NORGES BANK PAPERS

# Banks' assessment of Norges Bank's liquidity management system

NO. 4 | 2014

NORGES BANK

Norges Bank Papers no. 4 | 2014

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ISSN 1894-0277 (online)
ISBN 978-82-7553-843-8 (online)

## 1. Introduction

In October 2011, Norges Bank introduced a new system for managing bank reserves (bank deposits with the central bank). While banks previously received interest on all deposits at the key policy rate (the sight deposit rate), quotas were introduced in October 2011, restricting the level of a bank's reserves that would be remunerated at the key policy rate. The interest rate on deposits in excess of the quota is called the reserve rate, which has so far been one percentage point lower than the key policy rate. The purpose of changing to a quota-based system was to limit bank demand for central bank reserves and to provide a stronger incentive for banks to redistribute liquidity in the interbank market.

The proposed change in the liquidity management system was circulated for comment by Norges Bank on 6 October 2010. With one exception, all the responses to the new system were negative. Banks pointed out that the new system would make it more expensive for banks to hold reserves with the central bank, liquidity management would be more difficult, not only for banks but also for the central bank, and it would be more difficult for banks to meet the Basel III liquidity requirement (LCR). These views were reiterated at a seminar for the banking industry hosted by Norges Bank in September 2011.

Under the previous system, the low cost of holding reserves at the central bank made this an attractive option for banks, and the level of reserves grew over time. In addition, activity was low in the overnight market and banks would have been able to exploit the liquidity management system to meet the Basel III LCR requirement more easily.[1] Thus, from banks' point of view, the previous system was advantageous, which may explain the resistance to the change.

We have now had about three years' experience of the new system. Since the change, activity in the interbank market has increased. Central bank reserves are at the level Norges Bank has aimed to maintain, NOK 35 billion.

Norges Bank has had regular contact with banks to seek their views on the quota-based system. The Bank held meetings with a large number of banks in spring 2014 where banks expressed their views verbally and in writing. This paper examines banks' response to the quota-based system in more detail. Our impression is that banks have quickly adapted to the new system and that the general consensus is that it functions efficiently. As reflected in their comments, however, some banks see a need for changes to be made. These changes particularly reflect a perception of unfairness in the distribution of quotas and issues related to quarter- and year-ends.

To provide background, the next section presents a discussion of the previous floor system and the change to the new quota-based system. The various issues raised by banks are discussed in the subsequent sections. Section 3 deals with total quotas and the target for the level of total reserves, while Section 4 discusses the distribution of quotas among banks. The remaining sections examine the NOWA (Norwegian Overnight Weighted Average) interest rate and overnight trading of reserves by banks, Norges Bank's operations, issues related to quarter- and year-ends and

[1] To what extent banks' can make use of the liquidity management system in this way depends on the rules on collateral for loans from Norges Bank and the formulation of the LCR requirement. This is discussed in Section 7.

compliance with capital and liquidity requirements. A summary of other aspects of the liquidity management system is presented in the concluding section.

## 2. Liquidity management: the previous floor system and the current quota-based system[2]

The purpose of Norges Bank's liquidity management is to keep short-term money market rates close to the key policy rate. The Bank achieves this by setting the terms of banks' loans and deposits with the central bank and by adjusting the quantity of central bank reserves in the banking system. The central bank's instruments and the terms of these instruments constitute the liquidity management system. Such systems differ internationally, and the structure of these systems influences bank behaviour and interest rate formation in money markets.

Central bank reserves, or simply reserves, refer to banks' liquid deposits with the central bank. Banks need central bank reserves to effect interbank transactions.[3] There are different systems for managing banks' reserves. The level of reserves is generally managed through various market operations, whereby the central bank either adds reserves to or drains reserves from the banking system. Norges Bank uses fixed-rate loans (F-loans) to add reserves and fixed-rate deposits (F-deposits) to drain reserves. In addition, all liquidity management systems have standing facilities that allow banks to deposit funds or borrow funds at their own initiative. Norges Bank has issued guidelines for pledging securities as collateral in order to borrow reserves. Furthermore, Norges Bank offers an intraday facility, giving banks access to interest-free loans against collateral within one day.

*The previous floor system*

From the mid-1990s until 3 October 2011, Norges Bank used a so-called floor system for the management of banks' reserves. Under a floor system, banks receive interest on all deposits with the central bank at the sight deposit rate, which is also the central bank's key policy rate. The sight deposit rate normally forms a floor for the shortest money market rates, as banks will not normally lend reserves at an interest rate that is lower than the rate they receive from the central bank. Similarly, Norges Bank's overnight lending rate (for D-loans) forms a ceiling for the shortest money market rates, as banks will not normally borrow reserves at an interest rate that is higher than the rate they have to pay the central bank. In a floor system, the central bank must ensure that there is a surplus of reserves in the banking system, i.e. that banks hold deposits of a certain volume in the central bank. When these deposits are

[2] The text in this section is largely taken from Norges Bank's website (see www.norges-bank.no under the top menu Liquidity and Markets/Liquidity management). Liquidity management systems and their characteristics are discussed in more detail in Keister, T., A. Martin and J. McAndrews (2008) "Divorcing Money From Monetary Policy", *FRBNY Economic Policy Review*, September 2008, 41-55, Bernhardsen, T. and A. Kloster (2010) "Liquidity management system: Floor or Corridor?" *Staff Memo* 4/2010, Norges Bank and Syrstad, O. (2011) "Systemer for likviditetsstyring: Oppbygging og egenskaper" [Liquidity management systems: structure and characteristics], *Staff Memo* 05/2011, Norges Bank. Norwegian only.

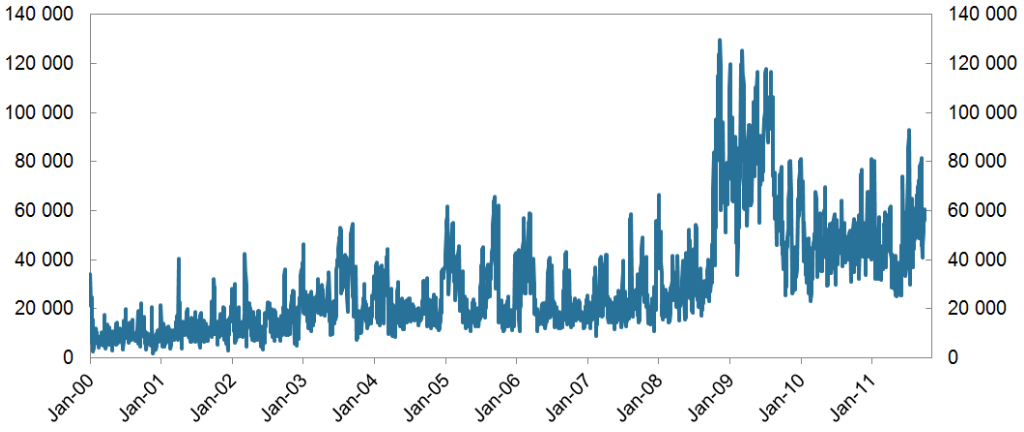
[3] For example, if a customer transfers money from bank A to bank B, the transaction between the banks is settled by reducing Bank A's deposits with the central bank and increasing Bank B's deposits by the same amount.

sufficiently large, the shortest money market rates will be driven down towards the sight deposit rate. The level of reserves required to achieve this depends on bank demand and can vary over time. Under the floor system, Norges Bank supplied reserves by providing F-loans to banks against collateral in the form of securities. These loans were offered when, in Norges Bank's judgement, there was a need for more reserves in the system to keep the market rate close to the sight deposit rate. The interest rate on F-loans is normally just above the sight deposit rate.

One of the characteristics of a floor system is that banks have ample access to central bank reserves and that the cost of borrowing reserves through the central bank's market operations is relatively low. Under this system, a bank could increase its holding of reserves with Norges Bank by borrowing reserves by means of an F-loan at an interest rate that was normally just above the sight deposit rate. Since all reserves were remunerated at the sight deposit rate, the cost of holding more reserves acquired through F-loans was normally only a few basis points.[4] All else being equal, a lower price for holding reserves implies that banks will want to hold more of them. Norges Bank observed that demand for reserves at F-loan auctions was generally high and higher than needed by banks to settle payments in Norges Bank's settlement system. Over time, Norges Bank tended to have to increase the level of reserves to keep short-term money market rates close to the sight deposit rate. Chart 1 shows total reserves in the banking system from January 2000 to October 2011. The level of reserves in the banking system generally increased over time. Particularly following the financial crisis, when the central bank temporarily supplied large quantities of reserves, the level tended to remain higher than previously.

