by the desire to ensure that banks have to adjust their balance sheets to manage substantial risk without receiving liquidity assistance from the central bank or other public authorities. As little risk as possible should be transferred to the central bank in particular or to the government in general. *The central bank's liquidity policy should support this principle, ie contribute to ensuring that the risk is borne by the private banking system.* Liquidity policy should be designed to ensure that banks as far as possible use market-based solutions to manage risk. Risk would then as far as possible be reflected in banks' lending rates and in the rates banks are willing to pay for deposit and wholesale funding. This contributes to an efficient allocation of resources.

In line with such a view, central bank reserves should primarily be a means of interbank settlement and thereby a liquidity management instrument that ensures that the payment system is efficient and the degree of monetary policy pass-through is high. In periods of financial stress, when as a result of central bank measures, central bank reserves may be offered and used to a considerable extent as a store of value, the reserves offered should be priced separately and not be a consequence of the ordinary conduct of liquidity policy. The liquidity management system should therefore be designed to reduce the incentive for banks, and more generally the central bank's counterparties, to use central bank reserves as a store of value. This would prevent banks and other counterparties from transferring risk to the central bank by borrowing reserves against collateral that can only be sold by the central bank at a value that is lower than the value used to secure the loan from the central bank. In line with this, the terms of the accounts granted to the Bank's counterparties should be oriented to reduce the incentive for counterparties to hold substantial deposits at the central bank. Norges Bank's counterparties are discussed in more detail in Section 4.

To sum up, this gives us four primary liquidity policy objectives:

1. ensure a high degree of pass-through from the policy rate to market rates,
2. facilitate an efficient payment system,
3. offer liquidity insurance and be lender of last resort,
4. provide a framework for liquidity and credit risk to be borne as far as possible by private agents in the financial system.

⁶ How banks create deposit money and their own funding when they provide credit is discussed in more detail in McLeay, Radia and Thomas (2014 a, b), Bernhardsen, Kloster and Syrstad (2016) and Nicolaisen (2017).

The different objectives illustrate difficult trade-offs in liquidity policy. The weight given to the fourth objective is the deciding factor shaping liquidity policy. Achieving the first three objectives does not pose a problem if little weight is placed on the fourth objective. The reason is that the objectives related to the pass-through of monetary policy, an efficient payment system and the role of lender of last resort can all be achieved by providing ample access to central bank reserves. However, if weight is also given to the objective of providing a framework for risk in normal times to be borne by private agents (the fourth bullet point), central bank liquidity insurance should be more limited. This suggests that it should cost more to hold central bank reserves as a liquid asset of durable value.

A liquidity policy that provides a framework for liquidity and credit risk to be borne by the private banking system is the starting point for most central banks. This is most clearly expressed in central banks' guidelines for pledging collateral for loans and in the pricing of standing liquidity facilities. The collateral guidelines limit the range of securities that are eligible for conversion into central bank reserves, while the interest rate on standing facilities (for example, Norges Bank's D-loan facility) stimulates banks to find solutions in the market before resorting to the central bank. Together, these conditions determine the attractiveness of the central bank's liquidity facilities. Disregarding minor variations across central banks, the basic principles are the same: collateral guidelines are used to protect the central bank from losses, and interest rates on standing facilities are less favourable than market rates. Even with these fundamental principles, important trade-offs still need to be made to ensure that all the objectives are achieved. The four above-mentioned objectives provide the starting point for assessing the design of liquidity policy and the instruments at the central bank's disposal.

2. Liquidity management systems and Norges Bank's quota system

This section examines different liquidity management systems, including Norges Bank's quota system.

2.1 The liquidity management framework

A liquidity management system defines a framework for a central bank's management of central bank reserves. Such systems can generally be divided into two main categories: floor systems and corridor systems. Within these main categories, there are a number of different variations, distinguished by the standing facility framework, the execution and design of market operations, the guidelines for pledging collateral for loans, the choice of counterparties and terms and conditions for accounts held at the central bank.

- *Overnight and intraday standing deposit and lending facilities.* Deposit facilities allow banks to deposit reserves on their own initiative overnight in an account at the central bank. The interest rate is known in advance and is determined by the central bank. Banks with a negative balance at the end of the day can use the lending facility to borrow overnight from the central bank at a given rate determined by the central bank.⁷ Loans are

⁷ Normally, the overnight lending facility can only be used – and must be used – by banks with a negative account balance at the central bank at the end of the day. Thus, a bank cannot use the lending facility to obtain more liquidity if its balance is positive,

normally provided against collateral in the form of securities. Interest rates on the overnight standing facilities are as a rule unfavourable for banks. To ensure an efficient payment system and reduce the risk of delays in the payment system, most systems also have an *intraday facility*, whereby banks can as a rule borrow reserves interest-free against collateral through the day. If an intraday loan is not settled before the end of the day, it will be automatically converted into an overnight loan.

- *Market operations.* The central bank employs a range of instruments to manage the quantity of reserves in the banking system. Market operations are conducted on the initiative of the central bank, often in the form of auctions. This is necessary to counter the effect of so-called autonomous factors, which are factors that affect the reserves in the banking system but are outside the control of the central bank. If autonomous factors cause the reserves to fall below the desired level, the central bank must supply reserves by lending reserves to banks or by purchasing securities or foreign currency. Correspondingly, if autonomous factors cause the reserves to rise above the desired level, the central bank must reduce the reserves in the banking system by converting them into time deposits from banks or by selling securities or foreign currency.
- *Collateral guidelines.* Normally, central banks only extend loans against collateral in the form of securities. The types of securities that are eligible, and any haircuts, play an important role for central bank balance sheet risk, but also for how attractive it is for banks to have central bank reserves at the central bank. Collateral guidelines also affect the relative value of different securities in the economy.
- *Counterparties.* A central bank's counterparty access policy defines the types of agents that can hold an account and have access to lending and deposit facilities at the central bank. Thus, the policy determines the counterparties that have access to central bank reserves in normal times and on what terms. Counterparty access policy does not normally regulate access to borrowing and deposit facilities at central banks in periods of financial stress.

Ordinary liquidity management comprises these four elements. The design of the liquidity management system combined with the way in which the central bank performs its role as lender of last resort make up the central bank's overall liquidity policy. Liquidity policy should support the liquidity policy objectives defined in Section 1 in the best possible way: a high degree of pass-through from the policy rate to market rates, an efficient payment system, facilitate the provision of liquidity insurance by the central bank and its role as lender of last resort, and provide a framework for liquidity and credit risk to be borne as far as possible by the private banking system.

2.2 Characteristics of corridor and floor systems

Generally, a liquidity management system is defined by the terms and conditions of the overnight standing deposit and lending facilities. The most important difference between the two main types of liquidity management systems – floor and corridor – is the cost of depositing central bank reserves at the central bank overnight.

but it can plan to have a negative balance at the end of the day in order to be able to use the lending facility.

Corridor system In a corridor system, the central bank's policy rate is normally midway between the rates on the Bank's standing deposit and lending facilities (the corridor). The central bank keeps the total quantity of reserves at zero (or marginally above zero). Banks that have a reserve deficit at the end of the day and are unable to borrow sufficient reserves in the interbank market have to use the central bank's overnight lending facility to cover their negative account balances. However, this is costly as the interest rate on the central bank's lending facility is normally well above the interbank market rate. Banks with excess reserves that they are not willing or able to lend to other banks have to deposit these reserves with the central bank using the overnight deposit facility. This is also costly as the interest rate on the deposit facility is normally substantially lower than the overnight market rate. The purpose of the interest rate corridor is to give banks an incentive to redistribute reserves among themselves overnight and not use the central bank's standing facilities. Thus, a corridor system promotes overnight activity in the interbank market. Chart 1 illustrates the main characteristics of a corridor system. Demand for reserves is a falling function of the overnight rate in the interbank market. The lower the market rate, the cheaper it is for banks to insure themselves against the need for reserves and the greater is the demand.

The interest rate on the central bank's lending facility normally serves as a ceiling for the overnight interbank rate as banks will normally not want to borrow reserves overnight in the interbank market at an interest rate that is higher than the rate they have to pay the central bank.⁸ Correspondingly, the interest rate on the central bank's deposit facility normally serves as a floor for the overnight rate as banks will normally not want to lend reserves to other banks at an interest rate lower than the deposit rate of the central bank.⁹ The central bank's supply of reserves is illustrated by the vertical supply curve.¹⁰

The central bank seeks to keep the reserves in the banking system overnight at around zero (or marginally above zero)¹¹ using various types of market operations. If the reserves fall below the desired level, the central bank has to supply reserves by lending reserves to banks or by purchasing securities or foreign currency from banks. If the reserves rise above the desired level, the central bank must reduce the reserves in the banking system by converting them into time deposits from banks or by selling securities or foreign currency to banks. The quantity of reserves changes owing to autonomous factors on

⁸ A stigma may be attached to the use of the central bank lending facility. In cases where this stigma cost is high, the market rate may exceed the rate on the standing lending facility.

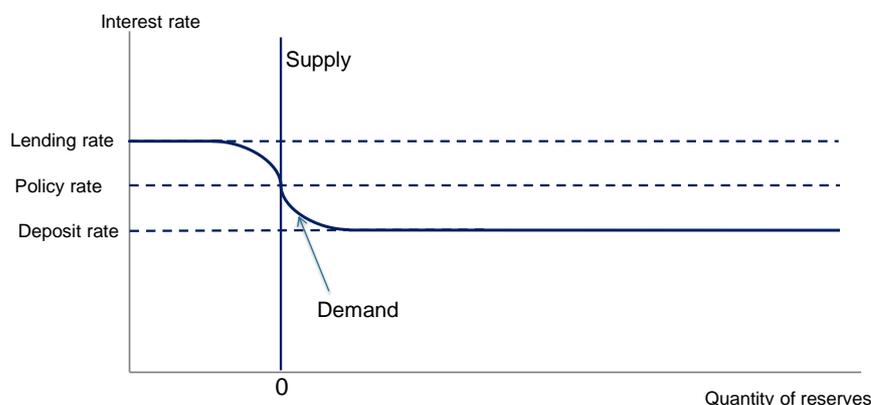
⁹ If some market participants are active in the overnight money market and do not have accounts at the central bank, the overnight rate can fall below the rate on the standing deposit facility. Such market participants must hold overnight deposits in banks that have accounts at the central bank. Furthermore, money market rates with longer than overnight maturities can be lower than the central bank deposit rate if market participants expect a reduction in the policy rate. Therefore, the corridor normally provides a ceiling and floor for the shortest money market rates.

¹⁰ This model is a simplified presentation of the model in Whitesell (2006). The model is also used by Keister, Martin and McAndrews (2008) to illustrate the Federal Reserve's liquidity policy. Bernhardsen and Kloster (2010) and Bernhardsen, Kloster and Syrstad (2016) also provide a presentation of this model.

¹¹ If banks are required to hold reserves, they must hold a certain quantity of reserves in their central bank accounts overnight (according to specific rules). The central bank then normally aims to maintain reserves at the level determined by the reserve requirement.

the liability side of the central bank's balance sheet and these changes must be counteracted by central bank market operations.