*Chart 1: Total reserves in the banking system. In millions of NOK. 1 January 2000 to 3 October 2011*

[4] A bank can acquire reserves in several ways. A bank can offer and obtain an F-loan and hold the acquired reserves as deposits with the central bank. As explained above, these reserves are "cheap" in a floor system. A bank can also issue a debt instrument and acquire reserves in the settlement when the debt instrument is sold (provided the purchaser of the debt instrument has an account in another bank). Central bank reserves acquired by issuing debt instruments can, from banks' point of view, be perceived as more costly as the bank will include the interest on the debt instrument in the cost. But then the term of the debt instrument must also be taken into account. Issuing a long-term debt instrument provides the bank with liquid central bank reserves for a long period. This should cost a bank more than if reserves were only acquired through more short-term F-loans. A bank can also acquire reserves «structurally», i.e. as part of interbank settlements, although banks have less control over these transactions.




As central bank reserves grew over time, Norges Bank also observed a decrease in the redistribution of reserves in the interbank market. Since the overnight rate in the interbank market was close to the central bank deposit rate, banks' earnings from lending to other banks were low. In some situations, there were signs that the short-term money market rate[5] had to be bid up considerably before a lender would enter the market. Demand for central bank reserves then increased, and to keep the overnight rate close to the sight deposit rate, Norges Bank had to supply reserves to the banking system.

Norges Bank viewed these developments as unfavourable and therefore wanted to change the liquidity management system. Two objectives in particular were important. One was to stop growth in central bank reserves.[6] The other was to generate more interbank activity in the overnight market as rising quantities of reserves in the banking system entailed a risk that Norges Bank would assume some of the functions of the interbank market. The role of the central bank is to control the level of total reserves, while banks' should redistribute the reserves in the interbank market. This resulted in a change of system from a floor system to a quota-based system.

*The change to a quota-based system*

In principle, the banking system can function without banks' holding overnight deposits with the central bank, i.e. that the level of total reserves in the banking system is zero. This is the case under a so-called corridor system (with no reserve requirements).[7] The redistribution of reserves through the day via interbank payments is reversed via interbank loans at the end of the day. Banks with a negative position vis-à-vis the central bank borrow reserves from banks that have been supplied with reserves through the day and thus have a positive position vis-à-vis the central bank. Since the total quantity of reserves is zero, the sum of negative positions will always be matched by the sum of positive positions. When the

[5] Under the floor system, banks' trades in reserves and the rates charged on these trades were not collected and registered. The largest banks reported indicative lending rates for reserves on Reuters (NIDR overnight and Tomorrow/Next).

[6] Note that the central bank is also generally capable of controlling the quantity of central bank reserves under a floor system, and Norges Bank would also in principle have been able to steer the quantity of reserves towards a lower level under the previous floor system. However, this would have been at the expense of a higher and more volatile overnight rate. This is because the central bank seeks to keep short-term rates close to the key policy rate, and thus has to accommodate demand for reserves in a floor system. It is in this sense the central bank "loses control" over the reserves.

[7] See the references in footnote 2 for details.

interbank market functions efficiently, banks do not need to avail themselves of the central bank's standing deposit and credit facilities (which are normally more expensive for banks to use).[8]

Thus, a corridor system requires reserves to be redistributed efficiently in the interbank market. Furthermore, it places considerable demands on liquidity management by the central bank, which must at all times steer towards zero reserves in the banking system. This is achieved by supplying reserves to banks when there is a deficit of reserves in the banking system (the sum of banks' positions vis-à-vis the central bank is negative) and by draining reserves when there is a surplus of reserves in the system. Reserves change in particular as a result of transactions between banks and the government when the government has an account at the central bank. Payments to the government drain reserves from the banking system, while payments from the government have the reverse effect. Consequently, payments to and from the government give rise to fluctuations in banks' reserves in the central bank.

In Norway, the government has an account with Norges Bank, and changes in reserves as a result of transactions with the government are counteracted by market operations (F-loans and F-deposits). To accomplish this, the central bank develops forecasts for changes in the reserves as a result of expected transactions between banks and the government. These forecasts are subject to a margin of error. The effect of such forecasting errors on the overnight rate is less pronounced under a floor system than under systems without surplus reserves. This is because the level of reserves in the banking system is in any case high under a floor system. Even if the supply of reserves should fall as a result of unexpected payments to the government, the quantity of reserves will still be sufficient to keep the overnight rate close to the key policy rate. The effect of government transactions on banking system reserves, making liquidity management more complicated, was a factor Norges Bank had to take into account when the liquidity management system was changed in October 2011.

The new system introduced on 3 October 2011 is a compromise between a floor system and a corridor system. Under the new system, only a certain amount of each bank's deposits with the central bank – a quota – is remunerated at the key policy rate. Deposits in excess of the quota are remunerated at a lower rate, the reserve rate.[9] The system is intended to give banks a financial incentive to reduce their demand for reserves and motivate them to redistribute reserves in the interbank market. Previously, a bank could retain large deposits in its sight deposit account at low cost. This cost has increased under the new system. A bank with deposits in excess of the quota has an incentive to offer the surplus in the interbank market. It

[8] A bank with a negative position vis-à-vis the central bank that is not able to borrow reserves overnight from other banks has to use the central bank's standing credit facility to obtain an overnight loan. The interest rate on these loans is high, for example one percentage point above the key policy rate. Banks with deposits with the central bank that are not able or willing to lend reserves to other banks overnight have to use the central bank's standing deposit facility overnight. The interest rate on these deposits is low, for example one percentage point below the key policy rate. The unfavourable interest rates on these standing facilities give banks an incentive to trade reserves in the interbank market overnight. The interest rate on these trades, the overnight rate, is usually around the key policy rate.

[9] Banks' reserve holdings can still be as large as they wish. The reserve rate is currently 1 percentage point below the sight deposit rate.

has become easier for banks needing to borrow reserves overnight to find a lender. It will also be profitable for banks with deposits lower than the quota to borrow reserves at an interest rate below the key policy rate and deposit these reserves with Norges Bank at the key policy rate.

Like the floor system, the quota-based system is a system with surplus reserves (the central bank aims to keep banking system reserves above zero). Any forecasting errors will therefore affect market rates to a lesser extent than under a corridor system. In addition, banks still have an intraday facility at Norges Bank and can borrow reserves interest-free through the day against collateral. Norges Bank ensures that banks have an adequate supply of reserves so that the overnight rate remains close to the key policy rate. In contrast to the floor system, however, the overnight rate in the quota-based system can also be below the key policy rate, not just above it. This is because the floor is no longer the sight deposit rate, but the reserve rate. Under the new system, banks with surplus 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 reserve rate.

## 3. Total quotas and target

When the quota-based system was introduced in October 2011, the target for reserves in the banking system was set at NOK 35 billion, with a target range of +/- NOK 5 billion around this level. The sum of banks' individual quotas (the total quota) was set at NOK 45 billion. The level of the total quota was set based on the average level of reserves over a two-year period prior to the change in system. The total quota functions as a ceiling for total reserve demand and helps to curb reserve growth. The target was set NOK 10 billion lower than the total quota in order to leave room for banks with reserves in excess of their individual quota to deposit these reserves with other banks. A target interval for the reserves means that the level is not fine-tuned to keep it at NOK 35 billion but that Norges Bank allows the level to fluctuate between NOK 30 billion and NOK 40 billion.

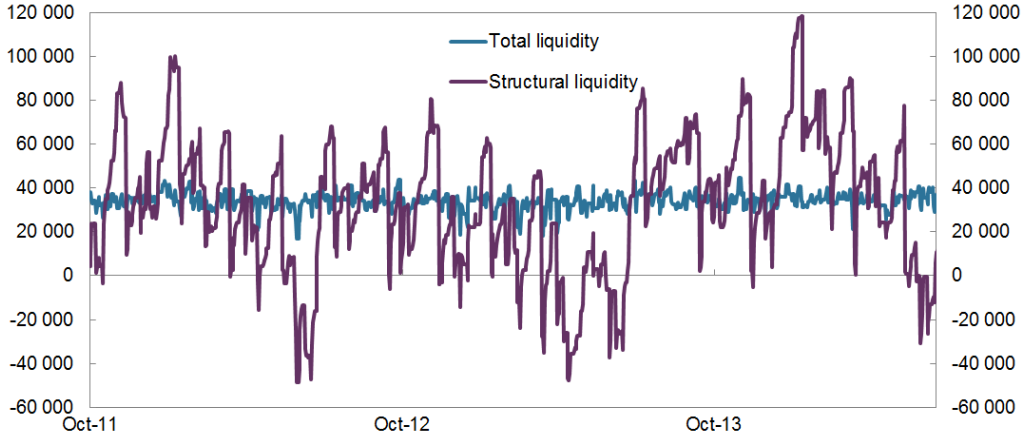
The total quota of NOK 45 billion is distributed across the 131 banks with accounts at Norges Bank. The banks have been divided into three groups, with all the banks in the same group allocated the same quota, with the exception of settlement banks, which have been allocated somewhat larger quotas. Each bank has been assigned to a group based on its level in Norges Bank's settlement system (NBO) and whether it is a NIBOR panel bank (a market maker in the money market). Group 1 comprises the six NIBOR panel banks. Group 2 comprises 15 banks (including the largest savings banks) and group 3 comprises 110 smaller banks. The group's share of the total quota is based on the group's share of total assets. Given the group's share of the total quota, quotas are shared out equally among all the banks in the group.

The level of the quotas and the target are assessed twice a year, but have not been changed since the system was introduced.[10] Since the system was introduced, the target level has been NOK 35 billion, while the sum of the quotas has been NOK 45 billion. Reserves have averaged NOK 34 billion, with the highest level at NOK 45

[10] See «Quotas in the system for the management of bank reserves», *Circular* 7/1 September 2014, www.norges-bank.no (under the top menu Published/Circulars).

billion and the lowest at NOK 16 billion[11,12], as illustrated in Chart 2, which shows total liquidity and so-called structural liquidity. Structural liquidity refers to the level of reserves in the banking system before Norges Bank conducts market operations to supply or drain reserves.

*Chart 2: Structural liquidity and total liquidity. In millions of NOK. 3 October 2011 to 30 June 2014*




*Reserve deposits*

With today's quota system, no banks should have to hold deposits in excess of the quota (reserve deposits) at Norges Bank. This is because Norges Bank aims at holding total liquidity at a level lower than the sum of banks' quotas. This means that any bank with reserves in excess of the quota should be able to deposit these reserves with other banks with room on their quota. Most banks are generally able to keep their reserves within the quota so that they avoid receiving interest on their reserves at the reserve rate.

Some banks nonetheless hold reserve deposits. In total, banks have held an average of about NOK 1 billion in reserve deposits with Norges Bank every day since the quota system was introduced.

Banks holding reserve deposits are primarily in group 3. Banks in group 3 held 69 percent of total reserve deposits between 3 October 2011 and 30 June 2014. In the same period, group 2 banks held 16 percent of reserve deposits, while group 1 banks held 15 percent.

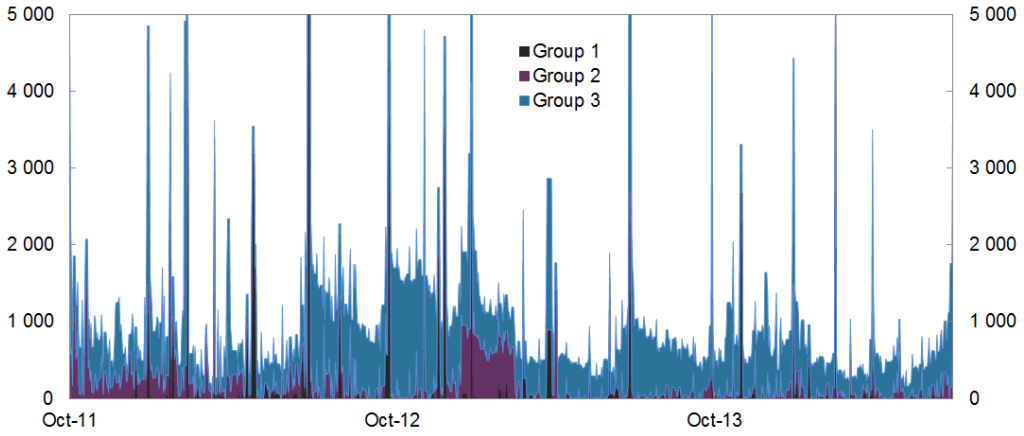
Group 3 banks are smaller than banks in groups 1 and 2 and probably spend less time and resources on liquidity management. As illustrated by Chart 3, reserve deposits

[11] From 3 October 2011 to 30 June 2014.

[12] In situations where total reserves have been well below NOK 30 billion, banks have been offered F-loans. The reserves have been as low as NOK 16 billion kroner because banks have not bid at F-loan auctions. Banks do not bid at these auctions because, despite the low level of reserves, the reserves in the system are evenly distributed among banks. Given that a bank has a positive position in deposits vis-à-vis the central bank, the bank will normally have no wish to borrow extra reserves from the central bank at an interest rate somewhat above the sight deposit rate, then have to deposit these funds overnight at the sight deposit rate.

are considerably higher at quarter-ends than at other times. The quarter-end issue is discussed in more detail below.

*Chart 3: Banks' reserve deposits by bank group in the liquidity management system. In billions of NOK. 3 October 2011 to 30 June 2014*




Banks have expressed the following on the subject of total reserves and the target:

*"Today's parameters of total quotas, quota distribution and Norges Bank's target seem reasonable."*

*"We find the total quota and the quota distribution to be reasonable. We would also like to highlight predictability with regard to the level of total reserves as a positive factor."*

*"In view of the way the system works for our bank, we have no particular wish to have the total quotas or the distribution of quotas adjusted."*

*"The total quota could be reduced slightly so as to lower Norges Bank's target to NOK 30 billion, with an interval of NOK 25 – 35 billion."*

*"We would prefer to see a slightly lower target, with the same quotas. Redistribution flows more smoothly when the level of total reserves is closer to NOK 30 billion than NOK 35 billion."*

Banks' have indicated that the reserve target of NOK 35 billion and the total quota of NOK 45 billion are appropriate. Several banks report that the quotas are generous enough to accommodate fluctuations in individual banks' liquidity. Predictability with regard to total reserves is also highlighted as a positive factor, and banks seem to have confidence that Norges Bank will keep the level of reserves within the target interval of NOK 30 billion to NOK 40 billion kroner. Norges Bank publishes a forecast for banks' reserves twice a week. This forecast provides an indication of when market operations will be conducted.

With regard to the target of NOK 35 billion, several banks are in favour of a lower target. Some banks report that the market functions more efficiently when total liquidity is below NOK 35 billion, or when the difference between the reserves and

the total quota is greater. This particularly applies to banks with reserves in excess of the quota that can more easily deposit surplus reserves with other banks when total liquidity is relatively low and many banks have deposits below the quota level.

Several banks expect that Norges Bank will eventually reduce *both* the target and the total quota.[13] And most banks do not expect a change in this direction to be a problem. For a bank that adapts to the system by maintaining negative reserves through the day and borrowing reserves overnight, a reduction in the total quota may not have a substantial impact. This is because the bank seldom fills its quota and holds close to zero reserves overnight.

Some banks, however, do not want the quotas to be reduced. For a bank that holds reserves through the day in excess of its quota, a lower quota means that it will have to offer more reserves to other banks before the banking system closes. This can involve considerable costs, not only in the form of a lower marginal deposit rate on the reserves, but also in the form of increased use of resources, as the bank has a large surplus of reserves that must be deposited with a number of other banks.

Total liquidity has been lower than NOK 25 billion on several occasions (18 days in the period 3 October 2011 to 30 June 2014) without pushing up overnight rates. Banks report that the occasions when levels of reserves were very low did not present a problem and were hardly noticeable. This is supported by the low number of D-loans drawn on these dates; there were only three cases, involving loans of NOK 15 million or less. On days when the level of the reserves has been considerably lower than the target, Norges Bank has offered F-loans to banks, but received few or no bids in the auctions. This is related to the distribution of the reserves among banks. When the reserves are evenly distributed so that no bank is in a negative position vis-à-vis Norges Bank, banks' incentive to borrow reserves is weak. As a result, Norges Bank sometimes receives fewer bids than necessary to maintain total liquidity close to the target of NOK 35 billion. A bank's options to bid at F-loan auctions can also be limited by the size of the bank's asset pool deposited as collateral at Norges Bank, although this does not seem to explain the low demand at some F-loan auctions. Norges Bank has also observed that banks to a greater extent than previously need fewer reserves even when the reserves are not evenly distributed. This may indicate that banks are also able to redistribute reserves when total liquidity is lower than the current target.

Total liquidity has on some days been higher than the upper bound of the target interval of NOK 40 billion. In some cases, Norges Bank has held F-deposit auctions on or before these days, but banks' total bids have been lower than the amount Norges Bank wanted to drain from the system. As long as banks have received one or more offers to deposit reserves as F-deposits, Norges Bank has not necessarily offered banks new F-deposits on the following days, even if total reserves have been above the target interval. This is a conscious choice on the part of Norges Bank, primarily to avoid a situation where a lack of bids for F-deposits with long maturities automatically triggers a chance to use F-deposits with shorter maturities instead. In such a situation, banks might only bid for the shortest F-deposits and Norges Bank would thereby assume a greater share of the market's function.