Chart 1. Demand for and supply of central bank reserves in a corridor system



Autonomous factors are conditions that affect the reserves in the banking system but are outside the direct control of the central bank. One example is the government's account. Tax payments to the government transfer reserves from banks' accounts with the central bank to the government's account with the central bank, thereby reducing the quantity of banking system reserves. Outgoing government payments reduce the government's deposits with the central bank, while banks' deposits increase by the same amount. It is important that the central bank, using market operations, is able to maintain the reserves in the banking system at target level (ie at zero or marginally above zero). If not, this can lead to a high level of volatility in short-term money market rates. If the central bank is unable to maintain the reserves in the banking system at zero, the vertical supply curve will shift and affect the interest rate in the overnight market. A corridor system therefore makes considerable demands on central bank reserve management. The central bank must neutralise autonomous factors on a daily basis and thus ensure that the total quantity of reserves in the banking system is equal to zero.¹²

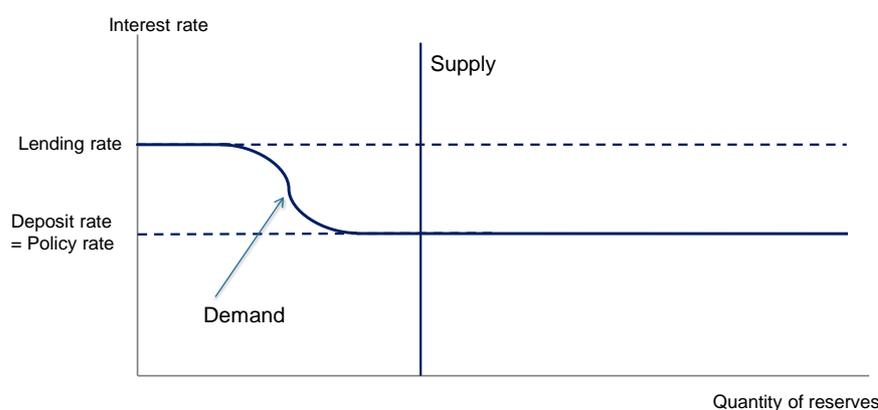
Floor system In a floor system, the policy rate is equal to banks' deposit rate at the central bank. To keep the market rate close to the policy rate, the central bank must supply the banking system with sufficient reserves to push down the market rate towards the deposit rate. This can be illustrated by expanding Chart 1. A floor system is represented by shifting the supply curve to the right of the area where the demand curve is flat and the market rate is equal to the central bank deposit rate (Chart 2). The quantity of reserves in the banking system is then considerably larger than zero. The central bank now has two independent instruments: the policy rate and the quantity of reserves in the banking system. Regardless of the quantity of bank reserves in the central bank, the overnight money market rate does not fall below the policy rate.¹³

¹² A corridor system with reserve requirements can contribute to reducing volatility in short-term money market rates (see Bernhardsen and Kloster (2010) and Bernhardsen, Kloster and Syrstad (2016) for a more detailed discussion).

¹³ Note, however, footnote 9.

The core of a floor system – in contrast to a corridor system – is the low alternative cost for banks of keeping excess reserves with the central bank.¹⁴ While banks in a corridor system must deposit excess reserves at a low rate of interest with the central bank, all the reserves in a floor system are remunerated at the policy rate. As a rule, banks can borrow central bank reserves at an interest rate only marginally above the policy rate and can at the same time deposit them with the central bank at the policy rate. Apart from the cost of pledging collateral for the loans, the cost of borrowing reserves from the central bank is low.¹⁵ In other words, central bank reserves are cheaper in a floor system than in a corridor system.

Chart 2. Demand for and supply of reserves in a floor system



2.3 Norway's liquidity management system

Norges Bank switched from a floor system to a quota system in October 2011.¹⁶ In a quota system, a certain quantity of banks' reserves are remunerated at the policy rate until a quota is reached. Deposits in excess of the quota are remunerated at a lower interest rate, the reserve rate. This

¹⁴ In a corridor system with no reserve requirements, there are excess reserves in the system if the reserves are greater than zero. In a corridor system with reserve requirements, there are excess reserves in the system if the reserves exceed the reserve requirement.

¹⁵ This applies in a situation where a bank obtains reserves directly from the central bank through a market operation. In a floor system, the interest rate on this market operation will normally be close to the central bank's deposit rate. However, a bank can also obtain reserves from the market at a price that differs from the central bank's rate. For example, a bank can obtain reserves by issuing bonds. The bank has then received reserves at the cost of other banks' reserve holdings. The cost of holding reserves then rises with the interest rate on the bond. Generally, banks must pay a higher price than the central bank's rate for reserves obtained in this way. However, the price difference reflects the fact that the maturity of a bond is normally considerably longer than the maturity of a loan from the central bank. This means that the bank has reserves at its disposal for a considerably longer period when it obtains reserves through a long-term loan in the market. Furthermore, a bond can be unsecured, while loans from the central bank must be collateralised.

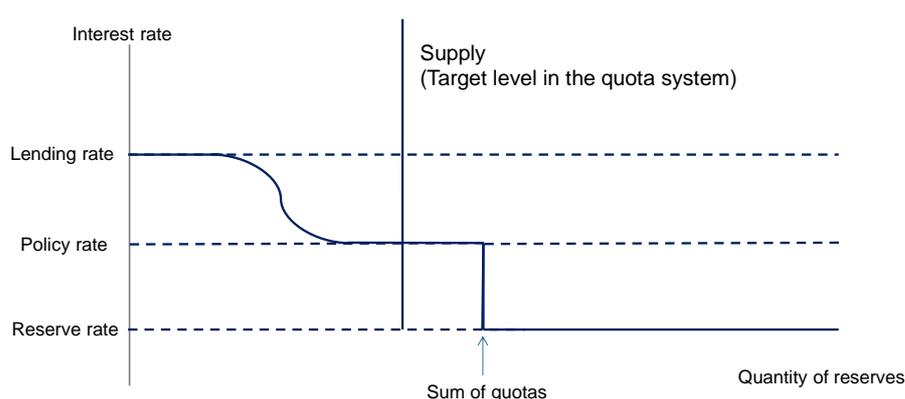
¹⁶ See <https://www.norges-bank.no/en/topics/liquidity-and-markets/The-liquidity-management-system/> for more details on the switch from the floor system to the quota system.

means that banks have an incentive to keep deposits below the quota. If the deposits are likely to exceed the quota, banks then have an incentive to lend reserves in the interbank market, in the same way as in a corridor system. The advantage of a quota system over a corridor system is that small changes in the reserves have a limited impact on money market rates, as long as the deposits stay below the quotas. This makes it easier for the central bank to manage the quantity of reserves in the banking system when there are changes in autonomous factors.

Standing facilities

Banks can borrow reserves intraday interest-free up to a limit determined by banks' available collateral. Banks' reserves are remunerated overnight at the policy rate up to a specific quota. Deposits in excess of the quota are remunerated at a rate 100 basis points below the policy rate (the reserve rate), while the standing lending facility rate (the D-loan rate) is 100 basis points above the policy rate. Chart 3 illustrates the quota system in Norway. Norges Bank aims to keep reserves around a specific level, within a target range. If there are prospects that the reserves will move outside this range, banks are offered central bank loans and deposits to keep banks' total overnight deposits around the target. A given change in the reserves supply has less impact on interest rates in a quota system than in a corridor system, as long as the reserves supply is smaller than the sum of banks' quotas. If the reserves supply exceeds the sum of banks' quotas, the reserve demand is on the other hand very inelastic, and the interest rate in the overnight market will fall to the reserve rate. This is because banks will seek to lend reserves in the interbank market rather than making deposits in Norges Bank at the reserve rate. When all or many banks do this, the overnight interbank market rate falls sharply. It is therefore important in a quota system that the central bank is able to manage the reserves to keep banks' total deposits in the central bank close to the target and lower than the sum of banks' quotas.

Chart 3. Demand for and supply of central bank reserves in a quota system



So far, the sum of banks' quotas has been NOK 45 billion (the total quota). The target for the sum of banks' overnight deposits (the central bank reserves) has been NOK 35 billion, with a target range of plus/minus NOK 5 billion. The difference of NOK 10 billion provides room for unexpected changes in autonomous factors without making a substantial impact on market rates. As long as the reserves in the banking system are above zero and below the total quota, no bank needs to hold deposits overnight that are remunerated at the reserve rate or borrow reserves overnight at the D-loan rate, *providing banks*

redistribute central bank reserves to each other in the interbank market. And as in a corridor system, the quota system gives banks an incentive to redistribute reserves among themselves overnight.

Quotas are distributed based on the type of account banks have in Norges Bank's settlement system, NBO. In NBO, banks are divided into three groups: A1, A2 and B. The same basic classification is used to set the quotas. Group 1 comprises banks that in NBO belong to Group A1, Group 2 comprises banks in Group A2, and Group 3 comprises banks in Group B. If a bank that is a market maker in the money market is initially in NBO Group A2, the bank will be moved to Group 1 when the bank's quota is set ("market maker" here means that the bank is on the NIBOR panel). Norges Bank determines the sum of all the quotas in all the groups (the total quota). The share of the total quota for each group is equal to the group's share of the aggregate total assets of the NBO banks. All the banks in a group are assigned the same quota. Settlement banks are assigned an additional quota determined by the size of the settlement bank in relation to the size of the second-tier banks for which it performs settlements (as measured by total assets).^{17, 18}

Market operations Norges Bank uses floating-rate loans and deposits (F-loans and F-deposits) in the day-to-day management of banks' central bank reserves. Maturities and allotments are adjusted to the forecasts of autonomous factors, which are determined in particular by government account transactions. Loan and deposit maturities normally vary from a few days and up to a couple of weeks. As a rule, market operations are settled on a same-day basis. In the event of unforeseen changes in the quantity of central bank reserves, Norges Bank can carry out fine-tuning operations at the end of the day, where settlement is immediate. F-loans (fixed-rate loans) are provided against approved collateral. Norges Bank can also offer foreign exchange (FX) swaps to supply krone liquidity, where the currency received is the collateral for the loan. This enables more counterparties to participate in market operations. This was done during the financial crisis in 2008/2009, but has not been repeated since then and is not one of Norges Bank's conventional liquidity management instruments.

Collateral guidelines The collateral pledged by a bank to Norges Bank is part of the bank's portfolio of collateral that it draws on for loans. When a bank borrows from Norges Bank, collateral with the same value as the loan is made unavailable to the bank, but no specific securities are locked up (referred to as the pool of collateral). This means that banks are able to swap securities as long as the loans are fully collateralised.

The Norwegian capital market is relatively small. Nevertheless, banks have at times substantial borrowing needs owing to autonomous factors and negative structural liquidity.¹⁹ Norges Bank therefore accepts a wide range of collateral.

¹⁷ The quotas are calculated twice a year and published on an ongoing basis as a circular (see <https://www.norges-bank.no/en/news-events/news-publications/Circulars/?tab=null&newstype=0&year=0&p=10>)

¹⁸ The distribution of quotas across banks involves some trade-offs, including the consideration of facilitating a well-functioning money market. For a more detailed discussion, see <https://www.norges-bank.no/en/topics/liquidity-and-markets/The-liquidity-management-system/The-management-of-bank-reserves-The-system-in-Norway/Background-system-managing-bank-reserves/>

¹⁹ Structural liquidity refers to the level of reserves in the banking system prior to market operations by Norges Bank.

Instead of reducing the credit quality of eligible collateral in NOK, Norges Bank has chosen to include high-quality securities denominated in a foreign currency. Even though the securities that are eligible as collateral at Norges Bank are of high quality, the range of securities is broader and comprises other types of securities in addition to those approved as highly liquid (Level 1 assets) under the authorities' Liquidity Coverage Ratio (LCR) requirement.²⁰

Counterparties Agents with accounts at Norges Bank and access to the Bank's facilities or parts of these are referred to as Norges Bank's counterparties. A distinction is made between monetary policy counterparties and other counterparties. This is discussed in further detail in Section 4.

3. Assessment of the current quota system

This section assesses the quota system based on the primary objectives of Norges Bank's liquidity policy: monetary policy pass-through, an efficient payment system, liquidity insurance and the role of Norges Bank as lender of last resort, and risk allocation.

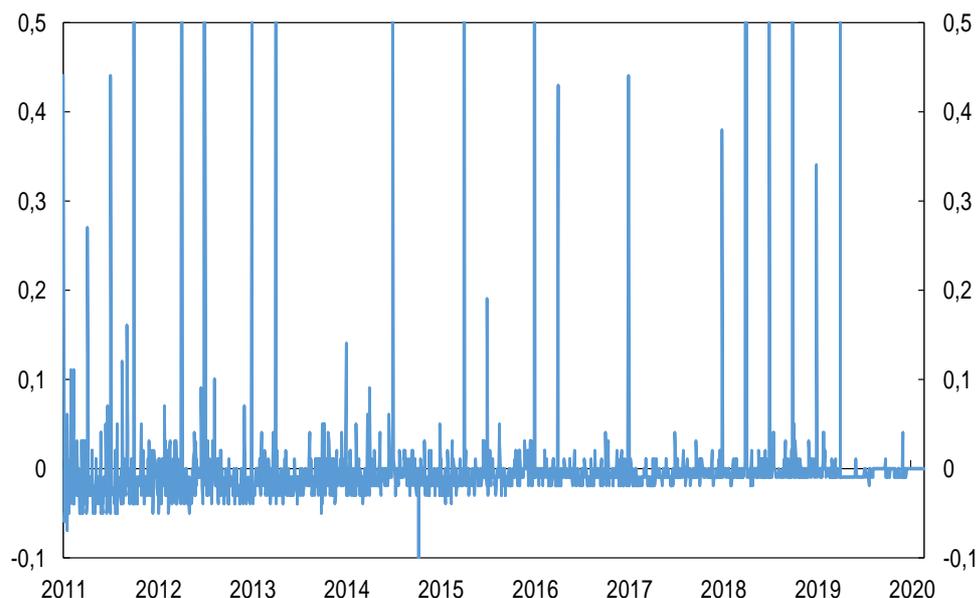
3.1 Monetary policy pass-through

The pass-through of the policy rate to short-term market rates is the first stage in the monetary policy transmission mechanism. The pass-through is first evident in the overnight market where banks redistribute central bank reserves. Before the switch to the quota system, there was no formal registration of rates on loans and overnight deposits in NOK. Norges Bank assessed the monetary policy pass-through based on implied overnight rates in the FX swap market (tomorrow-next, T/N rates). In connection with the new liquidity management system introduced in 2011, Norges Bank, in collaboration with Finance Norway, established a reporting system for overnight market transactions by a panel of banks. This reporting formed the basis for the Norwegian Overnight Weighted Average (Nowa) rate. Nowa was defined as the interest rate on unsecured overnight loans from Nowa panel banks to other banks and was as a rule close to the policy rate (see Chart 4, which shows the Nowa premium, the spread between Nowa and the policy rate). The exception was at certain quarter- and year-ends (the definition of Nowa was changed on 1 January 2020, see details below).

²⁰ See Norges Bank (2017) for a brief description of the LCR. Norges Bank's collateral guidelines are described in Circular 1/2021:

<https://www.norges-bank.no/en/news-events/news-publications/Circulars/2021/1/collateral-for-loans/>

Chart 4. NOWA premium. 2011-2020. In percentage points

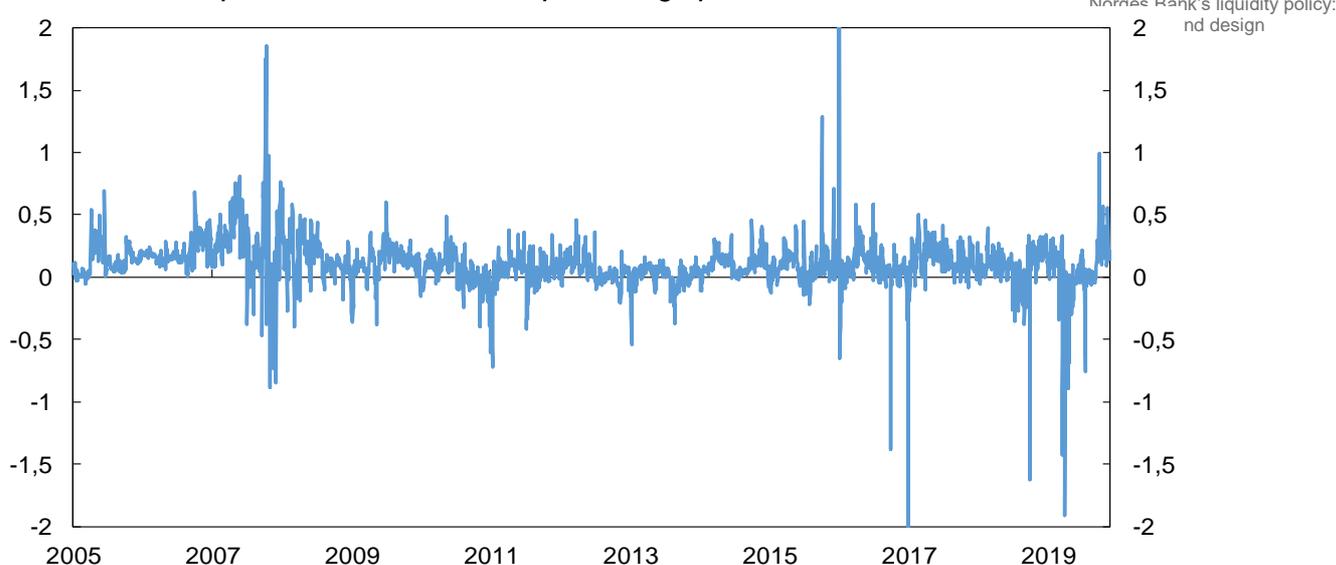


In addition, the FX swap market is important for the redistribution of NOK. The most liquid segment of this market is the tomorrow-next (T/N) segment, where NOK is exchanged for USD from tomorrow until the next business day. Maturity is one day, as in the overnight market, but the starting point is one day later. The T/N rate is derived from the price of NOK relative to USD and is normally more volatile than a pure krone rate. The T/N rate has generally behaved in the same way before and after the switch to the new liquidity management system. The level of volatility is approximately the same, while the average spread between the policy rate and the T/N rate (the T/N premium) has been 5-10 basis points lower (Table 1 and Chart 5). In sum, there is a high degree of pass-through from the policy rate to the T/N rate.

Table 1. The T/N premium in selected periods. In percentage points

	2006-2020	2006-oct.2011	Oct.2011- 2020
Average	0.1	0.187	0.071
Median	0.11	0.168	0.072
Standard deviation	0.21	0.204	0.215
Observations	3538	949	2377

Chart 5. The T/N premium. 2005-2020. In percentage points



Even though the T/N rate has on average been close to the policy rate, it shows relatively wide fluctuations, as is the case for T/N rates in comparable currencies. Some of this volatility stems from foreign banks' NOK positions. A number of the foreign banks that are active in the Norwegian market do not have access to Norges Bank's standing facilities and market operations. When there are substantial changes in these banks' liquidity positions, T/N rate volatility can increase.²¹ It is possible that access to Norges Bank's facilities for foreign banks would have resulted in a more stable T/N rate. This presupposes that foreign banks would have used these facilities in their liquidity management. Discussions with the banks in question have revealed that they do not wish to have large NOK positions or access to Norges Bank's facilities. This is also probably because access to Norges Bank's facilities involves meeting certain requirements.

In recent years, both Nowa and the T/N rate have been more volatile on reporting dates (quarter- and year-ends) (Charts 4 and 5). This is an international phenomenon related to stricter banking regulation and the payment of bank fees based on banks' risk exposure and balance sheet size. Banks in need of NOK liquidity on reporting dates have found it difficult to borrow from other banks. At the same time, it can be expensive to borrow NOK via USD. In 2017, Norges Bank offered a pre-announced F-loan with a maturity of one day over the turn of the year for the first time. This scheme has been continued at all quarter-ends. The loan is fully allotted against normal collateral and is priced at 15 basis points above the policy rate. The offer of this loan has dampened volatility in the T/N rate.

Volatility in the Nowa rate on reporting dates was, until the end of 2019, related to a low volume of lending and panel bank estimates. Nowa was estimated if the volume of transactions or the number of active banks was low.

²¹ A question is whether the volatility in the T/N rate spreads to FX swaps with longer maturities, but empirical evidence indicates that there is little contagion of T/N volatility to longer maturities.