[13] This may be related to signals from Norges Bank when the quota-based system was introduced indicating that the objective of the change was to stop reserve growth.

On other occasions, deviations from the target interval have occurred due to forecasting errors by Norges Bank. In the case of minor errors, Norges Bank has permitted the level of the reserves to fluctuate slightly outside the target interval without offering a market operation. Banks have handled this very well by redistributing reserves. The overnight rate has not been affected to any appreciable extent. In the event of a major error, with total reserves pushed well beyond the target interval, Norges Bank can offer an extraordinary or "fine-tuning" F-auction. This operation is conducted in the same way as an ordinary F-auction, but is held close to the banking system's closing time. Since the quota-based system was introduced, this has only occurred on one occasion. In January 2014, a fine-tuning F-deposit auction was held after a large government entity unexpectedly made a NOK 12 billion payment one business day earlier than had been reported to Norges Bank. This resulted in an increase in the level of total reserves to about NOK 47 billion after the ordinary F-deposit auction and the last transactions had been settled. The fine-tuning auction pulled the reserves down to NOK 37.4 billion. According to the banks, the operation proceeded uneventfully and the solution using fine-tuning F-auctions appears to be effective based on this incident.

## 4. Distribution of quotas among banks

The distribution of quotas is calculated twice a year based on updated figures for banks' total assets. As from 1 October 2014, banks in group 1 are allocated a quota of NOK 4 900 million, while the quota for banks in group 2 is NOK 590 million and for group 3 NOK 59 million (see Table 1).[14] The settlement banks DNB and Sparebank 1 SMN receive a supplementary quota for their settlement activities.[15]

*Table 1. Banks' quotas as from 1 October 2014. In thousands of NOK*

| | Sum TA | Share TA | Sum quota per group | Number banks | Quota per bank |
|---|---|---|---|---|---|
| Group 1 | 2 831 154 616 | 65.9 % | 29 668 358 | 6 | 4 900 000 |
| Group 2 | 843 732 054 | 19.6 % | 8 841 673 | 15 | 590 000 |
| Group 3 | 619 316 582 | 14.4 % | 6 489 969 | 110 | 59 000 |
| Sum | 4 294 203 252 | 100 % | 45 000 000 | 131 | |

TA: Total assets

Banks have stated the following about the distribution of quotas:

*"Objectively speaking, we are satisfied with today's «parameters»."*

*"The distribution of quotas should be adjusted within each of the three groups to increase the differences within each group. The differences between the largest and the smallest bank are very large in all the groups."*

[14] For more details on the distribution of the total quota among banks and how the quotas are calculated, see «Quotas in the system for management of bank reserves», *Circular* 7/1 September 2014.
[15] As from 1 October 2014, DNB and SMN receive a supplementary quota of NOK 1300 million and NOK 650 million respectively for their settlement activities.

*"In our view, the difference in the quotas between group 1 and group 2 is too great."*

*"Today's quotas hamper large regional banks. Some customers make deposits that are often larger than the total allocated quota. As a result, the banks' liquidity departments have to conduct market operations for normal customer withdrawals and deposits. This creates a vulnerable situation when it occurs at quarter-ends or late in the business day. Quotas should be distributed according to total assets – it is possible to «cap» large banks, and/or increase the quota and give more to the regional banks."*

Even though banks in general would prefer larger quotas, some of the banks regard the current distribution of quotas as satisfactory. Most banks say that staying within their quota is not a problem. However, several banks emphasise that the quotas are not distributed fairly, pointing to two issues in particular.

Some consider quotas to be tightest for the largest banks[16] in each group, as both large and small banks in the same group are allocated the same quota. Banks point out that the quota for some group 2 banks is too small compared to some group 1 banks (primarily based on banks' relative size) and that this gives a competitive advantage to group 1 banks. In addition, some of today's group 2 banks hold the view that the quota they are allocated is so small that they are reluctant to take on large exposures in fear of large deposits being wiped out at short notice. This is of particular concern in connection with quarter-ends (see Section 7). In their view, such a situation impedes competition for large exposures. Some banks also hold the view that if the quotas for group 2 banks were to be reduced from today's level, their activity in the overnight market would be curtailed.

Due to the design of the system, combined with market behaviour, banks want their individual quota to be as large as possible. However, Norges Bank had to decide on the distribution of quotas based on the system as a whole. The reason for today's quota distribution is related to one of the objectives of the quota system, which is to stimulate activity in the money market. Thus, the criteria for the distribution of quotas were decided based on banks' capacity to redistribute reserves.[17] In the quota-based system, the incentive to lend is greater for a bank with reserves in excess of the quota than the incentive to borrow for a bank that has room on its quota but is not in a negative position vis-à-vis Norges Bank. In introducing a new system, Norges Bank therefore considered it important that some banks were allocated a quota large enough to enable them to borrow reserves. Market makers in the money market were considered best suited to this task and thus make up group 1, which has been allocated the largest quota.

Calculating the quota based exclusively on each bank's total assets was considered. There is no clear relationship between the size of a bank (measured by total assets), turnover in NBO[18] and the need for deposits with Norges Bank. Although group 1 banks, which were the largest in terms of total assets, had considerably larger

[16] Largest banks refers here to the banks with highest total assets.

[17] For more details on the basis for the quota distribution, see «The new system for managing bank reserves: background», Section 5, www.norges-bank.no (under the top menu Liquidity and Markets /The liquidity management system).

[18] NBO stands for «Norges Banks oppgjørssystem» (Norges Bank's settlement system).

deposits with Norges Bank than the smaller banks in group 2 and the small banks in group 3, Norges Bank did not find any clear relationship between the size of a bank and its deposits in Norges Bank within group 1. Thus, the quotas are not calculated based on individual banks' total assets, but on the total assets of the *group*. As a result, there will be differences between groups and there will be a difference between the smallest and the largest bank in each group.

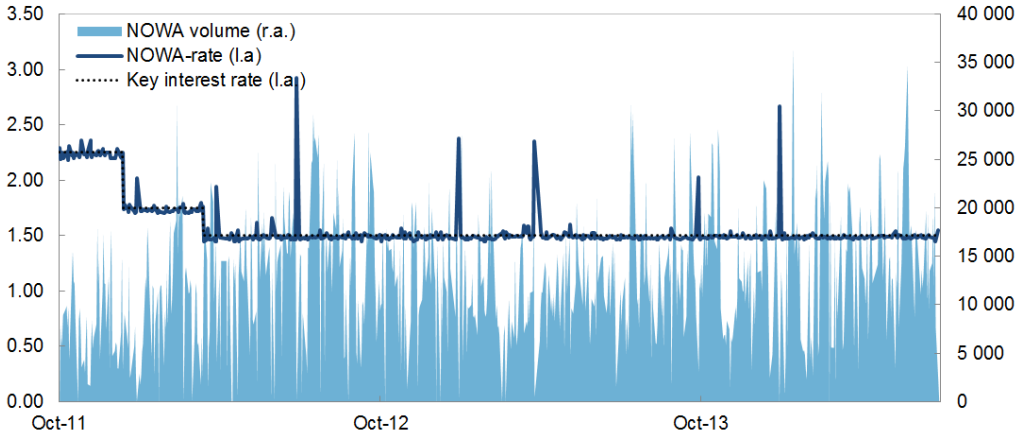
With regard to some banks' fear of taking on large exposures, Norges Bank holds the view that the quotas should not be a problem given a functioning interbank market. As mentioned earlier, the target for total reserves is currently NOK 35 billion. There should therefore be enough reserves in the system to cover negative positions in the interbank market. If some banks cannot cover negative positions, this will be because the interbank market is not functioning as it should, not that the quotas are too small. Difficulties borrowing reserves around quarter-ends are, in Norges Bank's view, related to how the market functions on quarter-end days (see Section 7), not to the liquidity system per se.

## 5. NOWA and banks' overnight trading of reserves

In connection with the introduction of the quota-based system, Norges Bank, in collaboration with Finance Norway, began collecting and recording rates on banks' trading of reserves in the overnight market, which have since been published as the Norwegian Overnight Weighted Average (NOWA) rate.[19] NOWA is a weighted average of the interest rates on traded unsecured overnight interbank lending in NOK. This is the first money market rate in Norway based on actual trades. The NOWA rate has on average been half a basis point lower than the key policy rate since the introduction of the system, while average turnover volume has been NOK 12.8 billion (see Chart 4).[20]

*Chart 4: The NOWA rate and turnover volume. As a percentage and in millions of NOK. 3 October 2011 – 30 June 2014*

[19] NOWA is calculated and published by Norges Bank on behalf of Finance Norway.
[20] If the NOWA rate at quarter-ends when the NOWA has been unusually high is disregarded, the NOWA rate has on average been 1-1.5 basis points below the key policy rate.