Norges Bank took over as administrator of Nowa on 1 January 2020 and Nowa was reformed in connection with new reporting requirements for money market transactions. Since 1 January 2020, Nowa has only reflected transactions between banks with an account at Norges Bank, and on days when the volume of transactions is low and there are few active banks, Nowa is now calculated based on historical data and not estimates. This has reduced volatility on reporting dates.²²

The most important and widely used NOK reference rate is Nibor. Nibor is quoted for different tenors, of which the most important are the three-month and six-month tenors. Nibor reflects today's short-term rates and expected short-term rates as well as money market risk premiums. It is very important for the implementation of monetary policy and the transmission mechanism that Nibor moves with developments in the policy rate over time. Nibor is an FX forward rate, and the pass-through of the policy rate to Nibor can therefore be assessed based on pricing in the forward exchange market. The price of an FX forward swap is based on the interest rate differential between the respective currencies. In principle, the forward premium – the difference between the spot rate and the forward rate – should be close to the interest rate differential. A high degree of pass-through from the policy rate to Nibor requires changes in the forward premium to move with changes in the policy interest rate differential. Chart 6 shows the policy interest rate differential for NOK and USD and the corresponding three-month forward premium. The chart shows a strong correlation between the forward premium and the interest rate differential. This suggests that changes in the policy rate have a high degree of pass-through to the forward exchange market.²³ There has also been a high degree of pass-through from the policy rate to three-month Nibor, residential mortgage rates and lending rates offered to non-financial firms.²⁴

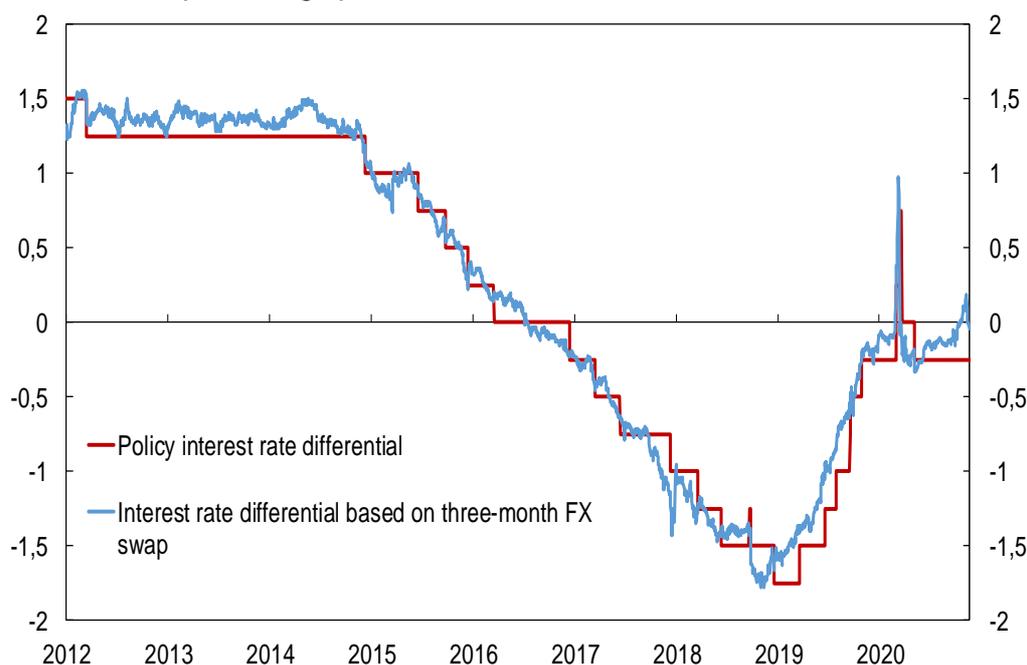
In sum, there is a high degree of pass-through from the policy rate to market rates. The current quota system appears to be a good framework for the transmission mechanism and the implementation of monetary policy.

²² New principles for calculating Nowa are discussed in Norges Bank (2019a). See also Norges Bank's website <https://www.norges-bank.no/en/topics/liquidity-and-markets/nowa/>

²³ This can be understood on the basis of covered interest parity (CIP), whereby the return from investing in two currencies should be equal when investments with the same risk are currency-hedged. Formally, this can be expressed by $i_N = 1_{\$} + (f - e)$, where i_N is three-month Nibor, $i_{\$}$ is the USD rate on which Nibor quoting is based, and where $(f - e)$ is the forward premium, the difference between the forward rate (f) and the spot rate (e) between NOK and USD (an increase denotes a weaker krone). This implies that the interest rate differential should move with the forward premium, ie that $(i_N - i_{\$}) = (f - e)$. Deviation from CIP may imply liquidity premiums between NOK and USD.

²⁴ See Juelsrud, Nordal and Winje (2020).

Chart 6. The policy interest rate differential and three-month forward premium. 2012-2020. In percentage points



3.2 Payment system

Norway has a very efficient payment system. When Norges Bank changed its liquidity system in 2011, ensuring sound operating conditions for the payment system was given weight. The collateral guidelines and intraday facility remained unchanged. Banks still have ample intraday access to central bank reserves against a set of collateral that ensures that this supply will exceed normal fluctuations in the need for liquidity.

Changes in the conditions for use of the standing facilities, the deposit and lending rates, have in isolation little bearing on the payment system. The introduction of the quota system has not had a negative impact on the payment system.²⁵

3.3 Lender of last resort/Liquidity insurance

Central banks can provide liquidity (central bank reserves) to their counterparties, including individual banks, the banking system in general or other institutions with an account at the central bank. This can be part of ordinary liquidity management (in Norway in the form of F-loans and the D-loan facility), but the central bank may also wish to give counterparties special liquidity support in periods of financial stress.

In general, the central bank's liquidity insurance weakens banks' incentives to manage liquidity risk through market adjustments. This is referred to as moral hazard and can lead to counterparties with access to the central bank's liquidity insurance taking excessive liquidity risk. The central bank faces a

²⁵ The payment system in Norway is discussed annually in Norges Bank's *Financial Infrastructure Report*, which concludes that the payment system in Norway is efficient (see <https://www.norges-bank.no/en/news-events/news-publications/?tab=publication&newstype=67&year=0&p=10>)

trade-off between dampening these incentives to take excessive risk and providing sufficient liquidity to prevent substantial liquidity problems and high market rate volatility. The most important measure the central bank can take to dampen moral hazard is to require high-quality collateral for loans and offer liquidity insurance on terms that give counterparties an incentive to manage liquidity risk through market adjustments. This reduces the central bank's balance sheet risk.

The risk that counterparties receiving liquidity insurance will take excessive risk is an important reason why these agents are strictly regulated. Stricter liquidity and capital regulation, as well as new crisis management tools, will counteract the risk of excessive risk-taking to a certain extent. In isolation, stricter regulation will imply that the central bank can relax the terms of its liquidity insurance as long as the terms do not weaken the impact of the regulation.²⁶

Design of the facilities

Central banks' liquidity insurance facilities are usually designed to provide a reasonable trade-off between two considerations: on the one hand, to achieve low volatility in short-term money market rates and prevent financial instability, on the other, to reduce moral hazard and avoid excessive balance sheet risk for the central bank. The most important elements in the design of liquidity insurance facilities are:

Size of liquidity insurance operations

The volume of liquidity supplied must be sufficient to prevent undesirable volatility in money market rates and to give counterparties sufficient funding assistance in periods of financial stress. In periods of financial stress, this can mean that a substantial volume of liquidity is provided or that requested loan amounts are fully allotted. Expectations that the central bank will provide sufficient liquidity in such situations can reduce liquidity tightening, for example because counterparties then have less incentive to hoard liquidity. This consideration must be weighed against the potential need to expand the range of collateral accepted for loans by the central bank, increasing risk on the central bank's balance sheet. Furthermore, expectations of large-scale market operations by the central bank in periods of market turmoil could weaken counterparties' incentives to adjust their balance sheets so that they are robust to potential liquidity problems. As long as the central bank provides insurance, such incentive problems will arise. The cost of letting in particular banks insure themselves against all forms of liquidity problems solely in the market would be a substantial reduction in maturity transformation. This suggests that some excessive risk-taking should be accepted.

Pricing of liquidity insurance and collateral for loans

Loans should be priced above what is considered normal funding costs to ensure that the central bank's counterparties normally manage their liquidity through the market. In addition, high-quality collateral and haircuts applied to the value of collateral for central bank loans are necessary to limit the central bank's risk, thereby reducing moral hazard and the risk of loans being provided to insolvent institutions. At the same time, the range of eligible collateral should be broad enough to allow the central bank to conduct sufficiently large market operations.

²⁶ For further discussion of liquidity insurance, see Bindseil (2014) and Søvik (2019).

Loans to individual institutions or market operations?

Central banks can supply liquidity to all agents through market operations or to individual institutions. Supplying liquidity through market operations reduces the risk of liquidity primarily being provided to weak institutions. Furthermore, there is a stigma attached to providing loans to individual institutions, precisely because it signals that the institution in question is in a weak financial position. On the other hand, situations can arise where loans to individual institutions cannot be ruled out because financial stability would be threatened if liquidity support were not provided to an individual institution. These would then be loans on special terms (S-loans).

Standing or ad hoc liquidity insurance?

Central banks provide standing facilities in ordinary liquidity management, but can also have standing facilities for emergency liquidity assistance (ELA), which means that the facilities can be used by central bank counterparties (according to specific rules) on their own initiative. Liquidity insurance can also be provided on an ad hoc basis, ie the central bank provides liquidity assistance as necessary. Standing liquidity facilities can reduce banks' incentives to manage their risk adequately in normal times and lead to moral hazard. On the other hand, the existence of standing liquidity insurance facilities can prevent liquidity problems from escalating to liquidity crises since agents can not only expect, but can be certain that liquidity will be available if necessary.

Liquidity insurance at Norges Bank

There is an element of liquidity insurance in the implementation of monetary policy in Norway. Norges Bank offers banks overnight D-loans against collateral, which provide banks with insurance against an acute liquidity need. The price of overnight D-loans is set relatively high (one percentage point above the policy rate) to give banks an incentive to obtain necessary liquidity in the market and not use the liquidity facility in normal times. Over the past few years, Norges Bank has also provided banks with additional liquidity insurance by offering extraordinary loans at quarter-ends, as the willingness to lend liquidity can be low during these periods. The price of these loans has so far been somewhat above the policy rate, but considerably lower than the interest rate on overnight D-loans. This is because extraordinary loans at quarter-ends are motivated by the aim of keeping the shortest money market rates close to the policy rate, although these loans can also be considered as a form of liquidity insurance for banks.

Apart from the above-mentioned loans, Norges Bank does not provide standing liquidity insurance facilities. Liquidity in addition to that offered by the Bank through ordinary liquidity management is only granted on an ad hoc basis. First, Norges Bank can extend loans on special terms (S-loans) to banks and other counterparties. These loans are provided to individual institutions.²⁷

Second, Norges Bank can provide extraordinary loans intended more generally for banks and other counterparties. These are loans of varying maturities and are often offered in situations of market turmoil or if Norges Bank wants to use liquidity policy as a supplemental instrument to reduce money market risk premiums. Such loans are not permanent, but they are

²⁷ For more on S-loans, see <https://www.norges-bank.no/en/topics/liquidity-and-markets/Lender-of-last-resort/>

provided as long as Norges Bank considers them necessary to safeguard financial stability and the implementation of liquidity and monetary policy. Norges Bank can also be involved in lending liquid securities collateralised by less liquid assets. During and after the financial crisis in 2008/2009, Norges Bank offered NOK and USD to banks in the form of loans and FX swaps, and collateral requirements were eased. Norges Bank also supplied NOK and USD in the form of F-loans during the Covid-19 crisis in 2020. (See box for a discussion of the extraordinary liquidity policy measures implemented by Norges Bank in 2020.)

Viewed against the primary objectives of liquidity policy, liquidity insurance provided by Norges Bank is designed to be in line with keeping risk in the banking system and not drawing it into the Bank. Liquidity is only supplied against high-quality collateral, as currently formulated in the new Central Bank Act, which entered into force on 1 January 2020 (Section 3-1, fifth paragraph). This applies in ordinary liquidity management, but also in situations where extraordinary liquidity is supplied to banks in general or to individual banks on special terms (S-loans).