On average, 5 banks submit rates to NOWA every day. At most, 10 of the 11 panel banks have submitted rates on one day. NOWA has been estimated 21 times, four of which have occurred at quarter-ends (in the period to end-2014 Q2), primarily because turnover was limited to fewer than three of the panel banks. [21]

The NOWA rate is very stable, remaining at levels around the key policy rate except on some days at quarter and year-ends. At quarter and year-ends, banks can be more reluctant to lend reserves to each other and therefore demand a higher price for loans (see Section 7). This can also lead to a fall in turnover volume. The effect of quarter- and year-ends on the overnight rate is not solely a Norwegian phenomenon. In most countries, the shortest money market rates increase and bank trading of reserves falls on days at quarter- and year-ends.

Banks have expressed the following about NOWA and overnight trading of reserves:

*"We note that the overnight rate is now closer to the key policy rate than before the introduction of the quota-based system. In our opinion, the quota-based system has had an impact on the O/N rate."*

*"NOWA is not a borrowing rate, but a deposit rate."*

*"NOWA reflects an actual cost of borrowing overnight, including on quarter-end days."*

*"The overnight rate has become more stable after the introduction of the quota-based system. The price of borrowing/depositing reserves overnight has remained steady at around 3 to 5 basis points below the key policy rate since the system was introduced."*

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21 There are a total of 11 banks on the NOWA panel: DNB, Nordea Bank Norge, SEB, Handelsbanken, Danske Bank Norge and Swedbank Norge (group 1 banks) and Sparebanken Vest, Sparebank 1 SMN, SR-bank, Bank 1 Oslo Akershus and Sparebank 1 Nord-Norge (group 2 banks). The panel banks report daily to Norges Bank, submitting the sum of overnight lending and the average lending rate, weighted by the size of the individual loan. Norges Bank calculates and publishes the NOWA rate, and the total volume on which the calculation is based, by 9 am the following business day. In cases where total reported volume is lower than NOK 250 million, or fewer than three banks report lending, the rate is estimated. The estimate is based on the lending rate that the six banks with the largest turnover over the previous trading days would have charged if they had provided overnight loans. When the rate is estimated, volume is not recorded.

*"Trading prices are more appropriate now."*

*"Real negotiation on price is very limited."*

The overnight rate is lower now than before the introduction of the quota-based system. This is because the system affects demand for and supply of reserves in the interbank market. While the sight deposit rate formed a floor for the overnight rate in the previous system, the reserve rate has this role in the quota-based system. Banks with surplus reserves are willing to lend reserves overnight at a rate below the key policy rate to avoid having to deposit reserves at the reserve rate. If banks with surplus reserves dominate the market, NOWA could be lower than the key policy rate. The perception that NOWA is a deposit rate probably reflects the fact that the incentive to lend is greater for a bank with reserves in excess of the quota than the incentive to borrow for a bank with room on its quota.[22]

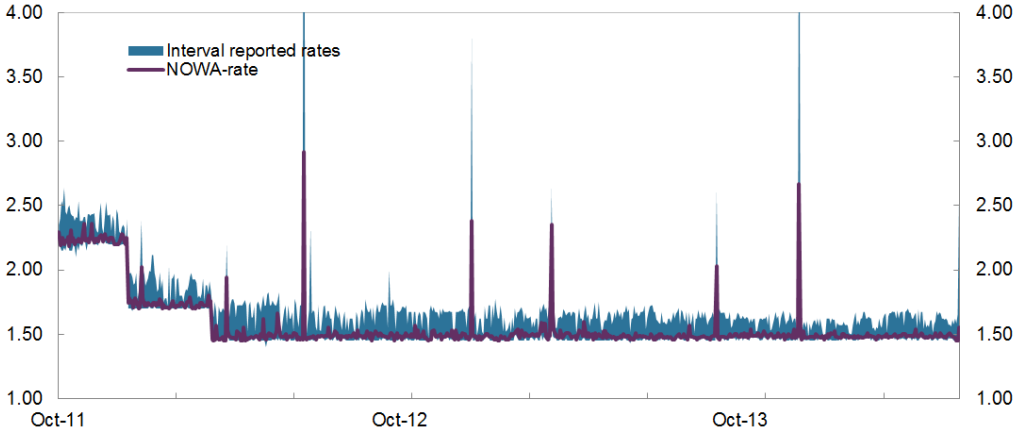
The overnight rate thus depends on how the reserves are distributed among banks. If the distribution is strongly skewed, the rate may be bid up or down to a considerable extent, depending on which bank initiates the trade and the individual banks' negotiating power. On days when trading in reserves is initiated by banks with a need to make a deposit, the rate will be pulled down. This is reflected in the NOWA rate, which has on average been 0.5 basis point below the key policy rate since the quota-based system and publication of the NOWA rate started in October 2011.

Banks' reports of rate stability and limited real price negotiations indicate that market participants are not putting unreasonable pressure on each other with regard to price. In Norges Bank's view, the banks try to maintain good relations. They help each other, both out of a general willingness to ease the workings of the market and because they might need to borrow or deposit themselves next time. In this context, banks report that after the change in the liquidity management system they talk to each other more often, have expanded their networks and contact the liquidity desks of more banks than previously (see Section 8.1 for more details).

Nonetheless, there is a relatively wide range between the traded rates reported each day, as shown in Chart 5 below, which shows the interval between the highest and lowest rate submitted to NOWA each day. On average, there is a difference of slightly more than 20 basis points in the participants' prices (rates) for lending. The NOWA rate, which is weighted according to the size of the various loans, is as a rule at the bottom of the interval. This means that volumes traded at the highest rates are relatively small.

[22] Only banks with a negative position vis-à-vis Norges Bank have incentives to borrow as strong as the incentives to lend for banks with surplus reserves. They both have an incentive to avoid the central bank's standing facilities. Banks' with positive deposits lower than the quota, on the other hand, are not penalised for this and have to receive an extra premium from other banks to be willing to either lend or borrow.

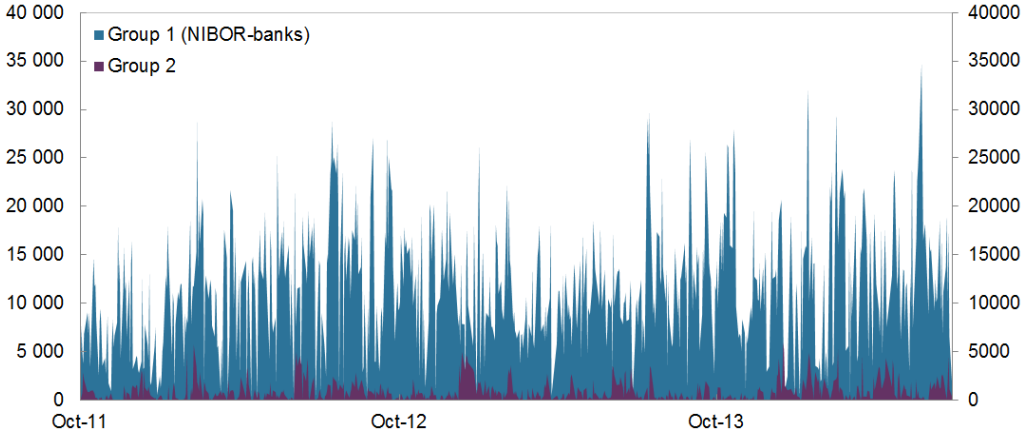
*Chart 5: The NOWA rate and the interval between the highest and lowest reported rates. Percent. 3 October 2011 to 30 June 2014*




Some banks use the NOWA rate as a reference rate in pricing borrowing from and lending to their customers and in other types of contracts and products. However, banks state that it can be difficult to use the NOWA rate when the market is not functioning efficiently at quarter-ends when NOWA estimates are very high. Some banks indicate that the quarter-end issue also makes it difficult to establish a Norwegian OIS market based on NOWA.