Box: Norges Bank's liquidity management in 2020

Norges Bank's quota system is a framework for liquidity policy in normal times, in the absence of severe financial market stress and frictions. In normal times, central bank reserves should primarily be a means of settlement for banks and not an asset for banks to use as any substantial store of value. This reduces the central bank's balance sheet risk (see Section 1). In times of severe financial market stress and frictions, liquidity policy measures can be necessary to ensure the effective functioning of markets and pass-through from the policy rate to market interest rates. Liquidity policy measures can differ in form but have in common that central bank reserves are supplied to the banking system.

In response to the Covid-19 crisis, Norges Bank implemented extraordinary liquidity policy measures in 2020, as did many other central banks.²⁸ The main liquidity policy measure was the provision of extraordinary F-loans to banks. Owing to the market situation, Norges Bank offered extraordinary three-month F-loans in NOK from 13 March. The loans were fully allotted at an interest rate equal to the prevailing policy rate. The aim was to ensure pass-through from the policy rate to money market rates. The economy consequences of the Covid-19 crisis could prove substantial, and banks were uncertain as to their own and others' liquidity situation. The money market functioned poorly, and risk premiums jumped up. It was then important to ensure a predictable supply of NOK liquidity to banks. Norges Bank announced that extraordinary loans would be offered as long as it was deemed appropriate. Loans with full allotment at the policy rate are favourable terms for banks and an effective instrument when the aim is to reduce money market risk premiums (see Section 3.5). The provision of reserves to the banking system pushed down money market risk premiums and contributed to underpinning the aim of a high degree of pass-through from the policy rate to money market rates. On 18 March, Norges Bank announced a softening of collateral requirements.

From 19 March, the extraordinary three-month loans were supplemented with extraordinary F-loans with maturities of one week, one month, six months and

²⁸ For an overview of measures implemented by Norges Bank in response to the Covid-19 crisis, see <https://www.norges-bank.no/tema/aktuelt/norges-bank-og-koronaviruset/>

twelve months, all with full allotment. As for the three-month loans, the interest rate on loans with maturities of one week and one month was equal to the prevailing policy rate, while the loans with maturities of six and twelve months had a premium above the policy rate of 15 and 30 basis points, respectively. In mid-August, Norges Bank affirmed that financial markets were functioning more normally, but announced that the period with three-month F-loans would be extended to the end of the year. The price of the three-month loans was increased to a premium of 15 basis points above the policy rate. The loans functioned as a form of liquidity insurance for the banks.

In the first half of 2020 (from the end of March), Norges Bank also offered F-loans in USD, after the US Federal Reserve established USD liquidity swap lines with a number of central banks, including Norges Bank. The loans had a maturity of three months and were allotted by auction.

In addition to reducing money market premiums, Norges Bank's liquidity provision also eased frictions in the overnight interbank market. This is the market where banks redistribute central bank reserves among themselves, normally to ensure that overnight deposits in the central bank are positive and lower than the quotas. There were periods in 2020 of uneven distribution of reserves overnight, ie individual banks held larger deposits in the central bank than normally (deposits above the quota at the reserve rate). This is not desirable for Norges Bank as it disturbs liquidity management and monetary policy implementation.

Liquidity provision from the extraordinary F-loans had an impact on Norges Bank's liquidity management. In the quota system, where the target for central bank reserves is NOK 35 billion, each bank's deposits within their quota are remunerated at the policy rate, while the reserve rate (one percentage point below the policy rate) is applied to deposits above the quota. In order to maintain the quota system, excess reserves (above NOK 35 billion) were withdrawn using daily F-deposits with a maturity of one day. Banks could thereby use the excess reserves on a daily basis (F-loans with longer maturities would have locked in the reserves for a longer period).²⁹ This pushed the quota system in the direction of a *temporary* floor system as banks' excess reserves were remunerated at, or very close to, the policy rate. This must be seen in the light of the advantageous attributes a floor system can have in times of financial stress (see Section 2.2).

The extraordinary liquidity measures implemented in 2020 demonstrated how the quota system could rapidly – and had to – be adapted to a situation with financial market stress and poorly functioning markets. For the central bank, that period tested the robustness of the liquidity management system. Banks provided feedback and input concerning the orientation and assessment of the extraordinary loans. In general, and in particular in times of low structural liquidity, banks want long-term F-loans from the central bank, and for banks the lower the interest rate on the F-loans is in relation to the policy rate, the more favourable these loans are. F-loans with a maturity of more than one month

²⁹ By withdrawing reserves using daily F-deposits with a maturity of one day, Norges Bank was able to maintain the quota system and the target for *unrestricted* reserves (sight deposits) in the banking system. If the reserves had not been withdrawn short term, the overnight interbank rate would have moved down towards the reserve rate. As an alternative, raising the reserve rate to the policy rate might have been considered, but Norges Bank found that it was more appropriate to operate within the established quota system.

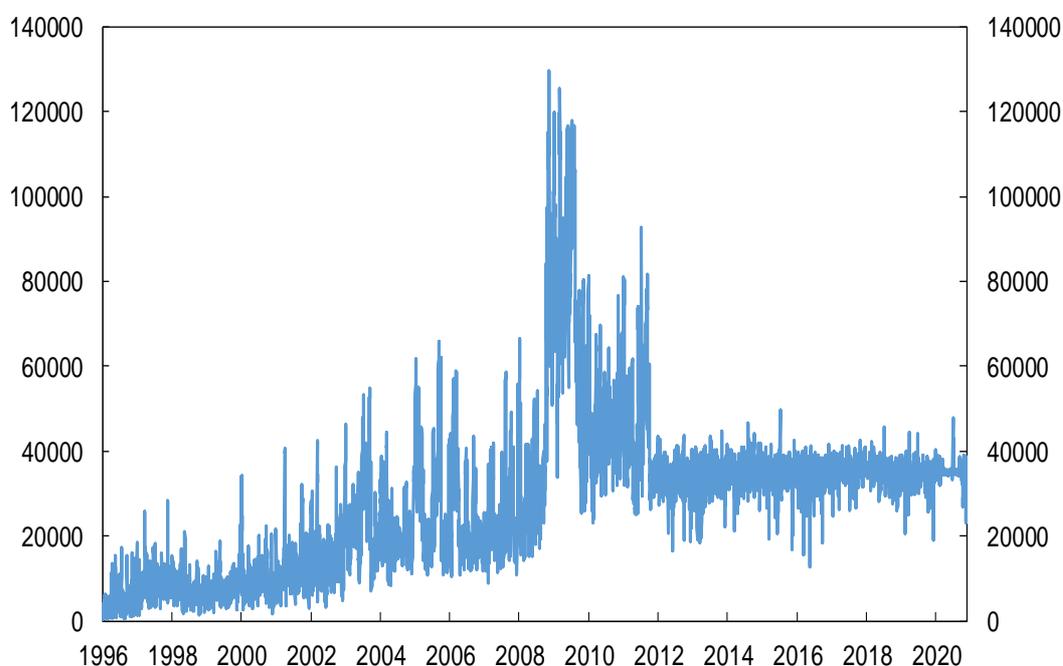
contribute to improving banks' required liquidity coverage ratio (LCR). For the central bank, this involves a trade-off. The supply of central bank reserves in the form of extraordinary F-loans, which can reduce money market risk premiums and ease frictions in the overnight interbank market, must be weighed against the possible costs of such a liquidity policy if the measures persist and expectations build up that the floor system will remain in place over time.

3.4 Allocation of risk

We have argued that the pass-through from monetary policy has been high and that the payment system is efficient. Furthermore, Norges Bank has been well equipped to offer extra liquidity to banks when necessary and has been able to fulfil its role as lender of last resort. In this respect, the quota system has functioned as intended: monetary policy is implemented with a high degree of pass-through in a system where demand for reserves is limited by the cost to banks of holding substantial reserves in their accounts at Norges Bank. Thus, the quota system also provides a framework for liquidity and credit risk to be borne as far as possible by agents in the private financial system.

The switch to the quota system had two aims in particular: to limit demand for central bank reserves and contribute to an efficient redistribution of Norges Bank's target quantity of central bank reserves among banks in the overnight market. When the quota system was introduced in 2011, the quantity of central bank reserves was reduced from NOK 50-60 billion to NOK 30-40 billion, which is the new target for the reserves (Chart 7).

Chart 7: Banks' overnight deposits at Norges Bank (central bank reserves). 1996-2020. In millions of NOK



The switch from a floor system to a quota system has also increased the overnight redistribution of reserves among banks. In line with stronger incentives to distribute liquidity from banks with surplus liquidity to banks with

a liquidity deficit, both the volume and number of transactions have increased.³⁰

The quota system, like a corridor system, is in line with the principle that central bank reserves should primarily be a means of settlement between banks and not a store of value (cf Section 1.2). In the quota system, it is “cheap” to use central bank reserves as a means of settlement and “expensive” to use the reserves as a store of value. Banks have thereby no incentives to convert less liquid assets into central bank reserves. This dampens demand for reserves and limits the size and level of risk on Norges Bank's balance sheet. This is in contrast to a floor system, where it is less expensive to use the reserves as a store of value because all deposits are remunerated at the policy rate. Such a system can have adverse consequences:

- Assume that banks can borrow central bank reserves against collateral in the form of illiquid securities. The central bank can then have a role in transforming illiquid securities into highly liquid assets (central bank reserves). Risk is moved from the banking system to the central bank. One could argue that the central bank's risk is negligible as long as the credit risk on the securities is zero. This would have been the case if the central bank had only accepted safe government bonds as collateral. However, the Norwegian government bond market is small, and Norges Bank must therefore accept a wider range of securities with higher liquidity and credit risk than Norwegian government bonds (cf the discussion of the guidelines for pledging collateral for loans above). In practice, it is very difficult to distinguish between credit and liquidity risk, and well-functioning guidelines for pledging collateral for loans will never be able to eliminate the central bank's risk of losses. *The more reserves the central bank must offer banks in the form of loans, the higher the central bank's potential exposure to credit risk will be.*
- In a floor system, central bank reserves could grow over time and move outside the control of the central bank (cf. Norges Bank's own experience, Chart 7). It is normally costly for banks to hold liquid assets. In a floor system, this cost is lower. If banks have less incentive to lend reserves to other banks, the central bank might have to accommodate banks' demand for reserves to prevent the overnight rate from increasing. This is in contrast to a corridor system or a quota system, where the central bank sets the terms and conditions for loans and deposits to give banks an incentive to demand the quantity of central bank reserves the central bank wishes to supply. In a floor system, it is to a greater extent banks – and to a lesser extent the central bank – that decide the level of reserves in the banking system.

In sum, in contrast to a floor system, a quota system (like a corridor system) contributes to limiting the use of central bank reserves as a store of value and keeping risk in the banking system rather than being drawn into the central bank. This also has consequences for the choice of counterparties and the terms and conditions for holding an account at the central bank, which are discussed in more detail in Section 4.

³⁰ See Akram and Findreng (2021).

3.5 Other factors

Operational factors The quota system requires more market operations in the form of F-loans, F-deposits and fine-tuning operations to keep the quantity of central bank reserves close to the target. Table 2 compares the two eight-year periods before and after the switch to the quota system and shows that the number of operations has more than doubled following the introduction of the quota system. The increase largely reflects the use of F-deposits to withdraw reserves that exceed the sum of the quotas.

Table 2. Number of operations in the periods 2004-2011 and 2012-2020

2004-2011			2012-2020		
F-deposits	F-loans	Total	F-deposits	F-loans	Total
0	335	335	477	367	844

More market operations increase operational risk. The risk is related to human error during the operations, system errors and unexpected changes in banks' liquidity position against Norges Bank.

To reduce the likelihood of operational errors, Norges Bank has improved its technical solution for market operations. In the new solution, automation has been increased, reducing the likelihood of human error.

Norges Bank has made a number of minor operational changes in recent years. Ordinary F-loans and F-deposits are now issued at a floating interest rate, allowing maturities to extend over the dates of monetary policy meetings. Norges Bank publishes an auction calendar showing planned market operations with non-standard settlement and/or terms. This includes fixed rate F-loans at the end of each quarter or year and F-loans with settlement T+2 in the event of a considerable decline in structural liquidity.

Alternative reference rates In light of international developments and proposals put forward by regulators in the US, the UK and the EU to establish alternative reference rates, Norwegian banks have chosen Nowa as Norway's alternative reference rate.³¹ A larger share of financial contracts can be linked to Nowa ahead. This implies that the monetary policy pass-through will be linked even more closely to the interest rate in the overnight unsecured market. Reference rates should preferably be formed in an efficient market with a large number of transactions. This calls for a liquidity management system where reserves are primarily used as a means of settlement and not as a store of value, ie a system where banks have an incentive to borrow reserves from each other overnight, as is the case in the quota system. Like a

³¹ In early 2018, Norges Bank, in consultation with the financial industry, established a working group on alternative Norwegian krone reference rates. Norges Bank is not itself a member of the group, but like Finance Norway, attends as an observer and provides the secretariat. For more on the work on alternative reference rates in Norway, see <https://www.norges-bank.no/en/topics/liquidity-and-markets/working-group-arr/>

corridor system, and in contrast to a floor system, the quota system creates market activity.

Alternative monetary policy measures In some situations, central banks will consider implementing alternative or extraordinary liquidity policy measures as a supplement to the ordinary monetary policy stance. Particularly in times of financial stress, it can be appropriate to inject liquidity into the banking system to reduce risk premiums in money market rates and other rates that are important for the transmission mechanism.

Since the 2008-2009 financial crisis, the risk premium in three-month Nibor (three-month Nibor minus the expected policy rate) has at times shown wide variations and has in periods been higher than normal. There are several reasons for this. In response to the financial crisis, central banks in other countries injected large amounts of reserves into the banking system (via long-term loans and asset purchases). This has in periods resulted in a *relative* shortage of NOK in the FX swap market, which determines the price of NOK relative to other currencies. In addition, the FX swap market has been affected by regulatory changes and reforms.³² All these factors have an impact on the Nibor premium as Nibor is constructed as an FX forward rate, derived from a USD rate and the forward premium (the interest rate differential) in the FX swap market.³³ Even though the pass-through of changes in the policy rate to Nibor has been high over time, this means that the Nibor premium has at times been high and variable. The question is to what extent this could weaken or disturb monetary policy transmission, particularly in an economy such as Norway with its high proportion of floating interest rates that directly or indirectly reference three-month Nibor.

Norges Bank can influence the premium in longer money market rates by injecting liquidity (reserves) into the banking system. Offering long loans on favourable terms is likely to push down money market rates. An increased supply of NOK liquidity reduces the relative shortage of NOK, the opposite of what happens when foreign central banks supply liquidity in their local currency. This reduces Norwegian money market rates.³⁴

Long-term loans from the central bank to reduce risk premiums in the money market are liquidity insurance that can have adverse consequences for banks' risk-taking (cf. the discussion on moral hazard in Section 3.3). Banks can internalise the central bank's intention to offer loans if the risk premium in money market rates or interest rates on other wholesale funding instruments increases. Banks may perceive this to mean that maturity transformation costs are lower. The result is an increase in banks' incentives to take on liquidity risk. This calls for caution in using liquidity policy measures to reduce money market premiums and ease banks' funding costs in normal times.

³² This is discussed in more detail in Lund, Tafjord and Øwre-Johnsen (2016) and in the Special Feature on page 57 of *Monetary Policy Report 3/2016* (see Norges Bank 2016).

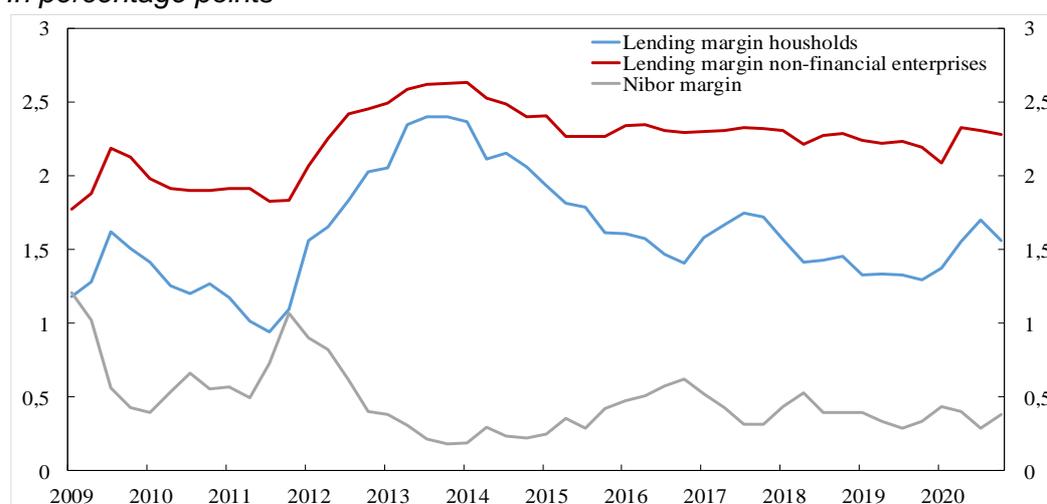
³³ Cf. footnote 23.

³⁴ Such loans can also be offered irrespective of which liquidity management system is in operation. In a floor system, the surplus liquidity generated by such loans will increase banks' overnight deposits at the central bank. In a corridor or quota system, surplus liquidity can be withdrawn via short-term market operations.

If higher money market risk premiums substantially weaken the monetary policy pass-through, the advantages of pushing down the premium can outweigh the disadvantages. Both the advantages and the disadvantages are difficult to quantify. The disadvantages include increased risk-taking and long-term costs related to the unintentional insurance against liquidity risk provided by the central bank. Such costs are particularly difficult to measure. The effect of lower money market premiums on monetary policy transmission must be considered in the light of the size of the risk premium and how long it is expected to persist. The larger the risk premium and the longer it is expected to persist, the larger the probable effect on money market rates, including banks' lending rates. Changes in the risk premium that are expected to be more temporary, and the lower it is, will likely have less effect on other interest rates and on the transmission mechanism.

The risk premium in Nibor may appear in periods to have had little impact on banks' lending rates. Separating policy rate expectations and the Nibor premium can provide an impression of the isolated effect of the premium on banks' interest rates. This is illustrated in Chart 8, which shows the premium in three-month Nibor and banks' lending margin, defined as the lending rate minus Nibor, from 2010. In this period, the Nibor premium only appears to have passed through to a limited extent to lending rates for households and enterprises. The relationship between the money market premium and banks' lending margins has been clearly negative. Higher money market premiums have coincided with lower lending margins and vice versa. Lower lending margins have tended to counteract the effect of higher Nibor premiums to some extent over the past ten years. This applies to both the corporate and household lending market.³⁵ It is likely that lending margins counteract a rise in Nibor premiums to a greater extent when the premium is or is expected to be volatile. Even substantial changes in the premium will likely have little effect on lending rates if the changes are expected to be, or prove to be, temporary. If, however, a change in the premium is expected to persist over time, it will likely have a more rapid effect on lending rates, even when the premium is more moderate.

Chart 8: Lending margins and premium above three-month Nibor. 2009-2020. In percentage points



³⁵ For longer market rates with Nibor as the underlying instrument (interest rate swaps), the Nibor premium has some effect on the shortest maturities (2-3 years), but the effect diminishes the longer the maturity is.

This means that monetary policy transmission will not necessarily be substantially weakened by variability in the Nibor premium. The effect of changes in the Nibor premium on banks' lending rates over the past ten years appears to have been limited. Nevertheless, if the Nibor premium should remain persistently high, we will have to expect that the premium could also have an effect on banks' lending rates.

Even though banks largely neutralise changes in the Nibor premium by adjusting interest rate margins, changes in the Nibor premium will affect interest expenses for bond issuers. In floating-rate bonds that reference Nibor, the interest rate margin above Nibor is fixed. Changes in Nibor affect interest payments whether this is because of changes in the premium or changes in the policy rate/policy rate expectations. But as most debt in Norway is intermediated through the banking system at floating rates, the results above indicate that changes in the money market premium do not substantially disturb monetary policy transmission.³⁶

In sum, the pass-through from the policy rate to money market rates and banks' lending rates has been high.³⁷ Higher money market risk premiums have less effect on lending rates when the premium is expected to be temporary. The premium normally fluctuates to some extent, although around moderate levels nevertheless. This reduces the need to implement liquidity policy measures to reduce the money market premium and the premium on banks' funding in normal times.

The 2008/2009 financial crisis is an example of the opposite. International capital markets came to a complete halt, and both money market premiums and banks' lending margins above Nibor rose. Liquidity had to be supplied to the banking sector in order to maintain both financial stability and monetary policy transmission. A similar situation arose during the Covid-19 crisis in 2020 (see the box on Norges Bank's liquidity policy through 2020 above).

Instruments and collateral

Norges Bank uses floating-rate loans and deposits in the day-to-day management of banks' reserves. Loan maturities normally range from one day and up to a couple of weeks, and loans are only provided against collateral. The instruments are constructed in such a way that Norges Bank assigns a collateral value equivalent to the loan amount without specifying which securities collateralise the loan (the collateral pool). This provides flexibility for a bank to move all the securities in the collateral portfolio as long as the value of the remaining collateral exceeds the bank's loan amount.

The collateral guidelines were drawn up to ensure that banks have sufficient access to intraday liquidity and liquidity through market operations (F-loans). Norges Bank accepts a relatively broad range of collateral, including collateral denominated in a foreign currency. Even with a haircut for currency risk, this can raise the central bank's balance sheet risk compared with accepting a

³⁶ This conclusion is supported by a similar analysis for the FX market. The effect of the Nibor premium on the exchange rate appears to be approximately half of the effect of the policy rate on the exchange rate (see Akram (2018)).

³⁷ Juelsrud, Nordal and Winje (2020) estimate that for the period 1991-2020, the total pass-through from the policy rate to both residential mortgage lending rates and corporate lending rates was 100%, ie a complete pass-through.

narrower range of low-risk securities. For the payment system, however, it is crucial for banks to have sufficient collateral to enable them to perform timely customer transactions.