Average daily turnover volume for NOWA has been NOK 12.8 billion. The highest turnover volume recorded on one day is NOK 36.2 billion. On about a third of the days, turnover has been higher than NOK 15 billion. Reserves are traded overnight primarily by the largest banks (the banks with the largest quota), which is also reflected in turnover statistics for NOWA. Chart 6 shows total turnover by panel bank in groups 1 and 2 in the liquidity management system. Group 1 banks account for 93 percent of total NOWA lending.[23]

*Chart 6: NOWA turnover volume by panel bank in groups 1 and 2 in the liquidity management system. Percent. 3 October 2011 to 30 June 2014*




[23] Only 5 of the 15 banks in group 2 in the liquidity management system are NOWA banks. Overnight reserves lending by the other 10 banks in group 2 is not included in the calculation of the NOWA rate.

Banks also note that:

*"The new quota-based system has led to an improvement in the distribution of reserves", "the distribution across banks has improved considerably", "the most positive aspect [...] is the improvement in reserve distribution ".*

Banks also report that if they need to borrow overnight, i.e. that they are in a negative position in deposits vis-à-vis Norges Bank, *"covering the shortfall in the market is no problem"*. This statement indicates that banks have confidence that the system redistributes available reserves.

One bank suggests that it would be an advantage for the money market if some interbank trading were conducted at maturities other than overnight. *"Although interbank liquidity distribution functions efficiently, it could be an advantage if a larger share of distribution took place before positions reach the O/N market"*.

## 6. Norges Bank's operations

Most banks report that they are generally satisfied with the arrangements for and conduct of Norges Bank's market operations. Even though maturities for F-loans and F-deposits follow from the date of the next monetary policy meeting and fluctuations in structural liquidity, there are also periods when Norges Bank can adjust these maturities based on other considerations. Periods of evenly high or low structural liquidity in particular offer flexibility in the choice of maturity. Most banks hold the view that F-loan maturities in these cases should be as long as possible[24], while F-deposit maturities should not exceed 14 days. The reason for this, according to the banks, is that long F-loans provide greater security for their own future liquidity situation and thereby greater flexibility for their own liquidity management. In order to retain this flexibility, banks do not wish to tie up reserves in long F-deposits.

Banks have made the following comments concerning Norges Bank's operations:

*"A contribution to this (distribution before positions reach the overnight market) would be if Norges Bank's F-auctions were conducted the day before settlement day so that the result of these auctions could also be taken into account in T/N trading. Norges Bank would still be able to conduct fine-tuning auctions with same-day settlement, although this should only take place in exceptional cases. If today's practice of same-day settlement is retained, the auction could be held at 3.30 pm (15 minutes later than today)."*

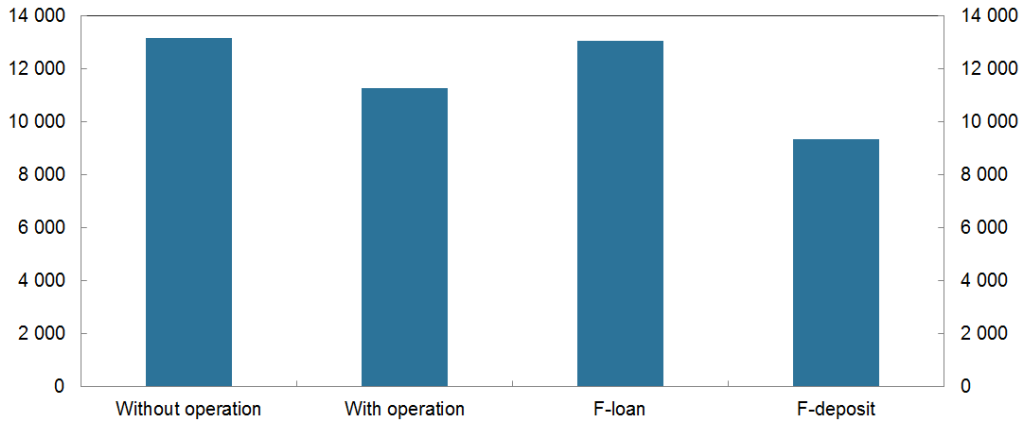
*"There is sufficient information, but in our opinion Norges Bank should avoid the use of long F-loans and F-deposits due to their adverse effect on daily liquidity. Norges Bank should replace long F-loans and F-deposits with daily F-loans and F-deposits in the applicable period. We think this will improve and simplify interbank redistribution."*

[24] And thereby only limited by monetary policy meeting dates and structural liquidity.

The auctions through which Norges Bank's market operations are conducted are normally held at 3.15 pm. Both F-loans and F-deposits are settled on the same day as the auction. Some banks would prefer the auction to be held after 3.30 pm as the last settlement between the government and the banking system takes place between 3.30 pm and 3.50 pm. Banks may therefore be somewhat uncertain at 3.15 pm what their liquidity situation will be at the end of the business day. Some banks have also said that they would prefer the auction to be held one day before settlement. They point out that banks would then be more certain about their own liquidity situation the next day and that a greater share of the distribution of reserves could then take place in the T/N market rather than overnight. Some hold the view that this would contribute to stabilising the T/N rate, which can on occasion deviate fairly widely from the key policy rate (see Section 8.7). Alternatively, some banks suggest that Norges Bank could publish a plan of its forthcoming market operations.

Norges Bank seeks to accommodate banks' preferences for F-loan and F-deposit maturities, within the limits of appropriate liquidity management. In general, at times of low structural liquidity, long F-loans form the basis, supplemented by shorter F-loans if necessary. At times of high structural liquidity, liquidity is drained through F-deposits with up to 14 days' maturity, supplemented by shorter F-deposits. Within these "guidelines", Norges Bank seeks to keep the number of operations as low as possible, both to limit the operational workload for all the involved parties and because turnover in the overnight market seems to be lower on days when Norges Bank conducts market operations, particularly on F-deposit auction days (see Chart 7).

*Chart 7: Average NOWA turnover on days with and without market operations and by F-loans and F-deposits. In millions of NOK.*




Since the quota-based system was introduced, Norges Bank has moved the time of the auctions from 3 pm to 3.15 pm, partly to give banks more control of their liquidity position at the time of the auction. If the time of the auction were to be moved further forward, banks might have a weaker incentive to keep their liquidity flows under control. Apart from this, operational risk and vulnerability to technical problems increase the closer to NBO closing time the auction is held. Norges Bank's experience and assessments indicate that moving the time of auction even further forward is not appropriate at the present time.

Large daily fluctuations in structural liquidity make it difficult to commit to a plan for forthcoming market operations, as suggested by some banks. It will sometimes be necessary to deviate from the plan, which thereby becomes misleading, creating

uncertainty among banks. The final decision to conduct a market operation often has to be made on the same day the operation is conducted. In Norges Bank's view, the liquidity forecasts published on the central bank website every Monday and Thursday provide a reasonably clear indication of when market operations will be conducted. This has also been confirmed by a number of banks.

Furthermore, holding auctions one day before settlement could increase the risk that the liquidity situation changes in the meantime and that Norges Bank has to hold fine-tuning operations to keep total liquidity close to the target. A higher number of fine-tuning operations will increase both uncertainty and the operational workload for all the involved parties and should therefore be avoided.

## 7. Quarter- and year-ends and compliance with capital and liquidity requirements

Many banks note that the redistribution of reserves in the overnight market can be challenging at quarter- and year-ends:

*"The bank tries to adjust reserves at quarter- and year-ends to keep within the quota and avoid the need for short-term borrowing. This is challenging at year-ends in particular as a number of the bank's customers make adjustments that can entail large aggregated transactions. Norges Bank could prevent the liquidity squeeze around quarter- and year-ends by offering both F-deposits and F-loans at quarter- and year-ends irrespective of the target for the level of total reserves."*

*"Our bank has no self-imposed requirements to refrain from lending to other banks at quarter-ends and is therefore willing to lend if the liquidity situation permits."*

*"Since the overnight market functions less efficiently at quarter-, half year- and year-ends, we have taken action: we build up liquidity in advance so that we do not need to borrow overnight. As a result, earnings are lower than if the market had functioned as it does at "normal" month-ends. Since the market functions less efficiently due to regulatory factors such as capital adequacy, the LCR and the deposit insurance fee, and line limitations in some banks, Norges Bank should offer short-term F-loans and F-deposits at quarter, half year- and year-ends."*

*"[We] try to trade surplus liquidity and cover short positions in the swap market around these dates. In our view, it is important that fine-tuning is aimed towards the targeted level of total reserves at quarter- and year-ends. Since the cost of having to draw on D-loans or make deposits at the reserve rate can be considerable, it is important that Norges Bank's forecasts are accurate so as to provide optimal conditions for banks' liquidity management. In other words, it is in our view important that the level of reserves is not too high or too low."*

*"We do not see a need for Norges Bank to make specific adjustments at quarter- and year-ends."*

At quarter- and year-ends, a number of banks with surplus reserves choose to hold reserves in excess of the quota (reserve deposits) with Norges Bank rather than lend to other banks. This can create problems for banks in a negative position vis-à-vis Norges Bank and that therefore need to borrow reserves. According to the banks,

there are three main factors affecting their adjustments at quarter- and year-ends that can explain this behaviour:

I. Capital and buffer requirements under CRD IV (from summer 2013) include a minimum capital requirement for banks of 8 percent of risk-weighted assets. A claim on another bank increases a bank's risk-weighted assets, while a claim on the central bank does not.[25,26] If a bank deposits excess reserves with the central bank rather than lending them to another bank, the bank will have to hold less regulatory capital to maintain a given capital adequacy ratio. As regulatory capital is a relatively costly source of financing, overnight lending in the interbank market will in principle involve extra costs for the bank.