Our assessment is that the selection of eligible collateral in the trade-off between central bank risk and an efficient payment system is appropriate in the current guidelines.

3.6 Quota system versus corridor system

The above discussion implies that in normal times, with no financial stress, the liquidity management system should be based on "limited" reserves in the banking system, as in a corridor or quota system. In addition, the liquidity management system should be able to manage situations in which the central bank needs to supply large reserves to banks, for example in times of financial stress. The quota system, like the corridor system, has these capabilities. Within the quota system, Norges Bank can as necessary lend reserves to banks at longer maturities and at the same time withdraw them using short time deposits. A quota system can also quickly be converted into a floor system, either by expanding the quotas (to infinity) or by raising the reserve rate to the policy rate.

A pure corridor system would also have these capabilities. In a corridor system (with no reserve requirements), the central bank aims to keep reserves in the banking system at zero (or marginally above zero) overnight. In a corridor system, in contrast to a quota system, it is critical that liquidity in the banking system is very efficiently distributed overnight and that the central bank's forecasts of structural liquidity are accurate. If not, the overnight rate can be highly volatile, and the central bank might have to implement numerous fine-tuning operations to be able to keep the overnight rate near the policy rate. A pure corridor system appears to be less suitable for Norway since the government's account at the central bank generates large fluctuations in structural liquidity. At the same time, relatively few banks are active in the Norwegian overnight market, which can in periods make it difficult to redistribute liquidity accurately.

The quota system can be regarded as an intermediate solution between a floor system and a corridor system. In the same way as the floor system, the quota system relies on excess reserves. This means that forecast errors that result in a deviation of the actual level of the reserves from the expected level will not affect market rates as much as in a corridor system. Norges Bank supplies sufficient reserves to the banking system to keep the overnight rate close to the policy rate. In contrast to the floor system, however, the overnight rate can be below the policy rate as often as above it. This is because the floor for money market rates is no longer the sight deposit rate but the reserve rate. In a quota system, banks with excess reserves will be willing to lend reserves in the interbank market at a rate below the sight deposit rate precisely to avoid having to make deposits at the even lower reserve rate.

Box: International developments in liquidity policy

Over the past 10 years, major changes to liquidity policy have been made by many central banks. The main changes are a direct consequence of the measures taken in response to the 2008/2009 financial crisis. The changes have been further cemented through central bank measures in response to the Covid-19 pandemic.

One of the measures that has influenced the orientation of liquidity policy is asset purchases, in particular government securities, often referred to as quantitative easing. Central bank asset purchases entail an increase in central bank reserves because central banks pay for the securities by crediting banks' accounts in the central bank. Such asset purchase programmes have been substantial particularly in the US, UK and euro area. Before the financial crisis, the central banks in those countries used variants of the corridor system in liquidity management. In order to ensure that the increase in reserves resulting from the measures did not push down short-term market rates below the central bank's policy rate, the central banks switched to floor systems, where all reserves are remunerated at the policy rate. When all reserves are remunerated at the policy rate, holding central bank reserves as a liquid asset becomes favourable. The largest central banks have used variants of floor systems over the past 10 years.³⁸ The central bank of Australia has traditionally aimed at keeping the market rate midway between the deposit and lending rate, but after introducing its asset purchase programme during the Covid-19 crisis in 2020, the central bank has let the market rate decline towards the deposit rate. In Canada and New Zealand, the central banks have also switched to a variant of the floor system after substantial provision of central bank reserves in response to the Covid-19 crisis.³⁹

It is difficult to reduce holdings of securities rapidly. Some central banks are also of the view that asset purchases should be a permanent part of central bank toolkits and that liquidity policy should continue to be oriented so that the banking system has substantial access to central bank reserves overnight.

The international tendency towards a liquidity policy with substantial access to central bank reserves must therefore be seen in the light of the measures implemented in response to the financial crisis. In the absence of those measures and the provision of substantial central bank liquidity after the financial crisis, the switch to floor systems would likely not have taken place. However, it should be noted that the basic principles discussed in Section 1.2 related to low risk on central bank balance sheets and high costs for central banks' standing liquidity insurance facilities remain firm. By way of example, the Bank of England offers liquidity insurance facilities that banks can use at an extra cost.⁴⁰ For Norges Bank it is less relevant to offer substantial access to reserves, as asset purchases have not been part of Norges Bank's toolkit and using such an instrument is limited due to a relatively thin government securities market. If Norges Bank were to implement monetary policy in a system with substantial access to reserves, reserves would have to be provided using loans backed by securities with higher risk. That would have increased the central bank's balance sheet risk.

³⁸ The switch from the corridor to the floor system in these central banks is further discussed in Bernhardsen and Kloster (2010) and Bernhardsen, Kloster and Syrstad (2016).

³⁹ Traditionally, New Zealand has managed liquidity within a quota system that has some commonalities with the Norwegian system.

⁴⁰ See <https://www.bankofengland.co.uk/markets/bank-of-england-market-operations-guide>

4. Counterparties and terms and conditions for holding an account at Norges Bank

An important liquidity policy instrument is the choice of firms that may open an account with Norges Bank and the appurtenant terms and conditions. Firms that may hold an account are referred to as Norges Bank's counterparties. In principle, Norges Bank is unrestricted in terms of offering accounts to financial sector firms provided it contributes to furthering the purpose of central banking activities in keeping with the Central Bank Act. Norges Bank has chosen to classify counterparties in two groups, *monetary policy counterparties* and *other counterparties*.⁴¹

Monetary policy counterparties may hold an account with access to all of Norges Bank's facilities and comprise all Norwegian deposit-taking banks, including Norwegian branches of foreign banks that actively participate in payment and credit intermediation.⁴² Deposit-taking banks have access to all of Norges Bank's facilities due to their special role in payment and credit intermediation. As discussed in Section 1.2, the activities of deposit-taking banks entail a liquidity risk for those banks, which is ultimately the risk of not having central bank reserves to settle a payment to another bank. By giving banks access to central bank reserves through loan and deposit facilities in the liquidity management system, Norges Bank can influence banks' liquidity risk and thereby form a basis for monetary policy implementation.

Other counterparties may also be eligible to hold an account and be granted access to Norges Bank's standing facilities or parts of them if such access contributes to furthering the purpose of central banking activities. Such counterparties can be financial sector firms that participate actively in the payment system and/or firms whose holding of an account will contribute to financial stability or in other ways further the purpose of central banking activities. Other counterparties may not participate in Norges Bank's market operations.

4.1 More on account terms and conditions and the objective of liquidity policy

Account terms and conditions for monetary policy counterparties are designed in line with the objectives of liquidity policy, ie to ensure pass-through from the policy rate to market rates, contribute to an efficient payment system, facilitate the central bank's provision of liquidity insurance and role as lender of last resort, and ensure that risk is allocated to the private banking system. It is precisely the account terms and conditions for monetary policy counterparties, including access to all facilities that, together with Norges Bank's open market operations practices, determine the features of the quota system.

⁴¹ Cf. [Regulation on lending and deposit facilities at Norges Bank](#)

⁴² Banks that use another settlement bank and that do not participate directly in Norges Bank's settlement system (level-2 banks) are also classified as monetary policy counterparties. Level 2 banks do not use their accounts at the central bank actively in day-to-day liquidity management, but can choose to be a level 1 bank if they wish. They can also choose to participate in F-auctions if they wish. Being a level 1 bank is a right, but not an obligation. Level 2 banks are active in payment and credit intermediation and are important for Norges Bank to achieve its objectives. Both level 1 and level 2 banks in Norges Bank's settlement system are therefore classified as monetary policy counterparties.

Other counterparties will be a more heterogeneous group of financial sector firms and can face different account terms and conditions and varying access to Norges Bank's facilities. In addition to the consideration of an efficient payment system and financial stability, it is important that the account terms and conditions for these counterparties are designed to incentivise them to use central bank reserves primarily as a means of settlement and not as a store of value. This is ensured by stipulating limitations on the terms for other counterparties compared with the terms for monetary policy counterparties. By way of example, other counterparties' access may be limited to intraday facilities, they may be limited to small overnight deposit quotas, and their overnight deposits may be remunerated below the policy rate. This ensures that the account terms for other counterparties do not disturb monetary policy implementation and at the same time contribute to financial stability.

The starting point for this rationale is that when deposit-taking banks create deposit money as a liability, this liability remains in the banking system as long as the central bank limits the right to hold an account at the central bank to deposit-taking banks. If, on the other hand, the central bank broadens access to others than deposit-taking banks, this also allows banks' liabilities to be moved from banks' aggregate balance sheet to the central bank. Then, non-bank counterparties will hold deposits at the central bank, while the offsetting item on the central bank's balance sheet will be loans to banks that replace the banks' deposit money/deposits. If the deposit money moved from the banking system is substantial, the central bank's balance sheet risk will increase.

This can be illustrated by the balance sheet of the banking system and the central bank (Table 3). For banks, assets include credit to the general public (C), securities and deposits at the central bank, while liability items are deposits from the general public (deposit money created by banks, M), debt instruments, loans from the central bank and equity capital. For the central bank, securities and loans to banks are assets, while liability items are deposits from banks (central banks reserves), notes/coins, government deposits and equity capital.

Table 3. Balance sheet of banks and central bank

Bank		Central bank	
Assets	Liabilities	Assets	Liabilities
Credit to general public (C)	Deposits from general public (M)	Securities	Deposits from banks (CB reserves, R)
Securities	Debt instruments	Loans to banks	Notes/coins
Deposits at central bank (reserves)	Loans from central bank		Government account (deposits)
	Equity capital		Equity capital

Assume that there are no financial firms other than banks (except the central bank). When the general public moves deposits between banks, some banks see their deposits increase while others see a decrease (only changes in deposits from the general public at individual banks, on the banks' liabilities side). But the general public's total bank deposits – banks' total financing – remain unchanged. *The money stays in the banking system.* Assume, on the other hand, that others apart from traditional deposit-taking banks can hold deposits at the central bank. This could lead to what is called "leakages from

the banking system”, which can assume various forms depending on the cause of the leakages.

This can, for example, occur in the case of full reserve banks, whose only activity is to take deposits from the general public and place them at the central bank, cf Table 4, which shows the balance sheet of a full reserve bank.⁴³

Table 4. Balance sheet of a full reserve bank

Assets	Liabilities
Deposits at central bank	Deposits from the general public
	Equity capital

When the general public moves deposits from traditional banks to full reserve banks, reserves must be moved from traditional banks’ accounts at the central bank to full reserve banks’ accounts at the central bank. The traditional banks lose financing and the deposits from the general public must be replaced with loans from the central bank. Depending on the quality of the collateral pledged by banks for the loans, this can increase the central bank’s balance sheet risk, particularly in times of financial stress when full reserve banks’ deposits can seem attractive to some depositors.

The same argument could apply if the central bank allows “shadow banks” to hold large deposits at the central bank. Shadow banks issue short-term paper and tend to invest in longer-term paper, thereby performing maturity transformation (eg money market funds) in the same way as banks. Shadow banks do not create money as banks do, however, but intermediate credit already created by banks. Shadow banks may also seek very safe placement (eg stablecoin issuers) and might therefore want to hold large deposits at the central bank. In the same way as full reserve banks, shadow banks could in effect draw central bank reserves out of the traditional banking system. Traditional banks could lose their financing, which would have to be replaced by loans from the central bank. This could expose the central bank to increased risk.⁴⁴

⁴³ Full reserve banks, also referred to as “narrow banks”, are not exactly defined, but are often described as banks that only invest in risk-free assets. A common definition is that a full reserve bank only holds deposits in the central bank. For example, ... “Narrow banks” can be conceived of as any private sector depository institution, public sector facility or other entity whose main purpose is to offer nonbanks overnight investments that are, directly or indirectly, fully backed by central bank liabilities... see *The Narrow Bank* (TNB, 2019): [Potential Revisions to Regulation D \(federalreserve.gov\)](https://www.federalreserve.gov) or... “The idea of the Narrow Bank is that you can open a bank account with TNB, and it will take your money and park it at the Fed, and that’s it...” (Levine/Bloomberg 2019): <https://www.bloomberg.com/opinion/articles/2019-03-08/the-fed-versus-the-narrow-bank>

⁴⁴ There is no exact definition of the term “shadow bank”, but it usually refers to financial firms that are not defined as traditional banks but that engage in various forms of banking activities in the same way as traditional banks. A somewhat more precise distinction in terms of monetary circulation could be to define shadow banks as those that perform credit intermediation without creating money themselves. Shadow banks issue debt instruments, often short-term paper, and receive existing bank deposits. These deposits are used to purchase securities that may have varying characteristics, such as long maturities or higher credit risk, or are very low-risk

This issue also arises in connection with central bank digital currency (CBDC). CBDC is electronic money the public could hold, in the same way as notes and coins today, and that would be on the liabilities side of the central bank's balance sheet. When the public moves deposits from banks to the central bank, banks will have to reduce their deposits at the central bank by a corresponding amount. If banks do not have enough reserves at the central bank, the central bank might have to lend more reserves to the banks, raising the question of which assets banks could pledge as collateral. CBDC could lead to leakages from the banking system similar to that associated with full reserve banks.⁴⁵ A number of central banks, including Norges Bank, are currently exploring whether to introduce a CBDC. The consequences of CBDC for bank financing and central bank risk is an issue, particularly if the public is to be given access to unlimited digital money in an account at the central bank.^{46,47}

Based on the examples above, full reserve banks, shadow banks and CBDCs where the public can hold unlimited deposits at the central bank could all result in banks losing financing that would have to be replaced by central bank financing. This could increase the central bank's balance sheet risk.

Thus we see that (i) the objective of allocating liquidity and credit risk in the private banking system, (ii) the orientation of the liquidity management system to prevent central bank reserves from being used as a store of value and (iii) account terms and conditions are all connected. Norges Bank aims to achieve all three objectives by giving counterparties account terms and conditions that prevent leakage from the banking system to the central bank. Traditional deposit-taking banks have full access to all the central bank's facilities and can receive interest at the policy rate on deposits up to the quota. Transferring deposits between banks does not lead to leakages from the banking system to the central bank. Other counterparties are given terms and conditions that seek to prevent leakages. This contributes to keeping risk in the private banking system and limiting risk on the central bank's balance sheet.

(government paper, high-quality securities, etc.). One example is money market funds in the US, which invest in a variety of types of security depending on the fund's investment universe (prime, government). Another example is the stablecoin system Libra, currently in its initial phase, where it may be possible to buy short-term securities issued by Libra and where Libra invests in low-risk securities in various currencies. The issue discussed above could arise if shadow banks can place deposits at the central bank. For further discussion of shadow banking, particularly with reference to the US, see Gissler and Narajabad (2017 a, b, c), Kodres (2013), Anadu and Baklanova (2017) and Noeth and Sengupta (2011).

⁴⁵ From the point of view of monetary circulation, a CBDC and deposits in full reserve banks are fairly similar with regard to the consequences for bank and central bank balance sheets, although there may be legal and technical/operational differences.

⁴⁶ Leakage from the banking system can be limited through interest rate conditions or deposit quotas at the central bank, or by introducing other forms of CBDC that do not include the public's direct deposits at the central bank.

⁴⁷ There is now an extensive literature on CBDCs (see for example Auer, Cornelli, Frost (2020), BIS (2018) and Riksbanken (2020)). A CBDC project is also in progress at Norges Bank (see Norges Bank (2018), Norges Bank (2019b) and Norges Bank (2021)). See also the websites of the central banks of the euro area, England and Canada, and the IMF website, which refers to a large number of analyses related to CBDC.

5. Summary and conclusion

- The purpose of central banking activities is to maintain monetary stability and to promote the stability of the financial system and an efficient and secure payment system. The objective of liquidity policy is to support these aims. Liquidity policy instruments are: terms and conditions for deposits and loans, market operations, guidelines for pledging collateral for loans, choice of counterparties and liquidity support to individual banks.
- To underpin the purpose of central banking activities, liquidity policy should be designed to achieve the following objectives:
 - ensure a high degree of pass-through from the policy rate to market rates,
 - facilitate an efficient payment system,
 - offer liquidity insurance and be a lender of last resort, and
 - provide a framework for liquidity and credit risk to be borne as far as possible by the private banking system.
- The quota system Norges Bank has operated since 2011 is well suited to achieving the objectives of liquidity policy in normal times. In times of financial stress, the quota system can be adjusted to meet the need for extraordinary liquidity. This was the case during the Covid-19 crisis in 2020 when the quota system was temporarily adjusted in the direction of a floor system, whose properties can be an advantage in times of financial stress.
- In normal times, central bank reserves should primarily be a means of settlement between Norges Bank's counterparties rather than an asset the counterparties can use as a store of value. This should be reflected in the account terms and conditions. The account terms and conditions for both monetary policy counterparties and other counterparties provide incentives to demand the amount of central bank reserves the central bank wants to supply. This reduces the central bank's balance sheet risk and provides the framework for liquidity and credit risk to be borne by private participants and not be drawn into the banking system.

References

Akram, Q. F. (2018) "[Virkninger av pengemarkedspåslag på kronekursen](#)" [Impact of money market premiums on the krone exchange rate]. *Staff Memo* 5/2018. Norges Bank (Norwegian only).

Akram, Q. F. and J. H. Findreng (2021) "[Norwegian interbank market's response to changes in liquidity policy](#)". *Journal of Banking & Finance*, Vol. 125, April 2021. See also *Norges Bank Working Papers* 7/2017.

Anadu, K. E. and V. Baklanova (2017) "[The Intersection of U.S. Money Market Mutual Fund Reforms, Bank Liquidity Requirements, and the Federal Home Loan Bank System](#)". *Supervisory Research Working Papers* 17/05. Federal Reserve Bank of Boston.

Auer, R., G. Cornelli and J. Frost (2020) "[Rise of the central bank digital currencies: drivers, approaches and technologies](#)". *BIS Working Papers* 880.

BIS (2018) "[Central bank digital currencies](#)". *Committee on Payments and Market Infrastructure, Markets Committee Papers* 174, 12 March 2018. Bank for International Settlements.

Bernhardsen, T. and A. Kloster (2010) "[Liquidity management system: Floor or corridor?](#)" *Staff Memo* 4/2010. Norges Bank.

Bernhardsen, T., A. Kloster and O. Syrstad (2016) "[Alternative virkemidler i pengepolitikken – den nødvendige monetære økosirk](#)" [Alternative monetary policy instruments – the necessary monetary circulation]. *Staff Memo* 12/2016. Norges Bank (Norwegian only).

Bindseil, U. (2014) [Monetary Policy Operations and the Financial System](#). Oxford University Press.

Gissler, S and B. Narajabad (2017 a) "[The increased role of the federal home loan bank system in funding markets, Part 1 Background](#)". FEDS Notes 18 October 2017.

Gissler, S and B. Narajabad (2017 b) "[The increased role of the federal home loan bank system in funding markets, Part 2 Recent trends and potential drivers](#)". FEDS Notes 18 October 2017.

Gissler, S and B. Narajabad (2017c) "[The increased role of the federal home loan bank system in funding markets, Part 3 Implications for financial stability](#)". FEDS Notes 18 October 2017.

Juelsrud, R., K. B. Nordal and H. Winje (2020) "[Om gjennomslaget fra styringsrenten til bankenes renter](#)" [On the pass-through from the policy rate to banks' interest rates]. *Staff Memo* 11/2020. Norges Bank (Norwegian only).

Keister, T., A. Martin and J. McAndrews (2008) "[Divorcing Money From Monetary Policy](#)". *FRBNY Economic Policy Review*, Volume 14, Number 2, September 2008. Federal Reserve Bank of New York.

Kodres, L.E. (2013) "[What is shadow banking?](#)" *Finance and Development*, June 2013, Vol. 50, No. 2. International Monetary Fund.

Lund, K., K. Tafjord and M. Øwre-Johnsen (2016) "[What drives the risk premium in Nibor?](#)" *Economic Commentaries* 10/2016. Norges Bank.

McLeay, M., A. Radia and R. Thomas (2014a) "[Money in the modern economy: an introduction](#)". *Quarterly Bulletin* 2014 Q1, Bank of England.

McLeay, M., A. Radia and R. Thomas (2014b) "[Money creation in the modern economy](#)". *Quarterly Bulletin* 2014 Q1, Bank of England.

Nicolaisen, J. (2017) "[What should the future form of our money be?](#)" Speech at the Norwegian Academy of Science and Letters on 25 April 2017.

Noeth, B. J. and R. Sengupta (2011) "[Is shadow banking really banking?](#)" *The Regional Economist*, October 2011.

Norges Bank (2014) "[Banks' assessment of Norges Bank's liquidity management](#)". *Norges Bank Papers* 4/2014. Norges Bank.

Norges Bank (2016) "[Monetary policy report with financial stability assessment 3/2016](#)". Norges Bank.

Norges Bank (2017) "[Financial stability report 2017](#)". Norges Bank.

Norges Bank (2018) "[Central bank digital currencies](#)". *Norges Bank Papers* 1/2018. Norges Bank.

Norges Bank (2019a) "[New principles for Nowa – possible implications](#)". *Norges Bank Papers* 3/2019. Norges Bank.

Norges Bank (2019 b) "[Central bank digital currencies](#)". *Norges Bank Papers* 2/2019. Norges Bank.

Norges Bank (2020) "[Financial Infrastructure Report 2020](#)". Norges Bank.

Norges Bank (2021) "[Central bank digital currencies – Third report of working group](#)". *Norges Bank Papers* 1/2021. Norges Bank.

Riksbanken (2020) "[Second special issue on the e-krona](#)". *Economic Review* 2020 2. Sveriges Riksbank.

Søvik, Y. (2020) "[The rationale for central bank liquidity insurance and liquidity regulation](#)". *Staff Memo* 3/2020. Norges Bank.

Whitesell, W. (2006) "[Interest rate corridors and reserves](#)". *Journal of Monetary Economics*, 53, Issue 6, September 2006, pp 1177-1195.