II. The purpose of the Liquidity Coverage Ratio (LCR) is to ensure that banks have an adequate liquidity buffer to meet their expected net cash outflows over a 30-day period of considerable stress in the markets. A bank achieves a higher LCR by depositing reserves in its sight deposit/reserves account with Norges Bank rather than lending these reserves to another bank.[27]

III. Banks pay a fee to the Norwegian Banks' Guarantee Fund, based on factors such as the bank's total guaranteed deposits and risk-weighted assets.[28] The argument in favour of holding deposits at the central bank rather than lending to other banks is therefore analogous to the argument under subsection I.

The requirements in subsections I and II must be met at all times. Meeting these requirements will nonetheless probably affect banks to a greater extent at quarter-ends than otherwise, as this involves important performance measures in banks' accounts reporting. The gain to be made from being able to present good indicators, such as the LCR and capital adequacy ratio, to owners and potential investors is probably considerable. Some banks state that they therefore have a clear strategy to refrain from lending reserves to other banks at quarter-ends. One result of this is that banks' total reserve deposits may increase on these dates.

The fact that some banks choose to hold (at times considerable) reserve deposits with Norges Bank rather than offer these reserves in the overnight market, results according to some banks in increased risk of having to draw on Norges Bank's D-loan facility. Banks report that D-loans not only involve considerable interest costs, but

[25] The central bank has a risk weight of 0 percent, while other banks have risk weights from 20 percent and upwards.
[26] As regards repo agreements included in a bank's portfolio, risk weights are required to be determined according to the risk category of the issuer of the underlying security or the debtor of the underlying asset and not according to the counterparty in the transaction, cf. Section 6-1 (3) of the capital requirements regulation. Thus, if the security in a repo agreement is a government bond, the risk weight will be 0 percent.
[27] Loans to other banks are not counted as high-quality liquid assets in the LCR (nor are loans with overnight maturity).
[28] Source: Guarantee Schemes Act (1996) Section 2-7

that using this facility sends negative signals to investors and other market participants. A bank that experiences large outflows of reserves towards the end of a quarter-end day (for example because all or some of a large customer's deposits are moved to another bank), may end up in a negative position vis-à-vis Norges Bank. In order to avoid drawing on the D-loan facility by an amount equivalent to the negative position, the bank has to borrow reserves from another bank to cover its position before the banking day comes to a close.[29] On normal days, these are the adjustments banks make when they trade reserves with each other. If the supply side of the market is reduced on the last day of the quarter, it will be more difficult to borrow reserves on these dates.

One result of banks' adjustment at quarter-ends is that turnover in the overnight market can be lower, and short-term interest rates higher, than normal (see Section 5). Banks clearly state that these effects are the result of the factors described above, and not of liquidity management and the quota-based system itself.

Many banks express the view that Norges Bank should remedy the situation at quarter-ends by offering banks both F-loans and F-deposits. In practice, they ask that Norges Bank offer banks F-loans and F-deposits on the last day of the quarter, with full allotment and with maturity on the next banking day. Banks could thus deposit/borrow as much liquidity at the central bank as they wish, and as a result would have no need to draw on the D-loan facility or to hold deposits at the reserve rate. Other banks, however, state that currency swap agreements can easily be used to adjust liquidity at quarter-ends and it is therefore unnecessary for Norges Bank to implement special measures.

Deviation between the overnight rate and the key policy rate at quarter- and year-ends is, however, not an effect that is unique to the Norwegian system. The same effect is evident in for example Sweden, Denmark and the euro area. The provision of F-loans and F-deposits at quarter-ends, as suggested by some banks, would not necessarily resolve this problem. Norges Bank would have taken over much of the activity in the interbank market that day and the NOWA rate would probably, under the current rules, have had to be estimated.

Thus, such a strategy would not necessarily contribute to keeping NOWA closer to the key policy rate than it does today. NOWA has been estimated in four of a total 11 quarter-ends since the quota-based system was implemented. The seven other cases show that the system is capable of resolving challenges related to quarter-ends without special measures from Norges Bank.

Some banks claim that the quota-based system contributes to amplifying the problems, for example by making it more difficult to comply with the LCR requirement. More specifically, it has become more costly for banks to comply with the LCR requirement by holding large quantities of central bank reserves.

*"Under the quota-based system, it will be costly for banks to hold deposits at the reserve rate as Level 1 assets (to comply with the LCR). Thus, banks must seek other Level 1 assets as an alternative to deposits with the central bank. We only hold deposits at the reserve rate in exceptional cases."*

[29] Norges Bank' settlement system (NBO) normally closes at 4.35 pm.

*"Under the quota-based system for deposits with Norges Bank, it will be too costly for banks to hold large quantities of cash as Level 1 (to comply with the LCR). Banks must seek other Level 1 assets as an alternative. Thus, the quota-based system has a limiting effect on banks' LCRs."*

*"Norges Bank's market operations related to the management of banks' reserves have no effect on banks' adjustment to the LCR requirement, except for F-deposits, which we define as central bank reserves."*

The purpose of capital adequacy and liquidity requirements is to increase banks' resilience. Banks that do not meet the requirements must make the necessary adjustments to their balance sheets. The liquidity coverage requirement (LCR) can be met by holding a sufficient quantity of liquid assets and by obtaining longer-term funding. Such an adjustment is intended to enhance financial stability. One of the objections to the quota-based system introduced in October 2011 was that it would be more difficult for banks to comply with the LCR.[30] The reason for this is that central bank reserves count as Level 1 assets (most liquid assets), and under the previous floor system banks could hold unlimited quantities of reserves with the central bank at the key policy rate. In addition, some of the securities eligible as collateral for F-loans at Norges Bank do not count as Level 1 assets in the LCR. This means that banks could have used Norges Bank's market operations to transform illiquid securities into central bank reserves and thus comply with the LCR at lower cost. Against this background, several banks held the view that the floor system should be continued. Enabling banks to meet regulatory requirements at the lowest possible cost is not a concern Norges Bank takes into account in its liquidity management. [31] It could also be problematic if the central bank, through its liquidity management, undermines the aim of the regulatory requirements. This suggests that F-loans and F-deposits with full allotment at quarter-ends should not be provided as this would enable banks to meet the liquidity requirement without making real adjustments to their balance sheets. The reason is that deposits with the central bank count as liquid assets under the LCR requirement. Loans from the central bank, on the other hand, do not increase the required level of liquid assets, even if the loan has a maturity of less than 30 days.

## 8. Other comments

8.1. Large networks, more contact between banks and larger credit lines:
*"The positive aspect of the new regime is that it provides incentives to redistribute reserves, which also strengthens contact between banks."*

*"Activity has picked up in the interbank market and for us both the number of transactions and the number of counterparties have increased."*

[30] As shown in some of the responses to Norges Bank's consultation about the new quota-based system, cf. http://www.norges-bank.no/en/Liquidity-and-markets/The-liquidity-management-system/
This was also emphasised by banks and the financial industry at meetings with Norges Bank prior to the introduction of the system.
[31] This also applies to the fee paid to the Norwegian Banks' Guarantee Fund. The fund was established to guarantee fund members' deposit commitments through the deposit guarantee scheme, for which members pay a fee.

*"We have also improved our contact with other banks."*

Many banks emphasise improved contact with other banks as one of the advantages of the new system. Increased trading activity contributes to more frequent contact between banks. A number of banks report that their credit lines with other banks have been increased in number and expanded since the system was introduced and that they have experienced more cooperation across the banking sector. Norges Bank holds a very positive view of the improved contact and cooperation among banks in the new liquidity management system, which may enhance the efficiency of the money market.

### 8.2. Norges Bank's forecasts

*"We are entirely satisfied with the information on liquidity management given by NB and the information is considered adequate to form a picture of the level of total reserves."*

*"In our view, the forecasts are very useful tools."*

*"A plan of forthcoming F-auctions could stabilise T/N rates (not only indicatively in relation to the forecast)."*

Banks seem to be generally satisfied with Norges Bank's forecasts of developments in structural liquidity, which are published on Norges Bank's website twice a week. The new presentation of the forecast and the new tables published when the system was introduced have been well received. Banks report that it is relatively easy to forecast when Norges Bank will conduct market operations.

Several banks also make their own forecasts for developments in structural liquidity, and only use Norges Bank's forecasts to gain an overview of developments ahead and as a cross-check. Banks also report that they use Norges Bank's forecast to explain how the system functions to participants less familiar with it, for example foreign banks.

### 8.3. Increased resource expenditure in banks

*"The most negative aspect is the higher costs [....] and the risk of reserve deposits."*

Several banks stated that the quota-based system had imposed extra costs in the form of increased time and resource expenditure without significant gain. In their view, a larger quota would have reduced costs. However, one of the main reasons for introducing the quota-base system was to stimulate activity in the interbank market. A well-functioning interbank market is desirable from the point of view of Norges Bank, in the interests of both the implementation of monetary policy and stability in the financial system. This involves an increase in the use of resources on liquidity management.

### 8.4. Liquidity risk

One bank states that the introduction of the quota-based system has entailed an increase in liquidity risk in NOK. This is because the bank holds lower sight deposits with the central bank than prior to the system change, as it is costly to hold deposits in excess of the quota under the new system. A reduction in bank deposits with the central bank was an intended consequence of Norges Bank's decision to change the system. If there was no cost attached to holding a large liquidity buffer with the

central bank, banks would not have had an incentive to redistribute reserves in the interbank market and the objective of increasing activity in this market would not have been achieved.

8.5. The government's account with Norges Bank

One bank notes that it would have been preferable to move the government's account out of the banking system to avoid fluctuations in structural liquidity.

Fluctuations in structural liquidity would have been considerably smaller if the government's account was moved out of the banking system. This could also facilitate a considerable reduction in total quotas and the reserve target. A corridor system for reserve management, as used in Sweden, could also have worked in this case.

8.6. Repo market welcome

*"The repo market for securities has become more important in controlling the variation in banks' liquidity."*

*"[Name of bank] would welcome an increase in the use of repos in Norges Bank's liquidity management. This would help to professionalise the Norwegian money market and eventually provide a basis for publishing repo yield curves in NOK. Such repos would initially involve government securities, but could gradually be expanded to include for example covered bonds."*

Several banks are positive to the idea of establishing a repo market in Norway and suggest that Norges Bank should be involved in establishing this market by using it in liquidity management. In their view, these repos do not need to have standard maturities, which could be adjusted to fluctuations in structural liquidity. Others report that F-loans and F-deposits function efficiently and that there is no reason for Norges Bank to use repos. Several banks are also positive to contributing to the establishment of a more effective repo market in Norway.

8.7. The short-term forward market and the tomorrow-next (T/N) rate[32]

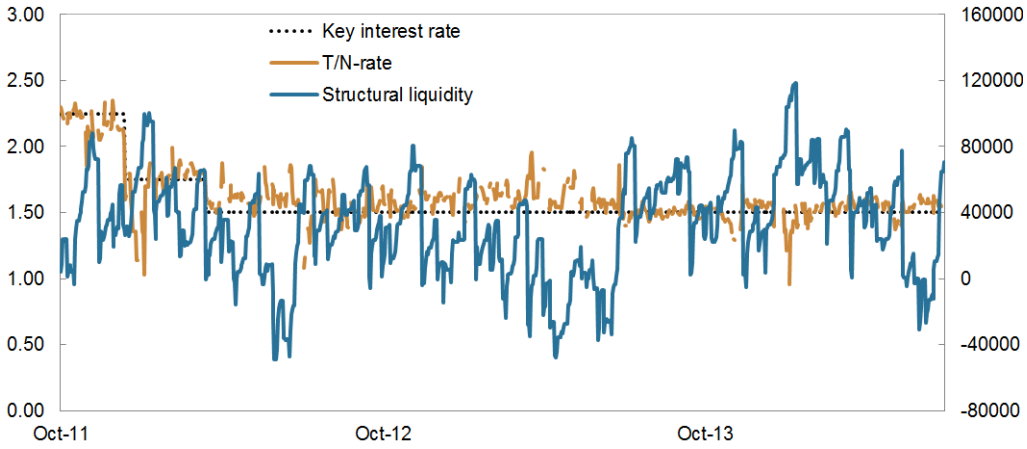
*"The level of O/N and T/N rates formed via the forward market might be higher since there is less liquidity in the market. This means that the implicit O/N rate is closer to the key policy rate. Fewer market participants take speculative positions. This could also affect volatility."*

*"The magnitude and direction of changes in structural liquidity could influence redistribution, but we think T/N rates could be pushed up to a greater extent when structural liquidity is low."*

Some banks hold the view that the T/N rate has become more stable since the quota-based system was introduced. Others feel that the premium in the T/N rate falls to a very low level in periods of high structural liquidity because the system makes it difficult for Norwegian banks to accept liquidity in the T/N market (see Chart 8). Most banks seem to agree that the level of structural liquidity affects the T/N rate.

[32] The T/N rate in NOK is not quoted and is thus not an observable rate, but can be estimated based on the forward points between USD and NOK and the T/N rate in USD.

*Chart 8: The T/N rate and structural liquidity, as a percentage and in millions of NOK. 3 October 2011 – 30 June 2014*




Some banks feel that volatility in the T/N rate is primarily driven by foreign banks' need to borrow or deposit in NOK (banks without access to Norges Bank's market operations). Different prices in the short-term money market for market participants with and without access to the central bank's facilities can be observed in a number of other countries. The connection between structural liquidity and the T/N rate need not, according to these banks, be related to foreign banks' misunderstanding of the liquidity management system. Some banks maintain that foreign banks choose to accept the offered rate in the interests of caution as they have no alternative in Norges Bank. Some banks also point out that internal guidelines require foreign banks to cover their positions before entering the overnight market and that this affects prices in the T/N market.

### 8.8. NIBOR and other money market rates

*"We also note that the difference between three-month NIBOR and the key policy rate is lower than when the quota-based system was introduced … … However, we have no basis for concluding that there is a causal relationship between the introduction of the quota-based system and the reduction in the difference between the key policy rate and three-month NIBOR."*

*"In our experience, the prices we achieve in the forward market are affected by the level of structural liquidity."*

*"The system has not affected the formation of money market rates to any great extent."*

Some banks hold the view that the spread between three-month NIBOR and the key policy rate has narrowed since the introduction of the quota-based system. They are less sure about whether this is actually due to the new system or other factors. Others report that they have not observed any effect on NIBOR rates from the new system and that Norges Bank could offer F-loans with settlement t+1 to reduce premiums. Some maintain that the volatility in the T/N rate caused by changes in structural liquidity affects three-month NIBOR. Some also point out that fluctuations in the Norwegian money market will naturally be wider than in international markets because of the small size of the Norwegian market.

There is broad support for the introduction of the NIBOR rules in 2011, but banks point out that the rules have not led to any change in practical NIBOR quoting. Several banks that are not members of the NIBOR panel today say they are considering becoming NIBOR panel banks, partly to qualify for larger quotas for their sight deposits with Norges Bank. Some banks feel nonetheless that their operations are too small and that the cost of being a NIBOR banks will exceed the gain.

## 9. Conclusion

Norges Bank continuously assesses the functioning of the liquidity management system and whether adjustments are needed. Feedback from banks is useful and plays an important role in this context. Most banks seem to think that the new system functions efficiently. The redistribution of reserves has improved and the overnight rate, NOWA, has generally remained close to the key policy rate.

On the other hand, banks point out that the interbank market does not function efficiently at some quarter-ends and that unexpected fluctuations in reserves on these days are difficult to manage. Some call for measures from Norges Bank to ease the situation. This paper presents the argument that special measures implemented by Norges Bank at quarter-ends could conflict with the objectives of several regulatory requirements. An explanation is also given of why an offer of F-loans and F-deposits at quarter-ends would not necessarily lead to less pronounced deviations between NOWA and the key policy rate.

Another issue raised by banks is the distribution of quotas itself. Norges Bank reviews the size of the total quota, the distribution among banks and the target for total reserves twice a year. The Bank's views will be included in the assessment in the period to the next revision of banks' quotas in April 2015. However, it is important to emphasise that the parameters in the quota-based system are not set to accommodate individual banks. They are set with the ambition of ensuring that the implementation of monetary policy and the Norwegian interbank market function as efficiently as possible.